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Junos<sup>®</sup> OS

# ACX Series Universal Access Router Getting Started Guide

Release  
12.3



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*Junos® OS ACX Series Universal Access Router Getting Started Guide*

Release 12.3

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- Supported Platforms on page xix
- Using the Examples in This Manual on page xix
- Documentation Conventions on page xxi
- Documentation Feedback on page xxiii
- Requesting Technical Support on page xxiii

## Documentation and Release Notes

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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

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

- [ACX Series](#)

## Using the Examples in This Manual

---

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

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

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

## Merging a Full Example

To merge a full example, follow these steps:

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

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

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

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

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

## Merging a Snippet

To merge a snippet, follow these steps:

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

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

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

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

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

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

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

For more information about the **load** command, see the *CLI User Guide*.

## Documentation Conventions

Table 1 on page xxi 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 xxi defines the text and syntax conventions used in this guide.

Table 2: Text and Syntax Conventions

Convention	Description	Examples
<b>Bold text like this</b>	Represents text that you type.	To enter configuration mode, type the <b>configure</b> command:  user@host> <b>configure</b>
Fixed-width text like this	Represents output that appears on the terminal screen.	user@host> <b>show chassis alarms</b>  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"> <li>Introduces or emphasizes important new terms.</li> <li>Identifies book names.</li> <li>Identifies RFC and Internet draft titles.</li> </ul>	<ul style="list-style-type: none"> <li>A policy <i>term</i> is a named structure that defines match conditions and actions.</li> <li><i>Junos OS System Basics Configuration Guide</i></li> <li>RFC 1997, <i>BGP Communities Attribute</i></li> </ul>
<i>Italic text like this</i>	Represents variables (options for which you substitute a value) in commands or configuration statements.	Configure the machine's domain name:  [edit] root@# <b>set system domain-name</b> <i>domain-name</i>
<b>Text like this</b>	Represents names of configuration statements, commands, files, and directories; configuration hierarchy levels; or labels on routing platform components.	<ul style="list-style-type: none"> <li>To configure a stub area, include the <b>stub</b> statement at the [edit protocols ospf area area-id] hierarchy level.</li> <li>The console port is labeled <b>CONSOLE</b>.</li> </ul>
< > (angle brackets)	Enclose optional keywords or variables.	<b>stub &lt;default-metric metric&gt;;</b>
(pipe symbol)	Indicates a choice between the mutually exclusive keywords or variables on either side of the symbol. The set of choices is often enclosed in parentheses for clarity.	<b>broadcast   multicast</b>  <b>(string1   string2   string3)</b>
# (pound sign)	Indicates a comment specified on the same line as the configuration statement to which it applies.	<b>rsvp { # Required for dynamic MPLS only</b>
[ ] (square brackets)	Enclose a variable for which you can substitute one or more values.	<b>community name members [ community-ids ]</b>
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.	
<b>GUI Conventions</b>		
<b>Bold text like this</b>	Represents graphical user interface (GUI) items you click or select.	<ul style="list-style-type: none"> <li>In the Logical Interfaces box, select <b>All Interfaces</b>.</li> <li>To cancel the configuration, click <b>Cancel</b>.</li> </ul>
> (bold right angle bracket)	Separates levels in a hierarchy of menu selections.	In the configuration editor hierarchy, select <b>Protocols&gt;Ospf</b> .

## Documentation Feedback

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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](mailto: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

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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

- [Router Overview on page 3](#)



## CHAPTER 1

# Router Overview

- [ACX Series Universal Access Router Overview on page 3](#)
- [Protocols and Applications Supported by the ACX Routers on page 5](#)
- [ACX1000 and ACX1100 Routers Hardware and CLI Terminology Mapping on page 10](#)
- [ACX2000 and ACX2100 Routers Hardware and CLI Terminology Mapping on page 13](#)
- [Router Hardware Components on page 16](#)

### ACX Series Universal Access Router Overview

---

The ACX Series Universal Access Router is principally designed to provide superior management for rapid provisioning to the access network. The ACX Series routers support rich Gigabit Ethernet and 10-Gigabit Ethernet capabilities for uplink, along with support for legacy interfaces and Gigabit Ethernet interfaces for radio and NodeB connectivity in a compact form factor that is environmentally hardened and passively cooled. Seamless, end-to-end MPLS can be used to address legacy and emerging requirements to provide the foundation for a converged network that utilizes the same mobile backhaul infrastructure for business or residential services.

- [ACX Series Router Architecture on page 3](#)
- [Junos OS on page 4](#)
- [Interfaces on page 4](#)
- [Mobile Backhaul on page 4](#)
- [Junos Space on page 4](#)

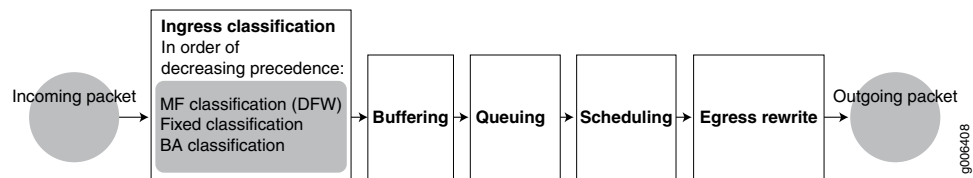
### ACX Series Router Architecture

The ACX Series router is a single-board router with a built-in Routing Engine and one Packet Forwarding Engine that has two “pseudo” Flexible PIC Concentrators (FPC 0 and FPC 1). Because there is no switching fabric, the single Packet Forwarding Engine takes care of both ingress and egress packet forwarding.

- **Routing Engine**—Provides Layer 3 routing services and network management.
- **Packet Forwarding Engine**—Performs Layer 2 and Layer 3 packet switching, route lookups, and packet forwarding.

The general architecture for ACX Series routers is shown in [Figure 1 on page 4](#).

Figure 1: ACX Series Router Packet Forwarding and Data Flow



## Junos OS

The ACX Series router is powered by Junos OS, supporting extensive L2 and L3 features, IP/MPLS with traffic engineering, rich network management, fault management, service monitoring and Operation, Administration, and Maintenance (OAM) capabilities, and an open software development kit (SDK) system that allows providers to customize and integrate operations with their own management systems. For a list of related Junos OS documentation, see <http://www.juniper.net/techpubs/software/junos/>

As part of the mobile backhaul, the ACX Series router at the cell site and the MX Series router at the aggregation layer provide comprehensive end-to-end Ethernet, MPLS, and OAM features with the one Junos OS running on both platforms.

## Interfaces

The ACX Series routers support time-division multiplexing (TDM) T1 and E1 interfaces and Gigabit Ethernet (10GbE, 100GbE, 1000GbE copper, and 1GbE and 10GbE fiber) interfaces to support both the legacy and evolution needs of the mobile network. Support for Power over Ethernet Plus (PoE+) at 65 watts per port mitigates the need for additional electrical cabling for microwaves or other access interfaces.

## Mobile Backhaul

In the mobile backhaul scenario, the ACX Series router is primarily used in the access layer as the cell site router and the MX Series router is used as the edge and aggregation router. As the cell site router, the ACX Series router connects the base station (BS) to the packet network. Several cell site routers can be connected in a ring or hub-and-spoke fashion to the upstream preaggregation and aggregation routers (MX Series routers).

The ACX Series router meets and often exceeds the key requirements for a cell site router. A one-rack unit (U) tall router, the ACX Series router is compliant with the European Telecommunications Standardization Institute (ETSI) 300, as well as environmentally hardened and passively cooled for easy deployment where space and cooling are limited as at the cell site.

Timing and synchronization are key elements in cell site router deployment. To deliver the highest quality of experience, the ACX Series router supports multiple high-precision timing options—for example, Synchronous Ethernet, 1588v2, and Precision Time Protocol (PTP).

## Junos Space

Junos Space is a suite of comprehensive Web-based tools for operational management and administration of Juniper Networks routers, including the ACX Series and MX Series

platforms. With the unified Junos Space network management system, network provisioning and operations can be streamlined. Juniper Networks has extended Junos Space with powerful new features designed to address the demanding requirements of mobile backhaul.

- Related Documentation**
- [ACX2000 and ACX2100 Routers Hardware and CLI Terminology Mapping on page 13](#)
  - [Understanding Interfaces on ACX Series Universal Access Routers on page 100](#)
  - [Protocols and Applications Supported by the ACX Routers on page 5](#)

## Protocols and Applications Supported by the ACX Routers

Table 3 on page 5 contains the first Junos OS Release support for protocols and applications on ACX1000, ACX1100, ACX2000, and ACX2100 routers. A dash indicates that the protocol or application is not supported.



**NOTE:** The [edit logical-systems *logical-system-name*] hierarchy level is not supported on ACX Series routers.

**Table 3: Protocols and Applications Supported by ACX1000, ACX1100, ACX2000, and ACX2100 Routers**

Protocol or Application	ACX1000	ACX1100	ACX2000	ACX2100
First Supported Junos OS Release				
<b>Interface and Encapsulation Types</b>				
Ethernet interfaces—1-/100/1000, 1G, 10G	12.2	12.2R2	12.2	12.2R2
ATM Interfaces (including IMA interfaces)	12.2	12.2R2	12.2	12.2R2
E1 Interfaces	12.2	12.2R2	12.2	12.2R2
T1 Interfaces	12.2	12.2R2	12.2	12.2R2
Circuit Emulation interfaces	—	—	—	—
<b>Layer 3</b>				
Static routes	12.2	12.2R2	12.2	12.2R2
OSPF	12.2	12.2R2	12.2	12.2R2
IS-IS	12.2	12.2R2	12.2	12.2R2
BGP	12.2	12.2R2	12.2	12.2R2
Internet Control Message Protocol (ICMP)	12.2	12.2R2	12.2	12.2R2

**Table 3: Protocols and Applications Supported by ACX1000, ACX1100, ACX2000, and ACX2100 Routers** (*continued*)

Protocol or Application	ACX1000	ACX1100	ACX2000	ACX2100
Address Resolution Protocol (ARP)	12.2	12.2R2	12.2	12.2R2
Bidirectional Forwarding Detection (BFD) protocol	12.2	12.2R2	12.2	12.2R2
Dynamic Host Configuration Protocol (DHCP)	12.2	12.2R2	12.2	12.2R2
IP Fast Reroute (FRR) (OSPF, ISIS)	12.2	12.2R2	12.2	12.2R2
Maximum transmission unit (MTU) 1518	12.2	12.2R2	12.2	12.2R2
RSVP	12.2	12.2R2	12.2	12.2R2
LDP (Targeted and direct)	12.2	12.2R2	12.2	12.2R2
<b>MPLS, VPLS, VPNs</b>				
Static label-switched path (LSP)	12.2	12.2R2	12.2	12.2R2
FRR	12.2	12.2R2	12.2	12.2R2
Traffic engineering	12.2	12.2R2	12.2	12.2R2
Diffserv traffic engineering	12.2	12.2R2	12.2	12.2R2
E-LINE	12.2	12.2R2	12.2	12.2R2
Pseudowire Emulation Edge to Edge [PWE3 (signaled)]	12.2	12.2R2	12.2	12.2R2
Static Ethernet PWs	12.2	12.2R2	12.2	12.2R2
Layer 2 Circuits	12.2	12.2R2	12.2	12.2R2
IEE802.1ag CC monitoring on active and standby pseudowires	12.2	12.2R2	12.2	12.2R2
Edge protection using static VPWS	12.2	12.2R2	12.2	12.2R2
<b>Ethernet Layer 2</b>				
802.3ah EFM OAM	12.2	12.2R2	12.2	12.2R2
802.1ag CFM	12.2	12.2R2	12.2	12.2R2
IEE802.1ag interface-status Type, Length, and Value (TLV)	12.2	12.2R2	12.2	12.2R2

**Table 3: Protocols and Applications Supported by ACX1000, ACX1100, ACX2000, and ACX2100 Routers (*continued*)**

Protocol or Application	ACX1000	ACX1100	ACX2000	ACX2100
<b>QoS</b>				
"Firewall filters (access control list -ACLs) - family inet" on page 83	12.2	12.2R2	12.2	12.2R2
"Standard Firewall Filter Match Conditions for MPLS Traffic on ACX Series Routers" on page 86	12.2	12.2R2	12.2	12.2R2
Firewall filters - family ccc/any	12.2	12.2R2	12.2	12.2R2
Policing - per logical interface	12.2	12.2R2	12.2	12.2R2
Policing - per physical interface	12.2	12.2R2	12.2	12.2R2
Policing - per family	12.2	12.2R2	12.2	12.2R2
TrTCM (color aware, color blind)	12.2	12.2R2	12.2	12.2R2
SrTCM (color aware, color blind)	12.2	12.2R2	12.2	12.2R2
Host protection	12.2	12.2R2	12.2	12.2R2
8 queues per port	12.2	12.2R2	12.2	12.2R2
Priority queuing	12.2	12.2R2	12.2	12.2R2
Rate control	12.2	12.2R2	12.2	12.2R2
Scheduling with 2 different priorities	12.2	12.2R2	12.2	12.2R2
Low Latency Queue (LLQ)	12.2	12.2R2	12.2	12.2R2
WRED with 2 levels of DP	12.2	12.2R2	12.2	12.2R2
Classification - DSCP	12.2	12.2R2	12.2	12.2R2
Classification - MPLS EXP	12.2	12.2R2	12.2	12.2R2
Classification - IEEE 802.1p	12.2	12.2R2	12.2	12.2R2
Rewrite - DSCP	12.2	12.2R2	12.2	12.2R2
Rewrite MPLS EXP	12.2	12.2R2	12.2	12.2R2
Rewrite 802.1p	12.2	12.2R2	12.2	12.2R2

**Table 3: Protocols and Applications Supported by ACX1000, ACX1100, ACX2000, and ACX2100 Routers (continued)**

Protocol or Application	ACX1000	ACX1100	ACX2000	ACX2100
Rewrite MPLS and DSCP to different values	12.2	12.2R2	12.2	12.2R2
<b>Timing</b>				
Timing–1588-v2, 1588-2008–slave clock	12.2	12.2R2	12.2	12.2R2
SyncE	12.2	12.2R2	12.2	12.2R2
Building-integrated timing supply (BITS)	12.2	12.2R2	12.2	12.2R2
Clock Sync	12.2	12.2R2	12.2	12.2R2
Redundant clock (multiple 1588 masters)	–	–	–	–
<b>OAM, Troubleshooting, Manageability, Lawful Intercept</b>				
Network Time Protocol (NTP)	12.2	12.2R2	12.2	12.2R2
SNMP	12.2	12.2R2	12.2	12.2R2
802.1ag CFM	12.2	12.2R2	12.2	12.2R2
802.3ah EFM	12.2	12.2R2	12.2	12.2R2
Y.1731 Fault and Performance Management	12.2	12.2R2	12.2	12.2R2
MPLS OAM	12.2	12.2R2	12.2	12.2R2
RMON	12.2	12.2R2	12.2	12.2R2
Layer 2 traceroute	12.2	12.2R2	12.2	12.2R2
DNS	12.2	12.2R2	12.2	12.2R2
TFTP for software downloads	12.2	12.2R2	12.2	12.2R2
Port mirroring [Local Port Mirroring]	12.2	12.2R2	12.2	12.2R2
Interface loopback	12.2	12.2R2	12.2	12.2R2
Interface byte and packet stats (full, as implemented in JUNOS)	12.2	12.2R2	12.2	12.2R2
Interface queue stats	12.2	12.2R2	12.2	12.2R2
Drop packet stats	12.2	12.2R2	12.2	12.2R2



**Table 3: Protocols and Applications Supported by ACX1000, ACX1100, ACX2000, and ACX2100 Routers (continued)**

Protocol or Application	ACX1000	ACX1100	ACX2000	ACX2100
Distinguish each 802.1ag connection by vlan-id	12.2	12.2R2	12.2	12.2R2
Interface Passive-monitor-mode	12.2	12.2R2	12.2	12.2R2
Multi-packet mirror	–	–	–	–
<b>Security</b>				
TACACS AAA	12.2	12.2R2	12.2	12.2R2
RADIUS authentication	12.2	12.2R2	12.2	12.2R2
Control plane DOS prevention	12.2	12.2R2	12.2	12.2R2
<b>High Availability</b>				
MPLS FRR	12.2	12.2R2	12.2	12.2R2
BFD	12.2	12.2R2	12.2	12.2R2
<b>ATM Transport</b>				
ATM over PWE3	12.2	12.2R2	12.2	12.2R2
RFC4717 ATM Encapsulation: S6.1 ATM N to one cell mode (required as per standard)	12.2	12.2R2	12.2	12.2R2
RFC4717: S6.3 – ATM AAL5 SDU encap (optional)	12.2	12.2R2	12.2	12.2R2
ATM PWE3 control word	12.2	12.2R2	12.2	12.2R2
ATM PWE3 via dynamic labels	12.2	12.2R2	12.2	12.2R2
ATM VPI/VCI Swapping	12.2	12.2R2	12.2	12.2R2
ATM idle/unassigned cell suppression	12.2	12.2R2	12.2	12.2R2
ATM support for N to 1 PW Promiscuous mode: 1 PW per port and 1 PW per VPI	12.2	12.2R2	12.2	12.2R2
Cell concatenation (1 to 30 cells per packet)	12.2	12.2R2	12.2	12.2R2
Packet/byte counters per VP and VC	12.2	12.2R2	12.2	12.2R2
ATM IMA	12.2	12.2R2	12.2	12.2R2

**Table 3: Protocols and Applications Supported by ACX1000, ACX1100, ACX2000, and ACX2100 Routers (continued)**

Protocol or Application	ACX1000	ACX1100	ACX2000	ACX2100
<b>ATM Encapsulation</b>				
AAL5 SDU [n-to-1 cell relay]	12.2	12.2R2	12.2	12.2R2
<b>ATM Queuing</b>				
ATM service categories (CBR, nrt-VBR, UBR) to the UNI	12.2	12.2R2	12.2	12.2R2
MAP ATM service categories to PW EXP bits	12.2	12.2R2	12.2	12.2R2
Input policing per VC	12.2	12.2R2	12.2	12.2R2
VC output shaping	12.2	12.2R2	12.2	12.2R2
Early Packet Discard	12.2	12.2R2	12.2	12.2R2
<b>MIBs</b>				
Standard SNMP MIBs	12.2	12.2R2	12.2	12.2R2
Juniper Networks Enterprise-Specific MIBs	12.2	12.2R2	12.2	12.2R2
<b>TDM Pseudowire</b>				
SATOP	12.2	12.2R2	12.2	12.2R2

## ACX1000 and ACX1100 Routers Hardware and CLI Terminology Mapping

- [ACX1000 Routers Hardware and CLI Terminology Mapping on page 10](#)
- [ACX1100 Routers Hardware and CLI Terminology Mapping on page 12](#)

### ACX1000 Routers Hardware and CLI Terminology Mapping

[Table 4 on page 10](#) describes the hardware terms used in ACX1000 router documentation and the corresponding terms used in the Junos OS command line interface (CLI).

[Figure 2 on page 11](#) shows the port locations of the interfaces.

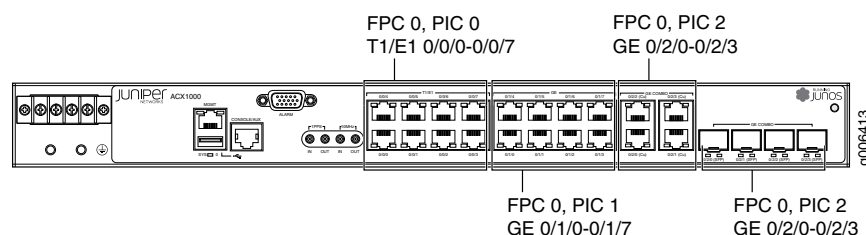
**Table 4: CLI Equivalents of Terms Used in Documentation for ACX1000 Routers**

Hardware Item (as displayed in the CLI)	Description (as displayed in the CLI)	Value (as displayed in the CLI)	Item in Documentation	Additional Information
Chassis	ACX1000	—	Router chassis	<i>Chassis Physical Specifications for ACX1000 and ACX1100 Routers</i>

Table 4: CLI Equivalents of Terms Used in Documentation for ACX1000 Routers (*continued*)

Hardware Item (as displayed in the CLI)	Description (as displayed in the CLI)	Value (as displayed in the CLI)	Item in Documentation	Additional Information
FPC (n)	Abbreviated name of the Flexible PIC Concentrator (FPC)	Value of <i>n</i> is always 0.	The router does not have actual FPCs. In this case, FPC refers to the router itself.	<i>Interface Naming Conventions Used in the Junos OS Operational Commands</i>
PIC (n)	Abbreviated name of the Physical Interface Card (PIC)	<i>n</i> is a value in the range of 0–2.	The router does not have actual PIC devices; see entries for PIC 0 through PIC 2 for the equivalent item on the router.	<i>Interface Naming Conventions Used in the Junos OS Operational Commands</i>
	8x T1/E1 (RJ-48)	PIC 0	Built-in network ports on the front panel of the router	<i>ACX1000 and ACX1100 Universal Access Router Overview</i>
	8x 1GE (RJ-45)	PIC 1	Built-in uplink ports on the front panel of the router	<i>ACX1000 and ACX1100 Universal Access Router Overview</i>
	One of the following: <ul style="list-style-type: none"> <li>4x 1GE (RJ-45)</li> <li>4x 1GE (SFP)</li> </ul>	PIC 2	Built-in uplink ports on the front panel of the router	<i>ACX1000 and ACX1100 Universal Access Router Overview</i>
Xcvr (n)	Abbreviated name of the transceiver	<i>n</i> is a value equivalent to the number of the port in which the transceiver is installed.	Optical transceivers	<i>Uplink Ports on ACX1000 and ACX1100 Routers</i>
Power supply (n)	Built-in power supply	Value of <i>n</i> is always 0.	DC power supply	<i>ACX1000 and ACX1100 Power Overview</i>
Fan	Fan  <b>NOTE:</b> ACX1000 routers are fanless models.	–	Fan	<i>Cooling System and Airflow in an ACX1000 and ACX1100 Router</i>

Figure 2: ACX1000 Interface Port Mapping



## ACX1100 Routers Hardware and CLI Terminology Mapping

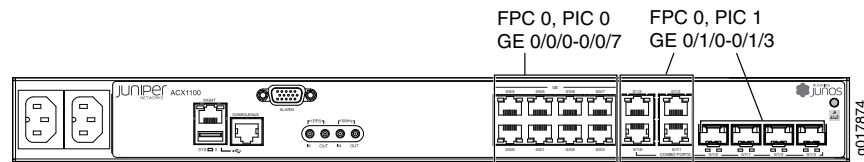
Table 5 on page 12 describes the hardware terms used in ACX1100 router documentation and the corresponding terms used in the Junos OS command line interface (CLI).

Figure 3 on page 13 shows the port locations of the interfaces.

**Table 5: CLI Equivalents of Terms Used in Documentation for ACX1100 Routers**

Hardware Item (as displayed in the CLI)	Description (as displayed in the CLI)	Value (as displayed in the CLI)	Item in Documentation	Additional Information
Chassis	ACX1100	–	Router chassis	<i>Chassis Physical Specifications for ACX1000 and ACX1100 Routers</i>
FPC (n)	Abbreviated name of the Flexible PIC Concentrator (FPC)	Value of <i>n</i> is always 0.	The router does not have actual FPCs. In this case, FPC refers to the router itself.	<i>Interface Naming Conventions Used in the Junos OS Operational Commands</i>
PIC (n)	Abbreviated name of the Physical Interface Card (PIC)	<i>n</i> is a value in the range of 0–1.	The router does not have actual PIC devices; see entries for PIC 0 through PIC 2 for the equivalent item on the router.	<i>Interface Naming Conventions Used in the Junos OS Operational Commands</i>
	8x 1GE (RJ-45)	PIC 0	Built-in uplink ports on the front panel of the router	<i>ACX1000 and ACX1100 Universal Access Router Overview</i>
	One of the following: <ul style="list-style-type: none"> <li>4x 1GE (RJ-45)</li> <li>4x 1GE (SFP)</li> </ul>	PIC 1	Built-in uplink ports on the front panel of the router	<i>ACX1000 and ACX1100 Universal Access Router Overview</i>
Xcvr (n)	Abbreviated name of the transceiver	<i>n</i> is a value equivalent to the number of the port in which the transceiver is installed.	Optical transceivers	<i>Uplink Ports on ACX1000 and ACX1100 Routers</i>
Power supply (n)	Built-in power supply	Value of <i>n</i> is always 0.	AC or DC power supply	<i>ACX1000 and ACX1100 Power Overview</i>
Fan	Fan  <b>NOTE:</b> ACX1100 routers are fanless models.	–	Fan	<i>Cooling System and Airflow in an ACX1000 and ACX1100 Router</i>

Figure 3: ACX1100 Interface Port Mapping



**Related Documentation**

- [ACX1000 and ACX1100 Universal Access Router Overview](#)

## ACX2000 and ACX2100 Routers Hardware and CLI Terminology Mapping

- [ACX2000 Hardware and CLI Terminology Mapping on page 13](#)
- [ACX2100 Hardware and CLI Terminology Mapping on page 14](#)

### ACX2000 Hardware and CLI Terminology Mapping

[Table 6 on page 13](#) describes the hardware terms used in ACX2000 router documentation and the corresponding terms used in the Junos OS command line interface (CLI).

[Figure 4 on page 14](#) shows the port locations of the interfaces.

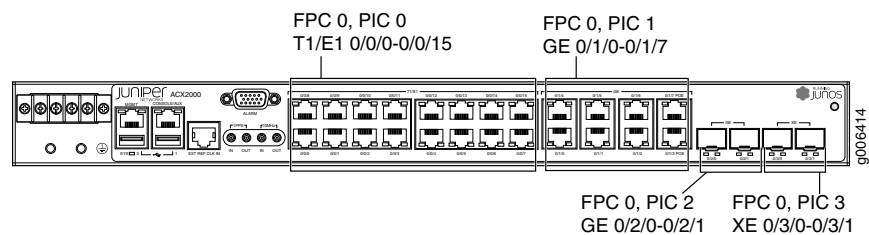
**Table 6: CLI Equivalents of Terms Used in Documentation for ACX2000 Routers**

Hardware Item (as displayed in the CLI)	Description (as displayed in the CLI)	Value (as displayed in the CLI)	Item in Documentation	Additional Information
Chassis	ACX2000	—	Router chassis	<i>Chassis Physical Specifications for ACX2000 and ACX2100 Routers</i>
FPC ( <i>n</i> )	Abbreviated name of the Flexible PIC Concentrator (FPC)	Value of <i>n</i> is always 0.	The router does not have actual FPCs. In this case, FPC refers to the router itself.	<i>Interface Naming Conventions Used in the Junos OS Operational Commands</i>
PIC ( <i>n</i> )	Abbreviated name of the Physical Interface Card (PIC)	<i>n</i> is a value in the range of 0–3.	The router does not have actual PIC devices; see entries for PIC 0 through PIC 3 for the equivalent item on the router.	<i>Interface Naming Conventions Used in the Junos OS Operational Commands</i>
	16x T1/E1 (RJ-48)	PIC 0	Built-in network ports on the front panel of the router	<i>ACX2000 and ACX2100 Universal Access Router Overview</i>
	One of the following: <ul style="list-style-type: none"> <li>• 6x 1GE (RJ-45)</li> <li>• 2x 1GE (POE RJ-45)</li> </ul>	PIC 1	Built-in network ports on the front panel of the router	<i>ACX2000 and ACX2100 Universal Access Router Overview</i>

Table 6: CLI Equivalents of Terms Used in Documentation for ACX2000 Routers (*continued*)

Hardware Item (as displayed in the CLI)	Description (as displayed in the CLI)	Value (as displayed in the CLI)	Item in Documentation	Additional Information
	2x 1GE (SFP)	PIC 2	Built-in uplink ports on the front panel of the router	<i>ACX2000 and ACX2100 Universal Access Router Overview</i>
	2x 10GE (SFP+)	PIC 3	Built-in uplink ports on the front panel of the router	<i>ACX2000 and ACX2100 Universal Access Router Overview</i>
Xcvr (n)	Abbreviated name of the transceiver	n is a value equivalent to the number of the port in which the transceiver is installed.	Optical transceivers	<i>Uplink Ports on ACX2000 and ACX2100 Routers</i>
Power supply (n)	Built-in power supply	Value of n is always 0.	DC power supply	<i>ACX2000 and ACX2100 Power Overview</i>
Fan	Fan  <i>NOTE:</i> ACX2000 routers are fanless models.	—	Fan	<i>Cooling System and Airflow in an ACX2000 and ACX2100 Router</i>

Figure 4: ACX2000 Interface Port Mapping



## ACX2100 Hardware and CLI Terminology Mapping

Table 7 on page 14 describes the hardware terms used in ACX2100 router documentation and the corresponding terms used in the Junos OS command line interface (CLI).

Figure 5 on page 16 shows the port locations of the interfaces.

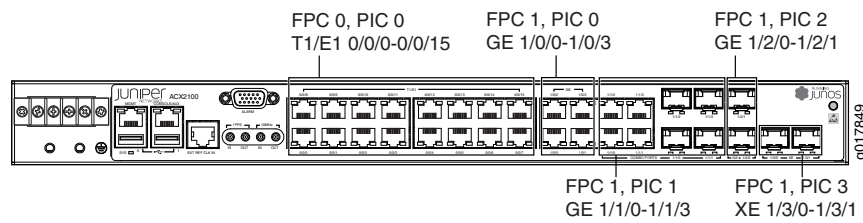
Table 7: CLI Equivalents of Terms Used in Documentation for ACX2100 Routers

Hardware Item (as displayed in the CLI)	Description (as displayed in the CLI)	Value (as displayed in the CLI)	Item in Documentation	Additional Information
Chassis	ACX2100	—	Router chassis	<i>Chassis Physical Specifications for ACX2000 and ACX2100 Routers</i>

Table 7: CLI Equivalents of Terms Used in Documentation for ACX2100 Routers (*continued*)

Hardware Item (as displayed in the CLI)	Description (as displayed in the CLI)	Value (as displayed in the CLI)	Item in Documentation	Additional Information
FPC ( <i>n</i> )	Abbreviated name of the Flexible PIC Concentrator (FPC)	<i>n</i> is a value in the range of 0–1.	The router does not have actual FPCs. In this case, FPC refers to the router itself.	<i>Interface Naming Conventions Used in the Junos OS Operational Commands</i>
PIC ( <i>n</i> )	Abbreviated name of the Physical Interface Card (PIC)	<i>n</i> is a value in the range of 0–3.	The router does not have actual PIC devices; see entries for PIC 0 through PIC 3 for the equivalent item on the router.	<i>Interface Naming Conventions Used in the Junos OS Operational Commands</i>
	16x T1/E1 (RJ-48)	PIC 0 on FPC 0	Built-in network ports on the front panel of the router	<i>ACX2000 and ACX2100 Universal Access Router Overview</i>
	4x 1GE (RJ-45)	PIC 0 on FPC 1	Built-in network ports on the front panel of the router	<i>ACX2000 and ACX2100 Universal Access Router Overview</i>
	One of the following: <ul style="list-style-type: none"> <li>4x 1GE (RJ-45)</li> <li>4x 1GE (SFP)</li> </ul>	PIC 1 on FPC 1	Built-in uplink ports on the front panel of the router	<i>ACX2000 and ACX2100 Universal Access Router Overview</i>
	2x 1GE (SFP)	PIC 2 on FPC 1	Built-in uplink ports on the front panel of the router	<i>ACX2000 and ACX2100 Universal Access Router Overview</i>
	2x 10GE (SFP+)	PIC 3 on FPC 1	Built-in uplink ports on the front panel of the router	<i>ACX2000 and ACX2100 Universal Access Router Overview</i>
Xcvr ( <i>n</i> )	Abbreviated name of the transceiver	<i>n</i> is a value equivalent to the number of the port in which the transceiver is installed.	Optical transceivers	<i>Uplink Ports on ACX2000 and ACX2100 Routers</i>
Power supply ( <i>n</i> )	Built-in power supply	Value of <i>n</i> is always 0.	AC or DC power supply	<i>ACX2000 and ACX2100 Power Overview</i>
Fan	Fan  <i>NOTE:</i> ACX2100 routers are fanless models.	—	Fan	<i>Cooling System and Airflow in an ACX2000 and ACX2100 Router</i>

Figure 5: ACX2100 Interface Port Mapping



**Related Documentation**

- [ACX2000 and ACX2100 Universal Access Router Overview](#)

## Router Hardware Components

Junos OS runs on Juniper Networks routers and Packet Transport Routers, including: ACX Series, J Series, M Series, MX Series, T Series, and PTX Series Packet Transport Routers. Each network device consists of the major hardware components as shown in [Table 8 on page 16](#). One or more of the major hardware components shown is used in each system.



**NOTE:** The ACX Series router is a single-board router with a built-in Routing Engine and one Packet Forwarding Engine. The “pseudo” FPCs and PICs are described in [“ACX2000 and ACX2100 Routers Hardware and CLI Terminology Mapping” on page 13](#)

Table 8: Major Router Hardware Components

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



Table 8: Major Router Hardware Components (*continued*)

	M Series	MX Series	T Series	PTX Series	J Series
Physical Interface Module (PIM)					X
Physical Interface Card (PIC)	X	X	X	X	

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

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

**Related Documentation**

- [Junos OS Architecture Overview](#)



## PART 2

# Configuration

- [Configuration Overview on page 21](#)
- [Autoinstallation on page 45](#)
- [CoS on page 53](#)
- [Firewall Filters on page 81](#)
- [Interfaces on page 95](#)
- [Layer 2 and Layer 3 on page 105](#)
- [MPLS, VPNs, and Pseudowires on page 113](#)
- [Network Management on page 137](#)
- [Operations, Administration, and Management \(OAM\) on page 165](#)
- [Routing Protocols on page 187](#)
- [Time Division Multiplexing \(TDM\) on page 195](#)
- [Timing and Synchronization on page 217](#)
- [Upgrade and Installation on page 251](#)
- [Junos Configuration Statements on page 275](#)
- [Configuration Statement Hierarchies on page 281](#)



## CHAPTER 2

# Configuration Overview

- [Classifiers and Rewrite Rules at the Global and Physical Interface Levels Overview on page 21](#)
- [CoS on ACX Series Universal Access Routers Features Overview on page 22](#)
- [Ethernet Link Aggregation Overview for ACX Series Routers on page 23](#)
- [Gigabit Ethernet Autonegotiation Overview on page 24](#)
- [IEEE 1588v2 PTP Boundary Clock Overview on page 25](#)
- [IEEE 1588v2 Precision Timing Protocol \(PTP\) on ACX Series Universal Access Routers on page 28](#)
- [Inverse Multiplexing for ATM \(IMA\) Overview on page 29](#)
- [IPv6 Support on ACX Series Universal Access Routers on page 29](#)
- [Pseudowire Overview for ACX Series Universal Access Routers on page 32](#)
- [Storm Control on ACX Series Routers Overview on page 33](#)
- [Synchronous Ethernet Overview on the ACX Series Universal Access Routers on page 35](#)
- [TDM CESoPSN Overview on page 36](#)
- [TDM CESoPSN on ACX Series Routers Overview on page 36](#)
- [Traffic Policing Overview on page 38](#)
- [Understanding PoE on ACX Series Universal Access Routers on page 42](#)

### Classifiers and Rewrite Rules at the Global and Physical Interface Levels Overview

On ACX Series Universal Access Routers and EX Series switches, CoS supports classification and rewrite at the global level and physical interface levels.

At a global level, you can define EXP classification.

At a physical interface level, you can define the following features:

- DSCP and inet-precedence classifiers
- DSCP and inet-precedence rewrites
- ieee-802.1 classifiers (inner and outer)
- ieee-802.1 rewrites (outer)

At a logical interface level, you can define the fixed classification and EXP rewrites.

To configure global EXP classifiers, include the **classifiers exp classifier-name** statement at the **[edit class-of-service] system-defaults** hierarchy level.

To configure classifiers or rewrite rules at the physical interface, include either the **classifiers** statement or the **rewrite-rules** statement at the **[edit class-of-service] interfaces interface-name ]** hierarchy level.

To display classifiers configured under **system-defaults**, enter the **show class-of-service system-defaults** command.

To display classifiers and rewrite rules bound to physical interfaces, enter the **show class-of-service interfaces interface-name** command.

**Related  
Documentation**

- [Configuring Classifiers and Rewrite Rules at the Global and Physical Interface Levels on page 63](#)

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## CoS on ACX Series Universal Access Routers Features Overview

The following key CoS features are supported on ACX Series Universal Access Routers:

- Physical interface-based classifiers at the **[edit class-of-service interfaces interface-name]** hierarchy level
- Fixed classification for all ingress packets traversing a logical interface to a single forwarding class. Fixed classification is supported on all interface types.
- EXP bits located in each MPLS label and used to encode the CoS value of a packet as it traverses a label-switched path (LSP). To configure global EXP bits, include the **exp** statement at the **[edit class-of-service system-defaults classifiers]** hierarchy level.
- Rewrite rules at the physical and logical interface levels including the following: IP type-of-service (ToS), DSCP, MPLS EXP bit value, and IEEE 802.1p bit value.
- Attachment of the following rewrite rules to the physical interface at the **[edit class-of-service interfaces interface-name rewrite-rules]** hierarchy level: IP ToS, DSCP, and IEEE 802.1p bit value.
- Rewrite rules for MPLS EXP bits on the logical interface at the **[edit class-of-service interfaces interface-name unit unit-number rewrite-rule]** hierarchy level.



**NOTE:** Fine-grained rewrite is not possible, even when you use multifield filters, because of the application-specific integrated circuit (ASIC) limitation.

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Queuing and scheduling features include:

- Support for up to eight forwarding classes.
- Support for up to eight egress queues per port.

- Internal buffer of 2 MB with per-egress queue buffer management.
- Three weighted random early detection (WRED) curves for TCP and one WRED curve for non-TCP. There are two fill levels and two drop probabilities per WRED curve; the drop probability corresponding to the first fill must be zero.
- Strict-priority and weighted deficit round-robin scheduling.
- Multiple strict-priority queues per port.
- Per-queue committed information rate (CIR) and peak information rate (PIR).
- Per-physical-port shaping.

Queue statistics features include:

- Per-egress-queue enqueue statistics in packets, bytes, packets per second (pps), and bits per second (bps).
- Per-egress-queue transmit statistics in packets, bytes, pps, and bps.
- Per-egress-queue drop statistics in packets and pps.

#### Related Documentation

- [Understanding CoS CLI Configuration Statements on ACX Series Universal Access Routers on page 56](#)
- [Configuring CoS on ACX Series Universal Access Routers on page 58](#)

## Ethernet Link Aggregation Overview for ACX Series Routers

Ethernet link aggregation is mechanism for increasing the bandwidth linearly and improving the resiliency of Ethernet links by bundling or combining multiple full-duplex same-speed point-to-point Ethernet links into a single virtual link. The virtual link interface is referred to as link aggregation group (LAG) or aggregated Ethernet (AE) interface

On ACX Series Routers, up to 128 AE IFDs can be created with each AE IFD having up to 8 physical IFDs. AE interfaces can be created across MICs and fixed-ports on the chassis.

### Load Balancing

JUNOS load-balances traffic across member links in an AE bundle based on the Layer 3 information in the packet. You can globally configure what fields are used for load-balancing for inet and MPLS

On ACX Series Routers, the inet family knobs are available at PIC level. You can configure inet family Layer 3 and Layer 4 fields to be used for load-balancing. ACX Series Routers also support symmetric hashing which can be used to swap source and destination addresses before hash computation to ensure that forwarding and reverse traffic flows use the same AE member link; this feature helps in ensuring the downstream transparent deep-packet-inspection devices can setup flows correctly.

## LACP Monitoring

LACP implementation supports link monitoring, but not automatic addition and deletion of member links in a AE bundle.

LACP monitoring can be either distributed or centralized. The default is distributed and it can be overridden by configuring the centralized knob under LACP protocols.

By default, LACP does not initiate a LACP PDU exchange. LACP packets can be configured to exchange LACP PDUs at a rate of 1 packet per second, or a slower rate of 1 packet for 30 seconds.

## Link Protection

Link protection can be configured on AE interfaces to provide 1:1 link resiliency using LACP. Primary and backup links can be configured within an AE bundle. The primary link is used for all transit traffic and host generated traffic. The backup link is used when the primary link fails.

Link protection is supported only when the AE bundles have no more than 2 member links, one primary and another backup. LACP works in revertive link-protection mode by default and can be configured to work in non-revertive mode.

### Related Documentation

- [CoS on ACX Series Universal Access Routers Features Overview on page 22](#)
- [Traffic Policing Overview on page 38](#)
- [Standard Firewall Filter Match Conditions and Actions on ACX Series Routers Overview on page 81](#)

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## Gigabit Ethernet Autonegotiation Overview

Autonegotiation is enabled by default on all Gigabit Ethernet and Tri-Rate Ethernet copper interfaces. However, you can explicitly enable autonegotiation to configure remote fault options manually.



**NOTE:**

- For Gigabit Ethernet interfaces installed in J4350 and J6350 Services Routers, when you manually configure either the link mode or speed settings, the system ignores the configuration and generates a system log message. When autonegotiation is enabled and you specify the link mode and speed, the link autonegotiates with the manually configured settings. When autonegotiation is disabled and you configure both the link mode and speed, the link operates with the manually configured settings. If you disable autonegotiation and do not manually configure the link mode and speed, the link operates at 1000 Mbps full duplex.
- When you configure the Tri-Rate Ethernet copper interface to operate at 1 Gbps, autonegotiation must be enabled.
- On ACX Series Universal Access Routers, when the autonegotiation is disabled, the speed has to be explicitly configured to 10–100 Mbps.
- On T4000 routers, the auto-negotiation command is ignored for interfaces other than Gigabit Ethernet.

- Related Documentation**
- [Configuring Gigabit Ethernet Autonegotiation](#)
  - [Ethernet Interfaces](#)

## IEEE 1588v2 PTP Boundary Clock Overview

The IEEE 1588v2 standard defines the Precision Time Protocol (PTP), which is used to synchronize clocks throughout a network. The standard describes the PTP boundary clock's hierarchical master/slave architecture for the distribution of time-of-day.

- [IEEE 1588v2 PTP Boundary Clock on page 25](#)
- [Clock Clients on page 27](#)

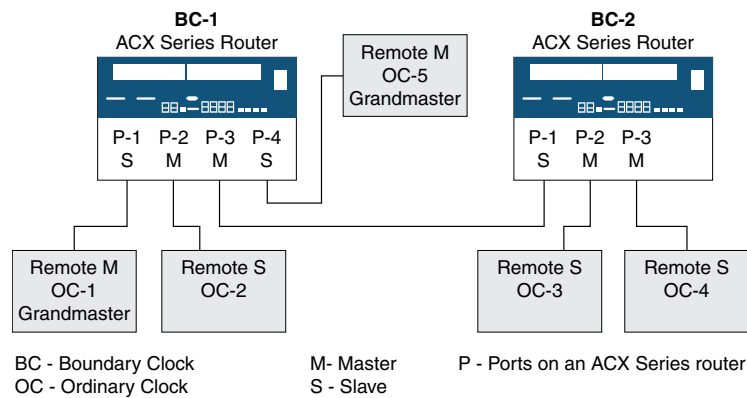
### IEEE 1588v2 PTP Boundary Clock

An IEEE 1588v2 boundary clock has multiple network connections and can act as a source (master) and a destination (slave or client) for synchronization messages. It synchronizes itself to a best master clock through a slave port and supports synchronization of remote clock clients to it on master ports. Boundary clocks can improve the accuracy of clock synchronization by reducing the number of 1588v2-unaware hops between the master and the client. Boundary clocks can also be deployed to deliver better scale because they reduce the number of sessions and the number of packets per second on the master.

The boundary clock intercepts and processes all PTP messages and passes all other traffic. The best master clock algorithm (BMCA) is used by the boundary clock to select the best configured acceptable master clock that a boundary slave port can see. To configure a boundary clock, include the **boundary** statement at the **[edit protocols ptp clock-mode]** hierarchy level and at least one master with the **master** statement and at least one slave with the **slave** statement at the **[edit protocols ptp]** hierarchy level.

Figure 6 on page 26 illustrates two ACX Series boundary clocks in a network in which the clock flow is from the upstream node (BC-1) to the downstream node (BC-2).

**Figure 6: Boundary Clocks in a Network**



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The first boundary clock—BC-1—has four ports. Each port is configured as follows:

- BC-1 P-1 and BC-1 P-4 are boundary slave ports connected to two grandmaster clocks—OC-1 and OC-5. The grandmasters are included as the clock sources in the slave port configurations. From the packets received on the slave ports, BC-1 selects the best master, synchronizes its clock, and generates PTP packets, which are sent over the master ports—BC-1 P-2 and BC-1 P-3—to the downstream clients.
- BC-1 P-2, a master port, is connected to OC-2, an ordinary remote slave. OC-2 is included as a clock client in BC-1 P-2's master configuration, and so receives PTP packets from BC-1 P-2.
- BC-1 P-3, a master port, is connected to BC-2 P-1, a remote boundary slave port. In this situation, the master port—BC-1 P-3—is included as a clock source in the configuration of the boundary slave port—BC-2 P-1. In addition, the boundary slave port—BC-2 P-1—is included as a clock client in the configuration of the master port—BC-1 P-3. With this configuration, the boundary slave—BC-2 P1—receives PTP packets from BC-1 P3.

The second boundary clock—BC-2—has three ports. Each port is configured as follows:

- BC-2 P-1 is a boundary slave port connected to the upstream master port—BC-1 P3. As described previously, BC-2 P-1 receives PTP packets from BC-1 P3. The master ports—BC-2 P-2 and BC-2 P-3—synchronize their time from the packets received from BC-2 P1.
- BC-2 P-2 and BC-2 P-3, boundary master ports, are connected to ordinary remote slaves—OC-3 and OC-4. OC-3 and OC-4 are included as clock clients in the configuration of the master ports—BC-2 P2 and BC-2 P-3. Both slaves receive PTP packets from the master boundary port to which they are connected.

In this example, the boundary clock synchronizes its clock from the packets received on its slave ports from the upstream master. The boundary clock then generates PTP packets, which are sent over the master port to downstream clients. These packets are

timestamped by the boundary clock by using its own time, which is synchronized to the selected upstream master.

## Clock Clients

A clock client is the remote PTP host, which receives time from the PTP master and is in a slave relationship to the master.



**NOTE:** The term *slave* is sometimes used to refer to the clock client.

An ACX Series router acting as a master boundary clock supports the following types of downstream clients:

- **Automatic client**—An automatic client is configured with an IP address, which includes the subnet mask, indicating that any remote PTP host belonging to that subnet can join the master clock through a unicast negotiation. To configure an automatic client, include the subnet mask in the **clock-client ip-address** statement at the **[edit protocols ptp master interface *interface-name* unicast-mode]** hierarchy level.
- **Manual client**—A manual client is configured with the **manual** statement at the **[edit protocols ptp master interface *interface-name* unicast-mode clock-client ip-address local-ip-address *local-ip-address*]** hierarchy level. A manual client does *not* use unicast negotiation to join the master clock. The **manual** statement overrides the **unicast negotiation** statement configured at the **[edit protocols ptp]** hierarchy level. As soon as you configure a manual client, it starts receiving announce and synchronization packets.
- **Secure client**—A secure client is configured with an exact IP address of the remote PTP host, after which it joins a master clock through unicast negotiation. To configure a secure client, include the exact IP address in the **clock-client ip-address** statement at the **[edit protocols ptp master interface *interface-name* unicast-mode]** hierarchy level.



**NOTE:** You can configure the maximum number of clients (512 ) in the following combination:

- Automatic clients 256.
- Manual and secure clients 256—Any combination of manual and secure clients is allowed as long as the combined total amounts to 256.

### Related Documentation

- [IEEE 1588v2 Precision Timing Protocol \(PTP\) on ACX Series Universal Access Routers on page 28](#)
- [Precision Time Protocol Overview](#)
- [Configuring Precision Time Protocol Clocking on page 227](#)
- [\[edit protocols ptp\] Hierarchy Level](#)
- [Supported IPv4, TCP, and UDP Standards](#)

## IEEE 1588v2 Precision Timing Protocol (PTP) on ACX Series Universal Access Routers

The IEEE 1588v2 standard defines the Precision Time Protocol (PTP), which is used to synchronize clocks throughout a packet-switched network. This synchronization is achieved through packets that are transmitted and received in a session between a master clock and a slave clock or remote clock client. The clocks used for the distribution of accurate time are in an hierarchical master/slave architecture, which includes boundary clocks, ordinary clocks, and grandmaster clocks. A boundary clock is both a clock source *and* a clock client. An ordinary clock is either a clock source *or* a clock client. However, a grandmaster clock is always a clock source. An ordinary clock on an ACX Series router is always a clock client. In addition, User UDP over IPv4 and unicast mode are used to transport PTP messages.

On an ACX Series router, the following key PTP features are supported:

- **Boundary clock**—A boundary clock has multiple network connections and can act as a source (master) and a destination (slave or clock client) for synchronization messages. It synchronizes itself to a best master clock through a slave port and supports synchronization of clients to it on master ports. Boundary clocks can improve the accuracy of clock synchronization by reducing the number of 1588v2-unaware hops between the master and the client. Boundary clocks can also be deployed to deliver better scale because they reduce the number of sessions and the number of packets per second on the master.
- **Ordinary clock**—The PTP ordinary clock has a single network connection and can act as a source (master) or destination (slave or clock client) for synchronization messages. On ACX Series routers, the ordinary clock is a slave, which receives synchronization reference messages from a master, either a grandmaster or a master boundary clock. You cannot configure an ordinary master on an ACX Series router. However, a boundary clock can provide time to the ordinary slave.
- **PTP grandmaster clock**—The PTP grandmaster clock communicates time information to destination or slave ports. The grandmaster clock is an external device to which the boundary or ordinary clock synchronizes. You cannot configure a grandmaster clock on an ACX Series router. However, a boundary clock slave or an ordinary clock slave can receive time from a grandmaster clock.
- **Clock source**—A clock source is the PTP master clock to which the slave synchronizes. The clock source is included in the configuration of the slave clock.



**NOTE:** The term *master* is sometimes used to refer to the clock source.

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- **Clock client**—A clock client is the remote PTP host, which receives time from the PTP master. The clock client is included in the configuration of the master clock.



**NOTE:** The term *slave* is sometimes used to refer to the clock client.

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- PTP over UDP over IPv4—The IEEE1588v2 standard specifies different transport protocols for carrying PTP packets. For example, PTP over Ethernet, PTP over UDP over IPv4, and PTP over UDP over IPv6. ACX Series routers support PTP over UDP over IPv4.
- Unicast mode (IPv4 on Gigabit Ethernet interfaces only)—Unicast mode is a user-to-user protocol used to send a datagram to a single recipient. Unicast mode is used for transporting PTP messages.

**Related  
Documentation**

- [Precision Time Protocol Overview](#)
- [IEEE 1588v2 PTP Boundary Clock Overview on page 25](#)
- [Configuring Precision Time Protocol Clocking on page 227](#)
- [\[edit protocols ptp\] Hierarchy Level](#)
- [Supported IPv4, TCP, and UDP Standards](#)

## Inverse Multiplexing for ATM (IMA) Overview

Inverse multiplexing for ATM is a technique of transporting ATM traffic over a bundle of T1 or E1 interfaces. Inverse multiplexing is the opposite of multiplexing. Multiplexing is a technique of combining multiple signals into a single signal. Inverse multiplexing is a technique that divides a data stream into multiple concurrent streams that are transmitted at the same time across separate channels (such as T1 or E1 interfaces) and then reconstructed at the other end back into the original data stream. Inverse multiplexing is used to speed up the flow of data across a slower interface, such as a T1 or E1 interface, by load balancing the data stream across multiple T1 or E1 interfaces, increasing the line capacity.

With ATM inverse multiplexing, an ATM cell stream is transported over a bundle of T1 or E1 interfaces called an IMA group. The ATM cells are inverse multiplexed and demultiplexed cyclically across the IMA group to create a higher-bandwidth logical link whose rate is approximately the sum of all the interfaces in the group.

**Related  
Documentation**

- [Configuring Inverse Multiplexing for ATM \(IMA\) on page 204](#)

## IPv6 Support on ACX Series Universal Access Routers

IPv6 builds upon the functionality of IPv4, providing improvements to addressing, configuration and maintenance, and security. The following IPv6 features are supported on ACX Series routers:

- **IPv6 path maximum transmission unit (MTU) discovery**  
Path MTU Discovery is used by single-source devices to determine the correct size of fragments. Path MTU Discovery is enabled for IPv6 packets by default.
- **Dynamic routes distribution through IS-IS and OSPF for IPv6**

Routers learn routes through different routing protocols such as OSPF, BGP, or IS-IS. Learned routes are put in the routing table to enable IPv6 traffic forwarding.

- **Dual stacking (IPv4 and IPv6)**

Dual stacking allows a device to run both IPv4 and IPv6 at the same time. End nodes, routers, and switches run both protocols and use IPv6 as the preferred protocol.

- **IPv6 forwarding**

The ACX Series port forwarding engine software supports unicast IPv6 routes and next hops. This includes basic route infrastructure, next-hop support, network infrastructure, and exception packet processing.

- **IPv6 over MPLS (6PE)**

ACX Series Universal Access Routers can interconnect IPv6 islands over an MPLS-enabled IPv4 network. IPv6 information is sent over the MPLS core using MG-BGP with IPv4. The BGP Next Hop field conveys the IPv4 address of the router so that MPLS LSPs can be used without explicit tunnel configuration.

- **Neighbor Discovery**

The Neighbor Discovery protocol facilitates a substantial number of functions related to local network connectivity, datagram routing, and configuration. Both regular hosts and routers in an IPv6 environment count on the Neighbor Discovery protocol to facilitate the important exchanges of information that are necessary for proper internetwork operations. Neighbor Discovery is a messaging protocol similar to ICMP. The following functions are performed by the protocol:

- Router discovery—How a host locates routers residing on an attached link.
- Prefix discovery—How a host discovers address prefixes for destinations residing on an attached link. Nodes use prefixes to distinguish between destinations that reside on an attached link and those destinations that it can reach only through a router.
- Parameter discovery—How a node learns various parameters (link parameters or Internet parameters) that it places in outgoing packets.
- Address resolution—How a node uses only a destination IPv6 address to determine a link-layer address for destinations on an attached link.
- Next-hop determination—The algorithm that a node uses for mapping an IPv6 destination address into a neighbor IPv6 address (either the next router hop or the destination itself) to which it plans to send traffic for the destination.
- Neighbor unreachability detection—How a node determines that it can no longer reach a neighbor.
- Duplicate address detection—How a node determines whether an address is already in use by another node.

- **Internet Control Message Protocol v6 (ICMPv6)**

ICMP sends error messages and information messages related to IP operations. ICMPv6 defines additional error messages and informational messages specific to IPv6.

There are four different ICMPv6 error messages:

- Destination Unreachable—A packet cannot be delivered due to an inherent problem with how it is being sent. Includes a code that indicates the nature of the problem that caused the packet not to be delivered
- Packet Too Big—Sent when a packet is too large to be delivered.
- Time Exceeded—A packet cannot be delivered because it has exceeded the hop count specified in the basic header hop-by-hop field.
- Parameter Problem—Indicates a problem with a field in the IPv6 header or extension headers that makes it impossible to process the packet.

ICMPv6 information messages are used for sharing the information required to implement various test, diagnostic, and support functions that are critical to the operation of IPv6. There are a total of eight different ICMPv6 informational messages:

- Echo Request—
- Echo Reply—
- Router Advertisement—
- Router Solicitation—
- Neighbor Advertisement—
- Neighbor Solicitation—
- Redirect—
- Router Renumbering—

#### • Static routes for IPv6

Routing information can be configured statically. Whenever a route is configured statically, the routing information base (RIB) is updated with routes specified through the static route. These routes should be configured statically in the “routing-options” hierarchy. The following configuration is used for enabling static routes for IPv6:

```

interfaces {
  fe/0/1/0 {
    unit 0 {
      family inet6 {
        address fec0:0:0:3::1/64;
      }
    }
  }
}
routing-options {
  rib inet6.0 {
    static {
      route fec0:0:0:4::/64 next-hop fec0:0:0:3::ffff;
    }
  }
}

```

```

user@router> show route table inet6.0
inet6.0: 3 destination, 3 routes (3 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

```

```
fec0:0:0:3::/64 *[Direct/0] 00:01:34
> via fe-0/1/0.0
fec0:0:0:3::1/128 *[Local/0] 00:01:34
Local
fec0:0:0:4::/64 *[Static/5] 00:01:34
> to fec0:0:0:3::1 via fe-0/1/0.0
```

**Related  
Documentation**

- *IPv6 Overview*
- *Understanding Dual Stacking*
- *IS-IS Overview*
- *OSPF Overview*
- *ICMP Router Discovery Overview*
- [MPLS Overview for ACX Series Universal Access Routers on page 113](#)
- *Configuring the Junos OS for IPv6 Path MTU Discovery*
- *IPv6 Neighbor Discovery Overview*
- *Monitoring the Status of IPv6 Static Routes in the Routing Table*

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## Pseudowire Overview for ACX Series Universal Access Routers

A pseudowire is a Layer 2 circuit or service, which emulates the essential attributes of a telecommunications service— such as a T1 line, over an MPLS packet-switched network. The pseudowire is intended to provide only the minimum necessary functionality to emulate the wire with the required degree of faithfulness for the given service definition. On the ACX Series routers, Ethernet, Asynchronous Transfer Mode (ATM), and time-division multiplexing (TDM) pseudowires are supported. The following pseudowire features are supported:

- Pseudowire transport service carrying Layer 1 and Layer 2 information over an IP and MPLS network infrastructure. Only similar end points are supported on the ACX Series—for example, T1 to T1, ATM to ATM, and Ethernet to Ethernet.
- Redundant pseudowires backup connections between PE routers and CE devices, maintaining Layer 2 circuits and services after certain types of failures. Pseudowire redundancy improves the reliability of certain types of networks (metro for example) where a single point of failure could interrupt service for multiple customers. The following pseudowire redundancy features are supported:
  - Maintenance of Layer 2 circuit services after certain types of failures with a standby pseudowire, which backs up the connection between PE routers and CE devices.
  - In case of failure, a protect interface, which backs up the primary interface. Network traffic uses the primary interface only so long as the primary interface functions. If the primary interface fails, traffic is switched to the protect interface.
  - Hot and cold standby enabling swift cut over to the backup or standby pseudowire.



- Ethernet connectivity fault management (CFM), which can be used to monitor the physical link between two routers. The following major features of CFM for Ethernet pseudowires only are supported:
  - Connection protection using the continuity check protocol for fault monitoring. The continuity check protocol is a neighbor discovery and health check protocol that discovers and maintains adjacencies at the VLAN or link level.
  - Path protection using the linktrace protocol for path discovery and fault verification. Similar to IP traceroute, the linktrace protocol maps the path taken to a destination MAC address through one or more bridged networks between the source and destination.

#### Related Documentation

- *Layer 2 Circuits Overview*
- *Layer 2 Circuits Feature Guide for Routing Devices*
- [Redundant Pseudowires for Layer 2 Circuits and VPLS on page 119](#)
- *Configuring a Maintenance Endpoint*
- [IEEE 802.1ag OAM Connectivity Fault Management Overview on page 182](#)
- *Configuring a Connectivity Fault Management Action Profile*
- *Configuring Interfaces for Layer 2 Circuits*
- [TDM Pseudowires Overview on page 118](#)
- [ATM Pseudowire Overview on page 116](#)
- [Ethernet Pseudowire Overview on page 117](#)

## Storm Control on ACX Series Routers Overview

A traffic storm is generated when messages are broadcast on a network and each message prompts a receiving node to respond by broadcasting its own messages on the network. This, in turn, prompts further responses, creating a snowball effect. The LAN is suddenly flooded with packets, creating unnecessary traffic that leads to poor network performance or even a complete loss of network service. Storm control enables the switch to monitor traffic levels and to drop broadcast, multicast, and unknown unicast packets when a specified traffic level—called the *storm control level*—is exceeded, thus preventing packets from proliferating and degrading the LAN. As an alternative to having the switch drop packets, you can configure it to shut down interfaces or temporarily disable interfaces when the storm control level is exceeded by using the **action-shutdown** or **port-error-disable** commands.

Storm control configuration is done in two steps. The first step is to create a storm control profile. Use the following configuration to create your storm control profile:

```
storm-control-profiles {
  foo {
    all {
      bandwidth [percentage] <x>;
```

```
        [no-unknown-unicast | no-broadcast | no-multicast | no-registered-multicast |  
        no-unregistered-multicast]  
    }  
}  
}
```

The second step in configuring storm control is to bind the profile to an IFD. The following configuration shows how to bind your storm control profile:

```
[edit interfaces]  
ge-0/0/0 {  
  ether-options {  
    ethernet-switch-profile {  
      storm-control foo;  
    }  
  }  
}
```

Storm control profiles can be used as aggregates of BUM traffics or for individual BUM traffic. By default, storm control will drop any packets that exceed the configured bandwidth. You can also configure a shutdown action in the profile. When the shutdown action is applied to a port, only that port will be brought down. When applied to an IFD, the storm control action will only apply to the IFD and the shutdown action will only bring down that IFD. Once **recovery-timeout** expires, the port or IFL will be brought back up.

If **recovery-timeout** is not set, the IFD will never come up by itself. In this case you must issue the **clear ethernet-switching recovery-timeout** command to restore the interface to service.

- You can change the storm control level for a specific interface by configuring the bandwidth value or the storm control level for the combined traffic streams that are subject to storm control on that interface. The type of traffic stream (broadcast, unknown unicast, and multicast) that is included within the bandwidth or storm control level consideration depends on which types of traffic are enabled for storm control monitoring on that interface.
- You can enable storm control selectively for multicast traffic on a specific interface or on all interfaces.
- You can disable storm control selectively for either broadcast streams, or multicast streams, or for unknown unicast streams.
- You can also disable storm control selectively for either registered multicast traffic, or unregistered multicast traffic, or for both types of multicast traffic.

The sending and receiving of broadcast, multicast, and unicast packets are part of normal LAN operation, so to recognize a storm, you must be able to identify when traffic has reached a level that is abnormal for your LAN. Suspect a storm when operations begin timing out and network response times slow down. As more packets flood the LAN, network users might be unable to access servers or e-mail.

Monitor the level of broadcast, multicast, and unknown unicast traffic in the LAN when it is operating normally. Use this data as a benchmark to determine when traffic levels are too high. Then configure storm control to set the level at which you want to drop

broadcast traffic, multicast traffic, unknown unicast traffic, or two or all three of those traffic types.



**NOTE:** When you configure storm control bandwidth or storm control level on an aggregated Ethernet interface, the storm control level for each member of the aggregated Ethernet interface is set to that bandwidth or level. For example, if you configure a storm control bandwidth of 15,000 Kbps on ae1, and ae1 has two members, ge-0/0/0 and ge-0/0/1, each member has a storm control level of 15,000 Kbps. Thus, the storm control level on ae1 allows a traffic rate of up to 30,000 Kbps of combined traffic streams. Traffic might include broadcast, multicast, and unknown unicast traffic, depending upon the configuration.

**Related  
Documentation**

- *action-shutdown*
- *interface (Storm Control)*
- *port-error-disable*
- *storm-control*

## Synchronous Ethernet Overview on the ACX Series Universal Access Routers

Synchronous Ethernet is supported on the ACX Series routers with Gigabit Ethernet and 10-Gigabit Ethernet SFP and SFP+ transceivers and is compliant with ITU-T Recommendation G.8261: *Timing and synchronization aspects in packet networks* and ITU-T Recommendation G.8264: *Distribution of timing through packet networks*. Synchronous Ethernet is a physical layer frequency transfer technology modeled after synchronization in SONET/SDH. Traditional Ethernet nodes, which do not support Synchronous Ethernet, do not carry synchronization from one node link to another. Synchronous Ethernet-capable nodes however can synchronize their chassis clock to a clock recovered from an interface connected to an upstream clock master. After this, the clock is used to time data sent to downstream clock slaves, forming a synchronization trail from a Primary Reference Clock (PRC) to Ethernet equipment clocks (EECs) and transferring frequency synchronization along the trail.

The ITU-T G.8264 specification defines the Synchronization Status Message (SSM) protocol and its format for Synchronous Ethernet to ensure interoperability between Synchronous Ethernet equipment used for frequency transfer—for example, SONET/SDH. Synchronous Ethernet provides stable frequency synchronization to a PRC and is not affected by load on the network. However, it requires that all the nodes from the PRC to the last downstream node are Synchronous Ethernet capable. Synchronous Ethernet is a recommended technology for mobile networks that require frequency-only synchronization—for example, 2G or 3G base stations.

**Related  
Documentation**

- *Synchronous Ethernet Overview*

## TDM CESoPSN Overview

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Circuit Emulation Service over Packet-Switched Network (CESoPSN) is an encapsulation layer intended to carry  $N$ xDS0 services over a packet-switched network (PSN). CESoPSN enables pseudowire emulation of some properties of structure-aware time division multiplexed (TDM) networks.

Particularly, CESoPSN enables the deployment of bandwidth-saving fractional point-to-point E1 or T1 applications as follows:

- A pair of customer edge (CE) devices operate as though they were connected by an emulated E1 or T1 circuit, which reacts to the alarm indication signal (AIS) and remote alarm indication (RAI) states of the devices' local attachment circuits.
- The PSN carries only an  $N$ xDS0 service, where  $N$  is the number of actually used time slots in the circuit connecting the pair of CE devices, thus saving bandwidth.

### Related Documentation

- [TDM CESoPSN on ACX Series Routers Overview on page 36](#)
- [Configuring CESoPSN Encapsulation on DS Interfaces on page 195](#)
- [Configuring CE1 Channels Down to DS Interfaces on page 196](#)

## TDM CESoPSN on ACX Series Routers Overview

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Structure-aware time division multiplexed (TDM) Circuit Emulation Service over Packet-Switched Network (CESoPSN) is a method of encapsulating TDM signals into CESoPSN packets, and in the reverse direction, decapsulating CESoPSN packets back into TDM signals. This method is also termed as *Interworking Function* (IWF). The following CESoPSN features are supported on Juniper Networks ACX Series Universal Access Routers:

- [Channelization up to the DS0 Level on page 36](#)
- [Protocol Support on page 37](#)
- [Packet Latency on page 37](#)
- [CESoPSN Encapsulation on page 37](#)
- [CESoPSN Options on page 37](#)
- [show Commands on page 37](#)
- [CESoPSN Pseudowires on page 38](#)

### Channelization up to the DS0 Level

The following numbers of  $N$ xDS0 pseudowires are supported for 16 T1 and E1 built-in ports and 8 T1 and E1 built-in ports, where  $N$  represents the time slots on the T1 and E1 built-in ports.

16 T1 and E1 built-in ports support the following number of pseudowires:

- Each T1 port can have up to 24 NxDS0 pseudowires, which add up to a total of up to 384 NxDS0 pseudowires.
- Each E1 port can have up to 31 NxDS0 pseudowires, which add up to a total of up to 496 NxDS0 pseudowires.

8 T1 and E1 built-in ports support the following number of pseudowires:

- Each T1 port can have up to 24 NxDS0 pseudowires, which add up to a total of up to 192 NxDS0 pseudowires.
- Each E1 port can have up to 31 NxDS0 pseudowires, which add up to a total of up to 248 NxDS0 pseudowires.

## Protocol Support

All protocols that support Structure-Agnostic TDM over Packet (SAToP) support CESoPSN NxDS0 interfaces.

## Packet Latency

The time required to create packets (from 1000 through 8000 microseconds).

## CESoPSN Encapsulation

The following statements are supported at the [edit interfaces *interface-name*] hierarchy level:

- `ct1-x/y/z partition partition-number timeslots timeslots interface-type ds`
- `ds-x/y/z:n encapsulation cesopsn`

## CESoPSN Options

The following statements are supported at the [edit interfaces *interface-name* cesopsn-options] hierarchy level:

- `excessive-packet-loss-rate (sample-period milliseconds)`
- `idle-pattern pattern`
- `jitter-buffer-latency milliseconds`
- `jitter-buffer-packets packets`
- `packetization-latency microseconds`

## show Commands

The `show interfaces interface-name extensive` command is supported for `t1`, `e1`, and `at` interfaces.

## CESoPSN Pseudowires

CESoPSN pseudowires are configured on the logical interface, not on the physical interface. So the **unit *logical-unit-number*** statement must be included in the configuration at the **[edit interfaces *interface-name*]** hierarchy level. When you include the **unit *logical-unit-number*** statement, circuit cross-connect (CCC) for the logical interface is created automatically.

**Related Documentation**

- [Setting the CESoPSN Options](#)

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## Traffic Policing Overview

This topic covers the following information:

- [Congestion Management for IP Traffic Flows on page 38](#)
- [Traffic Limits on page 39](#)
- [Traffic Color Marking on page 40](#)
- [Forwarding Classes and PLP Levels on page 41](#)
- [Policer Application to Traffic on page 41](#)

## Congestion Management for IP Traffic Flows

Traffic policing, also known *rate limiting*, is an essential component of network access security that is designed to thwart denial-of-service (DoS) attacks. Traffic policing enables you to control the maximum rate of IP traffic sent or received on an interface and also to partition network traffic into multiple priority levels, also known as *classes of service*. A policer defines a set of traffic rate limits and sets consequences for traffic that does not conform to the configured limits. Packets in a traffic flow that does not conform to traffic limits are either discarded or marked with a different forwarding class or packet loss priority (PLP) level.

With the exception of policers configured to rate-limit aggregate traffic (all protocol families and logical interfaces configured on a physical interface), you can apply a policer to all IP packets in a Layer 2 or Layer 3 traffic flow at a logical interface.

With the exception of policers configured to rate-limit based on physical interface media rate, you can apply a policer to specific IP packets in a Layer 3 traffic flow at a logical interface by using a stateless firewall filter.

You can apply a policer to inbound or outbound interface traffic. Policers applied to inbound traffic help to conserve resources by dropping traffic that does not need to be routed through a network. Dropping inbound traffic also helps to thwart denial-of-service (DoS) attacks. Policers applied to outbound traffic control the bandwidth used.



**NOTE:** Traffic policers are instantiated on a per-PIC basis. Traffic policing does not work when the traffic for one local policy decision function (L-PDF) subscriber is distributed over multiple Multiservices PICs in an AMS group.

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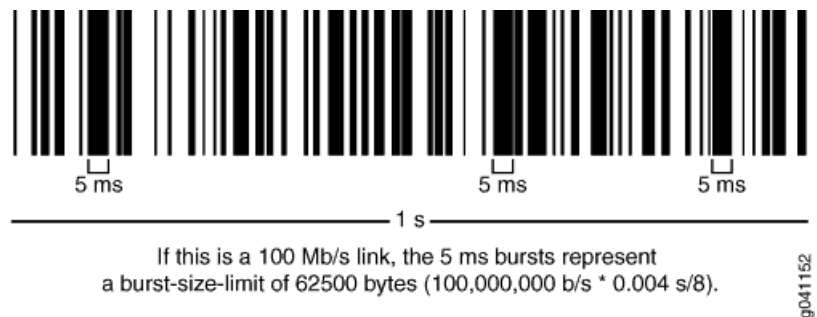
## Traffic Limits

Junos<sup>®</sup> operating system (Junos OS) policers use the *token-bucket* algorithm to enforce a limit on average transmit or receive rate of IP traffic at an interface while allowing bursts of traffic up to a maximum value based on the overall traffic load. The token-bucket algorithm offers more flexibility than the *leaky-bucket* algorithm in that you can allow a specified amount of bursting before starting to discard packets or apply a penalty to packet output-queuing priority or packet drop priority.

In the token-bucket model, the bucket represents the policing function. Tokens are added to the bucket at a fixed rate, but only up to the specified depth of the bucket. Each token represents a “credit” for some number of bits, and tokens in the bucket are “cashed in” for the ability to transmit or receive traffic at the interface. When sufficient tokens are present in the bucket, a traffic flow continues unrestricted. Otherwise, packets might be dropped or else re-marked with a lower forwarding class, a higher packet loss priority (PLP) level, or both.

- The rate at which tokens are added to the bucket represents the highest average transmit or receive rate in bits per second allowed for a given service level. You specify this highest average traffic rate as the *bandwidth limit* of the policer. If the traffic arrival rate is so high that at some point insufficient tokens are present in the bucket, then the traffic flow is no longer conforming to the traffic limit.
- The depth of the bucket in bytes controls the amount of back-to-back bursting allowed. You specify this factor as the *burst-size limit* of the policer. This second limit affects the average transmit or receive rate by limiting the number of bytes permitted in a transmission burst for a given interval of time. Bursts exceeding the current burst-size limit are dropped until there are sufficient tokens available to permit the burst to proceed.

Figure 7: Network Traffic and Burst Rates



As shown in the figure above, a UPC bar code is a good facsimile of what traffic looks like on the line; an interface is either transmitting (bursting at full rate) or it is not. The black lines represent periods of data transmission and the white space represents periods of silence when the token bucket can replenish.

Depending on the type of policer used, packets in a policed traffic flow that surpasses the defined limits might be implicitly set to a higher PLP level, assigned to a configured forwarding class or set to a configured PLP level (or both), or simply discarded. If packets

encounter downstream congestion, packets with a **low** PLP level are less likely to be discarded than those with a **medium-low**, **medium-high**, or **high** PLP level.

## Traffic Color Marking

Based on the particular set of traffic limits configured, a policer identifies a traffic flow as belonging to one of either two or three categories that are similar to the colors of a traffic light used to control automobile traffic.

A *two-color-marking* policer categorizes traffic as either conforming to the traffic limits (green) or violating the traffic limits (red):

- **Green**—Two-color-marking policers implicitly set the packets in a green flow to the low PLP level, and you cannot configure any policer actions for conforming traffic.
- **Red**—Two-color-marking policers do not perform any implicit actions on packets in a red flow. Instead, those packets are handled according to the actions specified in the policer configuration. You can configure a two-color-marking policer to simply discard packets if the traffic flow is red. Alternatively, you can configure a two-color-marking policer to handle the packets in a red flow by setting the PLP level to either **low** or **high**, assigning the packets to any forwarding class already configured, or both.

On MX Series, M120, and M320 routers and M7i and M10i routers with the Enhanced CFEB (CFEB-E) and EX Series switches only, you can specify two additional PLP levels for packets in a red flow: **medium-low** or **medium-high**.

*Three-color-marking* policers categorize traffic as conforming to the traffic limits (green), violating the traffic limits (red), or exceeding the traffic limits but within an allowed range (yellow):

- **Green**—Like two-color-marking policers, three-color-marking policers implicitly set the packets in a green flow to the low PLP level, and you cannot configure any policer actions for conforming traffic.
- **Yellow**—Unlike two-color-marking policers, three-color-marking policers categorize a second type of nonconforming traffic: yellow.

Single-rate three-color policing categorizes as yellow traffic that exceeds the traffic limits while conforming to a second defined burst-size limit. Two-rate three-color policing categorizes as yellow traffic that exceeds the traffic limits while conforming to both a second defined burst-size limit and a second defined bandwidth limit.

Three-color-marking policers implicitly set the packets in a yellow flow to the medium-high PLP level so that the packets incur a less severe penalty than those in a red flow. You cannot configure any policer actions for yellow traffic.

- **Red**—Unlike two-color-marking policers, three-color-marking policers implicitly set the packets in a red flow to the high PLP level, which is the highest PLP value. You can also configure a three-color-marking policer to discard the packets in a red flow instead of forwarding them with a high PLP setting.

Two-color-marking policers allows bursts of traffic for short periods, whereas three-color-marking policers allow more sustained bursts of traffic.



## Forwarding Classes and PLP Levels

A packet's forwarding class assignment and PLP level are used by the Junos OS class of service (CoS) features. The Junos CoS features include a set of mechanisms that you can use to provide differentiated services when best-effort traffic delivery is insufficient. For router (and switch) interfaces that carry IPv4, IPv6, and MPLS traffic, you can configure CoS features to take in a single flow of traffic entering at the edge of your network and provide different levels of service across the network—internal forwarding and scheduling (queuing) for output—based on the forwarding class assignments and PLP levels of the individual packets.



**NOTE:** Forwarding-class or loss-priority assignments performed by a policer or a stateless firewall filter override any such assignments performed on the ingress by the CoS default IP precedence classification at all logical interfaces or by any configured behavior aggregate (BA) classifier that is explicitly mapped to a logical interface.

Based on CoS configurations, packets of a given forwarding class are transmitted through a specific output queue, and each output queue is associated with a transmission service level defined in a *scheduler*.

Based on other CoS configurations, when packets in an output queue encounter congestion, packets with higher loss-priority values are more likely to be dropped by the random early detection (RED) algorithm. Packet loss priority values affect the scheduling of a packet without affecting the packet's relative ordering within the traffic flow.

## Policer Application to Traffic

After you have defined and named a policer, it is stored as a template. You can later use the same policer name to provide the same policer configuration each time you want to use it. This eliminates the need to define the same policer values more than once.

You can apply a policer to a traffic flow in either of two ways:

- You can configure a standard stateless firewall filter that specifies the **policer *policer-name*** nonterminating action or the **three-color-policer (single-rate | two-rate) *policer-name*** nonterminating action. When you apply the standard filter to the input or output at a logical interface, the policer is applied to all packets of the filter-specific protocol family that match the conditions specified in the filter configuration.

With this method of applying a policer, you can define specific classes of traffic on an interface and apply traffic rate-limiting to each class.

- You can apply a policer directly to an interface so that traffic rate-limiting applies to all traffic on that interface, regardless of protocol family or any match conditions.

You can configure policers at the queue, logical interface, or Layer 2 (MAC) level. Only a single policer is applied to a packet at the egress queue, and the search for policers occurs in this order:

- Queue level
- Logical interface level
- Layer 2 (MAC) level

**Related Documentation**

- *Stateless Firewall Filter Overview.*
- *Traffic Policer Types*
- *Order of Policer and Firewall Filter Operations*
- *Packet Flow Through the CoS Process Overview*

## Understanding PoE on ACX Series Universal Access Routers

Power over Ethernet (PoE) is the implementation of the IEEE 802.3af and IEEE 802.3at standards that allows both data and electrical power to pass over a copper Ethernet LAN cable.

Juniper Networks provides PoE on ACX2000 Universal Access Routers that allows power delivery up to 65 W per PoE port. PoE ports transfer electrical power and data to remote devices over standard twisted-pair cables in an Ethernet network. Using the PoE ports, you can plug in devices that require both network connectivity and electrical power, such as voice over IP (VoIP) and wireless LAN access points.

You can configure the ACX2000 Universal Access Router to act as a power sourcing equipment (PSE), supplying power to powered devices that are connected on designated ports.

This topic contains the following sections:

- [ACX2000 PoE Specifications on page 42](#)
- [PoE Classes and Power Ratings on page 43](#)
- [PoE Options on page 43](#)

### ACX2000 PoE Specifications

[Table 9 on page 42](#) lists the PoE specifications for the ACX2000 routers.

**Table 9: PoE Specifications for the ACX2000 Routers**

Specifications	For ACX2000 Universal Access Routers
Supported standards	<ul style="list-style-type: none"> <li>• IEEE 802.3 AF</li> <li>• IEEE 802.3 AT (PoE+)</li> <li>• Legacy (pre-standards)</li> </ul>
Supported ports	Supported on only two Gigabit Ethernet ports (ge-0/1/3 and ge-0/1/7).
Total PoE power sourcing capacity	130 W

Table 9: PoE Specifications for the ACX2000 Routers (*continued*)

Specifications	For ACX2000 Universal Access Routers
Default per port power limit	32 W
Maximum per port power limit	65 W
Power management modes	<ul style="list-style-type: none"> <li>• <b>class</b>—Power allocated for each interface can be configured.</li> <li>• <b>static</b>—Power allocated for interfaces is based on the class of powered device connected.</li> <li>• <b>high-power</b>—Power allocated for interfaces up to 65 W per port.</li> </ul>

## PoE Classes and Power Ratings

A powered device is classified based on the maximum power that it draws across all input voltages and operational modes. When class-based power management mode is configured on the ACX2000 routers, power is allocated taking into account the maximum power ratings defined for the different classes of devices.

Table 10 on page 43 lists the classes and their power ratings as specified by the IEEE standards.

Table 10: ACX2000 Universal Access Router PoE Specifications

Class	Usage	Minimum Power Levels Output from PoE Port
0	Default	15.4 W
1	Optional	4.0 W
2	Optional	7.0 W
3	Optional	15.4 W
4	Reserved	Class 4 power devices are eligible to receive power up to 30 W according to the IEEE standards.

## PoE Options

For ACX2000 Universal Access Routers that support PoE ports, the factory default configuration enables PoE on the PoE-capable ports, with default settings in effect. You might not have to do any additional configuration if the default settings work for you. Table 11 on page 44 shows the PoE configuration options and their default settings for the PoE controller and for the PoE interfaces.

Table 11: PoE Configuration Options and Default Settings

Option	Default	Description
PoE Controller Options		
<b><i>guard-band</i></b>	0 W	Reserves up to 19 W power from the PoE power budget to be used in the case of a spike in PoE power consumption.
<b><i>management</i></b>	static	<p>Sets the PoE power management mode for the router. The power management mode determines how power to a PoE interface is allocated:</p> <ul style="list-style-type: none"> <li>• <b>class</b>—Power allocated for each interface can be configured.</li> <li>• <b>static</b>—Power allocated for interfaces is based on the class of powered device connected.</li> <li>• <b>high-power</b>—Power allocated for interfaces up to 65 W per port.</li> </ul>
Interface Options		
<b><i>disable (Power over Ethernet)</i></b>	Not included in default configuration	When included in the configuration, disables PoE on the interface. The interface maintains network connectivity but no longer supplies power to a connected powered device. Power is not allocated to the interface.
<b><i>priority (Power over Ethernet)</i></b>	low	Sets an interface's power priority to either <b>low</b> or <b>high</b> . If power is insufficient for all PoE interfaces, the PoE power to low-priority interfaces is shut down before power to high-priority interfaces is shut down. Among interfaces that have the same assigned priority, the power priority is determined by port number, with lower-numbered ports having higher priority.
<b><i>telemetries</i></b>	Not included in default configuration	When included in the configuration, enables the logging of power consumption records on an interface. Logging occurs every 5 minutes for 1 hour unless you specify a different value for <b><i>interval (Power over Ethernet)</i></b> or <b><i>duration</i></b> .

- Related Documentation**
- [Example: Configuring PoE on ACX2000 Routers on page 245](#)
  - [Example: Disabling a PoE Interface on ACX2000 Routers on page 249](#)

## CHAPTER 3

# Autoinstallation

- [ACX Series Autoinstallation Overview on page 45](#)
- [Before You Begin Autoinstallation on an ACX Series Universal Access Router on page 47](#)
- [Autoinstallation Configuration of ACX Series Universal Access Routers on page 48](#)
- [Verifying Autoinstallation on ACX Series Universal Access Routers on page 49](#)
- [USB Autoinstallation on ACX Series Routers on page 50](#)

### ACX Series Autoinstallation Overview

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Autoinstallation provides automatic configuration for a new router that you connect to the network and turn on, or for a router configured for autoinstallation. The autoinstallation process begins anytime a router is powered on and cannot locate a valid configuration file in the CompactFlash (CF) card. Typically, a configuration file is unavailable when a router is powered on for the first time, or if the configuration file is deleted from the CF card. The autoinstallation feature enables you to deploy multiple routers from a central location in the network.

For the autoinstallation process to work, you must store one or more host-specific or default configuration files on a configuration server in the network and have a service available—typically Dynamic Host Configuration Protocol (DHCP)—to assign an IP address to the router.

Autoinstallation takes place automatically when you connect an Ethernet on a new Juniper Networks router to the network and power on the router. To simplify the process, you can explicitly enable autoinstallation on a router and specify a configuration server, an autoinstallation interface, and a protocol for IP address acquisition.

This topic describes:

- [Supported Autoinstallation Interfaces and Protocols on page 45](#)
- [Typical Autoinstallation Process on a New Router on page 46](#)

### Supported Autoinstallation Interfaces and Protocols

Before autoinstallation on a router can take place, the router must acquire an IP address or a USB key. The protocol or protocols you choose for IP address acquisition determine the router interface to connect to the network for autoinstallation. The router detects the connected interface and requests an IP address with a protocol appropriate for the

interface. Autoinstallation is supported over an Ethernet LAN interface. For IP address acquisition, the ACX Series router uses DHCP, BOOTP, or Reverse Address Resolution Protocol (RARP) on an Ethernet LAN interface.

If the server with the autoinstallation configuration file is not on the same LAN segment as the new router, or if a specific router is required by the network, you must configure an intermediate router directly attached to the new router, through which the new router can send HTTP, FTP, Trivial File Transfer Protocol (TFTP), BOOTP, and Domain Name System (DNS) requests. In this case, you specify the IP address of the intermediate router as the location to receive HTTP, FTP, or TFTP requests for autoinstallation.

## Typical Autoinstallation Process on a New Router

When a router is powered on for the first time, it performs the following autoinstallation tasks:

1. The new router sends out DHCP, BOOTP, or RARP requests on each connected interface simultaneously to obtain an IP address.

If a DHCP server responds, it provides the router with some or all of the following information:

- An IP address and subnet mask for the autoinstallation interface.
- The location of the TFTP (typically), Hypertext Transfer Protocol (HTTP), or FTP server on which the configuration file is stored.
- The name of the configuration file to be requested from the HTTP, FTP, or TFTP server.
- The IP address or hostname of the HTTP, FTP, or TFTP server.

If the DHCP server provides only the hostname, a DNS server must be available on the network to resolve the name to an IP address.

- The IP address of an intermediate router if the configuration server is on a different LAN segment from the new router.
2. After the new router acquires an IP address, the autoinstallation process on the router attempts to download a configuration file in the following ways:
    - a. If the configuration file is specified as a URL, the router fetches the configuration file from the URL by using HTTP, FTP, or TFTP depending on the protocol specified in the URL.
    - b. If the DHCP server specifies the host-specific configuration file (boot file) **hostname.conf**, the router uses that filename in the TFTP server request. (In the filename, **hostname** is the hostname of the new router.) The autoinstallation process on the new router makes three unicast TFTP requests for **hostname.conf**. If these attempts fail, the router broadcasts three requests to any available TFTP server for the file.
    - c. If the new router cannot locate **hostname.conf**, the autoinstallation process unicasts or broadcasts TFTP requests for a default router configuration file called

**network.conf**, which contains hostname-to-IP address mapping information, to attempt to find its hostname.

- d. If **network.conf** contains no hostname entry for the new router, the autoinstallation process sends out a DNS request and attempts to resolve the new router's IP address to a hostname.
  - e. If the new router can determine its hostname, it sends a TFTP request for the **hostname.conf** file.
  - f. If the new router is unable to map its IP address to a hostname, it sends TFTP requests for the default configuration file **router.conf**.
3. After the new router locates a configuration file on a TFTP server, autoinstallation downloads the file, installs the file on the router, and commits the configuration.

**Related  
Documentation**

- [Before You Begin Autoinstallation on an ACX Series Universal Access Router on page 47](#)
- [Autoinstallation Configuration of ACX Series Universal Access Routers on page 48](#)
- [Verifying Autoinstallation on ACX Series Universal Access Routers on page 49](#)
- [USB Autoinstallation on ACX Series Routers on page 50](#)
- [autoinstallation](#)
- [show system autoinstallation status on page 944](#)

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## Before You Begin Autoinstallation on an ACX Series Universal Access Router

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To configure a router for autoinstallation, complete the following tasks:

- Make sure you have a DHCP server on your network to meet your network requirements.
- Create one of the following configuration files and store it on an HTTP, FTP, or TFTP server in the network:
  - A host-specific file with the name **hostname.conf** for each router undergoing autoinstallation. Replace **hostname** with the name of a router. The **hostname.conf** file typically contains all the configuration information necessary for the router with this hostname.
  - A default configuration file named **router.conf** with the minimum configuration necessary to enable you to telnet into the new router for further configuration.
- Physically attach the router to the network using a Gigabit Ethernet interface.
- If you configure the DHCP server to provide only the HTTP, FTP, or TFTP server hostname, add an IP address-to-hostname mapping entry for the HTTP, FTP, or TFTP server to the DNS database file on the DNS server in the network.
- If the new router is not on the same network segment as the DHCP server (or other router providing IP address resolution), configure an existing router as an intermediate to receive HTTP, FTP, or TFTP and DNS requests and forward them to the HTTP, FTP, or TFTP and DNS servers. You must configure the LAN on the intermediate router with

the IP addresses of the hosts providing HTTP, FTP, or TFTP and DNS service. Connect this interface to the new router.

- If you are using **hostname.conf** files for autoinstallation of host-specific configuration files, you must also complete the following tasks:
  - Configure the DHCP server to provide a **hostname.conf** filename to each new router. Each router uses its **hostname.conf** filename to request a configuration file from the TFTP server. Copy the necessary **hostname.conf** configuration files to the TFTP server.
  - Create a default configuration file named **network.conf** and copy it to the TFTP server. This file contains IP address-to-hostname mapping entries. If the DHCP server does not send a **hostname.conf** filename to a new router, the router uses **network.conf** to resolve its hostname based on its IP address.

Alternatively, you can add the IP address-to-hostname mapping entry for the new router to a DNS database file.

The router uses the hostname to request a **hostname.conf** file from the server.

#### Related Documentation

- [ACX Series Autoinstallation Overview on page 45](#)
- [Autoinstallation Configuration of ACX Series Universal Access Routers on page 48](#)
- [Verifying Autoinstallation on ACX Series Universal Access Routers on page 49](#)
- [USB Autoinstallation on ACX Series Routers on page 50](#)
- [autoinstallation](#)
- [show system autoinstallation status on page 944](#)

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## Autoinstallation Configuration of ACX Series Universal Access Routers

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No configuration is required on a router on which you are performing autoinstallation because it is an automated process. However, to simplify the process, you can specify one or more interfaces, protocols, and configuration servers to be used for autoinstallation.

To configure autoinstallation:

1. Specify the URL address of one or more servers from which to obtain configuration files.

```
[edit system]
```

```
user@host# set autoinstallation configuration-servers tftp://tftpconfig.sp.com
```



**NOTE:** You can also use an HTTP or FTP address—for example, `http://user:password@httpconfig.sp.com` or `ftp://user:password@sftpconfig.sp.com`.

2. Configure one or more Ethernet interfaces to perform autoinstallation and IP address acquisition protocols for each interface. The router uses the protocols to send a request for an IP address for the interface:



```
[edit system]
user@host# set autoinstallation interfaces ge-0/0/0 bootp
```

- Related Documentation**
- [ACX Series Autoinstallation Overview on page 45](#)
  - [Before You Begin Autoinstallation on an ACX Series Universal Access Router on page 47](#)
  - [Verifying Autoinstallation on ACX Series Universal Access Routers on page 49](#)
  - [USB Autoinstallation on ACX Series Routers on page 50](#)
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## Verifying Autoinstallation on ACX Series Universal Access Routers

**Purpose** After you have configured autoinstallation, display the status of autoinstallation on an ACX Series router.

**Action** From the CLI, enter the **show system autoinstallation status** command.

### Sample Output

```
user@host> show system autoinstallation status
Autoinstallation status:
  Master state: Active
  Last committed file: None
  Configuration server of last committed file: 10.25.100.1
  Interface:
    Name: ge-0/1/0
    State: Configuration Acquisition
    Acquired:
      Address: 192.168.124.75
      Hostname: host-ge-000
      Hostname source: DNS
      Configuration filename: router-ge-000.conf
      Configuration filename server: 10.25.100.3
    Address acquisition:
      Protocol: DHCP Client
      Acquired address: None
      Protocol: RARP Client
      Acquired address: None
  Interface:
    Name: ge-0/1/1
    State: None
    Address acquisition:
      Protocol: DHCP Client
      Acquired address: None
      Protocol: RARP Client
      Acquired address: None
```

**Meaning** The output shows the settings configured for autoinstallation. Verify that the values displayed are correct for the router when it is deployed on the network.

- Related Documentation**
- [ACX Series Autoinstallation Overview on page 45](#)

- [Before You Begin Autoinstallation on an ACX Series Universal Access Router on page 47](#)
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## USB Autoinstallation on ACX Series Routers

If you have a new ACX Series router, you can use a Disk-on-Key USB memory stick (“USB key”) to configure the router.

This configuration method has the following requirements:

- A management device (PC or laptop).
- A Disk-on-Key device with one of the following 16-bit or 32-bit file allocation table (FAT) file systems:
  - DOS 3.0+ 16-bit FAT (up to 32 MB)
  - DOS 3.31+ 16-bit FAT (over 32 MB)
  - FAT32
  - FAT32, LBA-mapped
  - 16-bit FAT, LBA-mapped
- An ACX Series router with the factory configuration. If other Junos OS configuration files exist on the router, the router cannot read the **juniper-config.txt** file from the Disk-on-Key device.



**NOTE:** The USB-based autoinstallation process overrides the network-based autoinstallation process. If the ACX Series router detects a USB Disk-on-Key device containing a valid configuration file during autoinstallation, it configures the router using the configuration file on Disk-on-Key instead of fetching the configuration from the network.

---

To configure an ACX Series router using Disk-on-Key:

1. Using a text editor on a PC or laptop, create the configuration file, named *juniper-config.txt*, as a sequence of configuration commands (“set” commands). To reuse configuration from another ACX Series router, the configuration can be saved in configuration mode as a sequence of configuration commands on the router using the “**show | display set | save <filename>**” command and then copying the <filename> to the PC or router as *juniper-config.txt*.
2. Copy the *juniper-config.txt* file to a Disk-on-Key device.
3. Plug the Disk-on-Key device into the USB port on the new ACX Series router.

4. Power on the router by pressing the POWER button on the front panel. Wait for the router to start and access the Disk-on-Key device (observe the LEDs on the Disk-on-Key device).

The router reads the *juniper-config.txt* file from the Disk-on-Key device and commits the configuration.

5. Remove the Disk-on-Key device from the router.
6. The configuration of the router is complete.

**Related  
Documentation**

- [ACX Series Autoinstallation Overview on page 45](#)
- [Autoinstallation Configuration of ACX Series Universal Access Routers on page 48](#)
- [Before You Begin Autoinstallation on an ACX Series Universal Access Router on page 47](#)
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## CHAPTER 4

# CoS

- CoS on ACX Series Universal Access Routers Features Overview on page 53
- CoS on ATM IMA Pseudowire Interfaces Overview on page 54
- Understanding CoS CLI Configuration Statements on ACX Series Universal Access Routers on page 56
- Configuring CoS on ACX Series Universal Access Routers on page 58
- Configuring Classifiers and Rewrite Rules at the Global and Physical Interface Levels on page 63
- Configuring Fixed Classification on an ATM IMA Pseudowire on page 64
- Configuring Policing on an ATM IMA Pseudowire on page 65
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- Example: Configuring Fixed Classification on an ATM IMA Pseudowire on page 69
- Example: Configuring Policing on an ATM IMA Pseudowire on page 71
- Example: Configuring Shaping on an ATM IMA Pseudowire on page 76

### CoS on ACX Series Universal Access Routers Features Overview

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The following key CoS features are supported on ACX Series Universal Access Routers:

- Physical interface-based classifiers at the **[edit class-of-service interfaces *interfaces-name*]** hierarchy level
- Fixed classification for all ingress packets traversing a logical interface to a single forwarding class. Fixed classification is supported on all interface types.
- EXP bits located in each MPLS label and used to encode the CoS value of a packet as it traverses a label-switched path (LSP). To configure global EXP bits, include the **exp** statement at the **[edit class-of-service system-defaults classifiers]** hierarchy level.
- Rewrite rules at the physical and logical interface levels including the following: IP type-of-service (ToS), DSCP, MPLS EXP bit value, and IEEE 802.1p bit value.

- Attachment of the following rewrite rules to the physical interface at the [edit class-of-service interfaces *interface-name* rewrite-rules] hierarchy level: IP ToS, DSCP, and IEEE 802.1p bit value.
- Rewrite rules for MPLS EXP bits on the logical interface at the [edit class-of-service interfaces *interface-name* unit *unit-number* rewrite-rule] hierarchy level.



**NOTE:** Fine-grained rewrite is not possible, even when you use multifield filters, because of the application-specific integrated circuit (ASIC) limitation.

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Queuing and scheduling features include:

- Support for up to eight forwarding classes.
- Support for up to eight egress queues per port.
- Internal buffer of 2 MB with per-egress queue buffer management.
- Three weighted random early detection (WRED) curves for TCP and one WRED curve for non-TCP. There are two fill levels and two drop probabilities per WRED curve; the drop probability corresponding to the first fill must be zero.
- Strict-priority and weighted deficit round-robin scheduling.
- Multiple strict-priority queues per port.
- Per-queue committed information rate (CIR) and peak information rate (PIR).
- Per-physical-port shaping.

Queue statistics features include:

- Per-egress-queue enqueue statistics in packets, bytes, packets per second (pps), and bits per second (bps).
- Per-egress-queue transmit statistics in packets, bytes, pps, and bps.
- Per-egress-queue drop statistics in packets and pps.

#### Related Documentation

- [Understanding CoS CLI Configuration Statements on ACX Series Universal Access Routers on page 56](#)
- [Configuring CoS on ACX Series Universal Access Routers on page 58](#)

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## CoS on ATM IMA Pseudowire Interfaces Overview

ACX Series routers configured with Asynchronous Transfer Mode (ATM) Inverse Multiplexing ATM (IMA) pseudowire interfaces support class of service (CoS) features for ingress and egress traffic. Policing is performed by monitoring the configured parameters on incoming traffic to conserve resources by dropping traffic that may not

meet those configured parameters. Egress shaping uses queuing and scheduling to control the bandwidth used. Fixed classification is provided per interface.

ATM IMA pseudowires with the following encapsulation are supported:

- **atm-ccc-cell-relay**
- **atm-ccc-vc-mux**

The following ATM IMA CoS features are supported:

- [ATM Policing \(Cell Based\) on page 55](#)
- [ATM Shaping \(Cell Based\) on page 56](#)
- [Fixed Classification on page 56](#)

## ATM Policing (Cell Based)

Policing, or rate limiting, enables you to limit the amount of traffic that passes into or out of the interface. It works with firewall filters to thwart denial-of-service (DoS) attacks. Networks police traffic by limiting the input or output transmission rate of a class of traffic on the basis of user-defined criteria. The ATM policer controls the maximum rate of traffic sent from or received on the interface on which it is applied. To apply limits to the traffic flow, configure the **cdvt** and **peak-rate** parameters within the policer. Define the **policing-action** parameter as **discard**, **discard-tag**, or **count** to set a consequence for the packets that exceed these limits. The consequence of configuring the **discard-tag** statement is usually a higher loss priority so that if those packets encounter downstream congestion, they are discarded first.

On ACX Series routers, policing is cell based and configured in the ingress path of the ATM IMA pseudowire interface at the [**edit firewall**] hierarchy level. The following ATM policing features are supported:

- ATM Adaption Layer 5 (AAL5) pseudowires on which cell-based policing is performed before packet assembly.
- Per-ATM IMA channel policing.
- Traffic classes—Constant bit rate (**cbr**), real-time variable bit rate (**rtvbr**), nonreal-time variable bit rate (**nrtvbr**), and unspecified bit rate (**ubr**). All traffic classes must include the **peak-rate** and **cdvt** statements for the configuration to work. With the **peak-rate** statement, you can limit the maximum traffic allowed by specifying the largest number of cells per second that the policer processes before it drops packets. The **cdvt** statement ensures that the configuration functions correctly.

With the **peak-rate** statement, you can limit the maximum traffic allowed by specifying the largest number of cells per second that the policer processes before it drops packets

- For nonconforming cells, the **discard**, **discard-tag**, and **count** actions at the [**edit firewall atm-policer *policer-name***] hierarchy level. The **discard-tag** action is applicable to variable bit-rate—**nrtvbr** and **rtvbr**—traffic classes.

## ATM Shaping (Cell Based)

ATM cell-based shaping uses cell-based queuing and scheduling to determine the maximum amount of traffic that can be transmitted on an ATM IMA pseudowire. Packet-based shaping is not supported. On ACX Series routers, ATM shaping is configured in the egress path of the ATM IMA pseudowire interface at the **[edit class-of-service]** hierarchy level. The following ATM shaping features are supported:

- Prioritized bit rate—Constant bit rate (**cbr**) is the highest priority, followed by variable bit rate—**nrtvbr** and **rtvbr**. Unspecified bit rate (**ubr**) is similar to the *best-effort* service for Ethernet traffic.
- Constant bit rate shaping—Constant bit rate (**cbr**) shaping uses the peak cell rate to limit the number of cells per second that the shaper processes before it drops packets.
- Variable bit rate shaping—Variable bit rate shaping (**nrtvbr** and **rtvbr**) uses **peak-rate** and **sustained-rate**.
- Unspecified bit rate—Unspecified bit rate (**ubr**) uses **peak-rate** with the lowest transmit priority.
- Default shaping parameter—The default shaping parameter is Unspecified bit rate, which is similar to the *best-effort* service for Ethernet traffic.

## Fixed Classification

Fixed classifiers map all traffic on an interface to the forwarding class and loss priority. The forwarding class determines the output queue. A scheduler uses the loss priority to control packet discard during periods of congestion by associating different drop profiles with different loss priorities. On ACX Series routers, the fixed classifier is associated with the ingress interface. Packets are assigned on the basis of the type of fixed classification associated with the logical interface. To configure a fixed classifier, include the **forwarding-class class-name** statement at the **[edit class-of-service interface interface-name unit logical-unit-number]** hierarchy level.

### Related Documentation

- [Configuring Fixed Classification on an ATM IMA Pseudowire on page 64](#)
- [Configuring Policing on an ATM IMA Pseudowire on page 65](#)
- [Configuring Shaping on an ATM IMA Pseudowire on page 68](#)

---

## Understanding CoS CLI Configuration Statements on ACX Series Universal Access Routers

ACX Series Universal Access Routers have some statements or statement options supported on other platforms that are not supported or may not have effect on ACX Series devices.

The following CLI options are not applicable to ACX Series Universal Access Routers:

```
[edit class-of-service schedulers scheduler-name priority-level]  
low;
```



```

medium-low;
medium-high;
high;

```

Configure the strict-high-priority queue with unlimited transmission bandwidth so that all traffic receives precedence over any non strict-high priority queues.

At the `[edit class-of-service classifiers type classifier-name]` hierarchy level, the **dscp-ipv6** and **ieee-802.1ad** classifier types are not supported. For the **dscp** classifier type, only the outer tag is supported.

The following CLI stanza is not applicable to ACX Series Universal Access Routers.

```

[edit class-of-service interfaces interface-name]
irb {
  unit logical-unit-number {
    classifiers {
      type (classifier-name | default);
    }
    rewrite-rules {
      dscp (rewrite-name | default);
      dscp-ipv6 (rewrite-name | default);
      exp (rewrite-name | default) protocol protocol-types;
      ieee-802.1 (rewrite-name | default) vlan-tag (outer | outer-and-inner);
      inet-precedence (rewrite-name | default);
    }
  }
}

```

The following CLI statements are not applicable to ACX Series Universal Access Routers.

```

[edit class-of-service routing-instances routing-instance-name]

[edit class-of-service scheduler-map-chassis map-name]

[edit class-of-service interfaces interface-name unit logical-unit-number]
input-shaping-rate (percent percentage | rate);
input-traffic-control-profile profiler-name shared-instance instance-name;
output-traffic-control-profile profile-name shared-instance instance-name;
per-session-scheduler;
scheduler-map map-name;
shaping-rate rate;

[edit class-of-service interfaces iinterface-name unit logical-unit-number]
classifiers {
  type (classifier-name | default);
}
rewrite-rules {
  dscp (rewrite-name | default);
  dscp-ipv6 (rewrite-name | default);
  exp (rewrite-name | default) protocol protocol-types;
  exp-push-push-push default;
  exp-swap-push-push default;
  ieee-802.1 (rewrite-name | default) vlan-tag (outer | outer-and-inner);
  inet-precedence (rewrite-name | default);
}

```

In the above stanza, `[edit class-of-service interface-name unit logical-unit-number rewrite-rule exp (rewrite-name | default)]` is supported. However, edit `[class-of-service interface-name unit logical-unit-number rewrite-rule exp protocol protocol type]` is not supported.

```
[edit class-of-service interfaces interface-name interface-set interface-set-name]
excess-bandwidth-share;
internal-node;
output-traffic-control-profile profile-name;
output-traffic-control-profile-remaining profile-name;
```

- Related Documentation**
- [CoS on ACX Series Universal Access Routers Features Overview on page 22](#)
  - [Configuring CoS on ACX Series Universal Access Routers on page 58](#)

---

## Configuring CoS on ACX Series Universal Access Routers

Physical interface-based classifiers are supported at the `[edit class-of-service interfaces interfaces-name]` hierarchy level. EXP bits are located in each MPLS label and used to encode the CoS value of a packet as it traverses an LSP. To configure global EXP bits, include the `exp` statement at the `[edit class-of-service system-defaults classifiers]` hierarchy level.

To configure CoS on ACX Series routers:

1. Configure the class of service.

```
[edit]
user@host# edit class-of-service
```

2. Configure the rewrite rules.

```
[edit class-of-service]
user@host# edit rewrite-rules (dscp | inet-precedence) rewrite-name
user@host# edit forwarding-class class-name
user@host# set loss-priority low class-name code-points (alias | bits)
```

3. Configure behavior aggregate classifiers for DiffServ CoS.

```
[edit class-of-service]
user@host# edit classifiers (dscp | inet-precedence) classifier-name
user@host# edit forwarding-classes class-name
user@host# set loss-priority class-name code-points (alias | bits)
```

4. Configure expedited forwarding class classifiers.

```
[edit class-of-service classifiers]
user@host# edit forwarding-classes class-name
user@host# set loss-priority class-name code-points (alias | bits)
```

5. Define the forwarding-class mappings.

```
[edit class-of-service]
user@host# edit forwarding-classes class queue-number queue-number
```

6. Configure network control forwarding class classifiers.

```
[edit class-of-service]
```

```

user@host# edit forwarding-class class-name
user@host# set loss-priority low class-name code-points (alias | bits)

```

7. Apply the rewrite rules and classifiers to the interfaces.

```

[edit class-of-service interface interface-name unit unit-number]
user@host# set rewrite-rule (dscp | inet-precedence ) (rewrite-name| default)
user@host# set classifiers (dscp | inet-precedence ) classifier-name | default)

```

8. Set the global system default.

```

[edit ]
user@host# edit class-of-service system-defaults classifiers exp classifier-name

```

Following is a complete configuration. This example configures ge-1/0/2 as a network-to-network (NNI) and ge-1/0/1 as a user-to-network (UNI) interface on the ACX Series router F1, and ge-1/0/3 as an NNI and ge-1/0/4 as a UNI on F2. In addition, the configuration includes the following:

- Fixed classification of customer traffic on UNI ports.
- Diffserv code point (DSCP)-based BA classification and rewrites on NNI ports for IP control traffic at port level.
- EXP-based global behavior aggregate (BA) classification and rewrites on NNI ports for customer traffic from F1 to F2 by using pseudowire.

Common CoS configuration at F1 and F2:

```

[edit]
class-of-service {
  classifiers {
    dscp dscp-classf-core {
      forwarding-class be {
        loss-priority low code-points 011101;
      }
      forwarding-class be1 {
        loss-priority high code-points 010101;
      }
      forwarding-class ef {
        loss-priority low code-points 001101;
      }
      forwarding-class ef2 {
        loss-priority high code-points 000101;
      }
      forwarding-class af {
        loss-priority low code-points 011001;
      }
      forwarding-class af1 {
        loss-priority high code-points 010001;
      }
      forwarding-class nc {
        loss-priority low code-points 001001;
      }
      forwarding-class nc3 {
        loss-priority high code-points 000001;
      }
    }
  }
}

```

```
}
exp exp-rewrite-core {
  forwarding-class be {
    loss-priority low code-point 111;
  }
  forwarding-class be1 {
    loss-priority high code-point 110;
  }
  forwarding-class ef {
    loss-priority low code-point 101;
  }
  forwarding-class ef2 {
    loss-priority high code-point 100;
  }
  forwarding-class af {
    loss-priority low code-point 011;
  }
  forwarding-class af1 {
    loss-priority high code-point 010;
  }
  forwarding-class nc {
    loss-priority low code-point 001;
  }
  forwarding-class nc3 {
    loss-priority high code-point 000;
  }
}
}
forwarding-classes {
  class be queue-num 0;
  class ef queue-num 1;
  class af queue-num 2;
  class nc queue-num 3;
  class be1 queue-num 4;
  class ef1 queue-num 5;
  class af1 queue-num 6;
  class nc1 queue-num 7;
  class be2 queue-num 0;
  class ef2 queue-num 1;
  class af2 queue-num 2;
  class nc2 queue-num 3;
  class be3 queue-num 4;
  class ef3 queue-num 5;
  class af3 queue-num 6;
  class nc3 queue-num 7;
}
rewrite-rules {
  dscp dscp-rewrite-core {
    forwarding-class be {
      loss-priority low code-point 100000;
    }
    forwarding-class be1 {
      loss-priority high code-point 100001;
    }
    forwarding-class ef {
      loss-priority low code-point 100010;
```

```

}
forwarding-class ef2 {
    loss-priority high code-point 100011;
}
forwarding-class af {
    loss-priority low code-point 100100;
}
forwarding-class af1 {
    loss-priority high code-point 100101;
}
forwarding-class nc {
    loss-priority low code-point 100110;
}
forwarding-class nc3 {
    loss-priority high code-point 100111;
}
exp exp-rewrite-core {
    forwarding-class be {
        loss-priority low code-point 111;
    }
    forwarding-class be1 {
        loss-priority high code-point 110;
    }
    forwarding-class ef {
        loss-priority low code-point 101;
    }
    forwarding-class ef2 {
        loss-priority high code-point 100;
    }
    forwarding-class af {
        loss-priority low code-point 011;
    }
    forwarding-class af1 {
        loss-priority high code-point 010;
    }
    forwarding-class nc {
        loss-priority low code-point 001;
    }
    forwarding-class nc3 {
        loss-priority high code-point 000;
    }
}
}

```

CoS configuration at F1:

```

class-of-service {
    interfaces {
        ge-1/0/1 {
            unit 0 {
                forwarding-class be;
            }
        }
        ge-1/0/2 {
            classifiers {
                dscp dscp-classf-core;
            }
        }
    }
}

```

```
    }
    rewrite-rules {
        dscp dscp-rewrite-core;
    }
    unit 0 {
        rewrite-rules {
            exp exp-rewrite-core;
        }
    }
}
}
system-defaults {
    classifiers {
        exp exp-classf-core;
    }
}
}
```

CoS configuration at F2:

```
class-of-service {
    interfaces {
        ge-1/0/4 {
            unit 0 {
                forwarding-class be;
            }
        }
        ge-1/0/3 {
            classifiers {
                dscp dscp-classf-core;
            }
            rewrite-rules {
                dscp dscp-rewrite-core;
            }
            unit 0 {
                rewrite-rules {
                    exp exp-rewrite-core;
                }
            }
        }
    }
}
system-defaults {
    classifiers {
        exp exp-classf-core;
    }
}
}
```

**Related  
Documentation**

- [CoS on ACX Series Universal Access Routers Features Overview on page 22](#)
- [Understanding CoS CLI Configuration Statements on ACX Series Universal Access Routers on page 56](#)

## Configuring Classifiers and Rewrite Rules at the Global and Physical Interface Levels

On ACX Series Universal Access Routers and EX Series switches, CoS supports classification and rewrite at the global and physical interface levels.

To configure the global EXP classifier, include the following statements at the **[edit class-of-service] system-defaults** hierarchy level.

```
[edit class-of-service]
{
  system-defaults
  {
    classifiers exp classifier-name
  }
}
```

CoS supports one global system default classifier of the EXP type, as shown in the following example:

```
[edit class-of-service]
{
  system-defaults {
    classifiers {
      exp exp-classf-core;
    }
  }
}
```

To configure classifiers and rewrite rules at the physical interface level, include the following statements at the **[edit class-of-service] interfaces** hierarchy level.

```
[edit class-of-service]
interfaces {
  interface-name
  classifiers dscp classifier-name
  classifiers inet-precedence classifier-name
  classifiers ieee-802.1 [vlan-tag (outer | inner)] classifier-name
  rewrite-rules dscp rewrite-name
  rewrite-rules inet-prec rewrite-name
  rewrite-rules ieee-802.1 rewrite-name
}
```

The following example shows classifiers and rewrite rules configured on physical interfaces:

```
ge-0/1/0 {
  unit 0 {
    rewrite-rules {
      exp custom-exp;
    }
  }
  classifiers {
    dscp dl;
    ieee-802.1 ci;
  }
}
```

```
rewrite-rules {
  dscp default;
}
ge-0/1/2 {
  classifiers {
    ieee-802.1 ci;
  }
  rewrite-rules {
    ieee-802.1 ri;
  }
}
ge-0/1/3 {
  unit 0 {
    rewrite-rules {
      exp custom-exp2;
    }
  }
}
ge-0/1/7 {
  classifiers {
    dscp d1;
  }
}
ge-0/1/8 {
  classifiers {
    dscp d1;
  }
}
```

**Related Documentation** • [Classifiers and Rewrite Rules at the Global and Physical Interface Levels Overview on page 21](#)

---

## Configuring Fixed Classification on an ATM IMA Pseudowire

You configure fixed classification on the ATM IMA pseudowire logical interface (unit) by specifying a forwarding class, which is applied to all packets received by the logical interface. To complete this configuration, you can define a forwarding class at the **[edit class-of-service forwarding-classes]** hierarchy level or by not defining a forwarding class, the default class is used.

The following steps require you to navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the *CLI User Guide*.

To configure CoS fixed classification on an ATM IMA pseudowire:

1. Define the ATM IMA pseudowire. For information about defining the ATM IMA pseudowire, see [“Configuring Inverse Multiplexing for ATM \(IMA\)” on page 204](#).
2. In configuration mode, go to the **[edit class-of-service]** hierarchy level:

```
[edit]
user@host# edit class-of-service
```



3. Define the forwarding class to apply to the input logical interface, if the default forwarding class is not used:

```
[edit class-of-service]
user@host# set forwarding-classes class class-name queue-num queue-num
```

4. Specify the ATM IMA interface on which to include the forwarding class:

```
[edit class-of-service]
user@host# edit interfaces at-fpc/pic/port
```

5. Configure the logical unit:

```
[edit class-of-service interfaces at-fpc/pic/port]
user@host# edit unit logical-unit-number
```

6. Apply the forwarding class to the logical interface:

```
[edit class-of-service interfaces at-fpc/pic/port unit logical-unit-number]
user@host# set forwarding-class class-name
```

After you have configured fixed classification, enter the **commit** command from configuration mode.

#### Related Documentation

- [CoS on ATM IMA Pseudowire Interfaces Overview on page 54](#)
- [Example: Configuring Fixed Classification on an ATM IMA Pseudowire on page 69](#)
- [Configuring Policing on an ATM IMA Pseudowire on page 65](#)
- [Configuring Shaping on an ATM IMA Pseudowire on page 68](#)

## Configuring Policing on an ATM IMA Pseudowire

On ACX Series routers, the ATM policer is attached to the ingress path of the ATM IMA interface, making it an input policer configured at the **[edit firewall]** hierarchy level. This input policer is then applied to an ATM IMA logical interface. The ATM IMA logical interface must have circuit cross-connect (CCC) family encapsulation configured for the configuration to work.

The following steps require you to navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the *CLI User Guide*.

This topic includes the following tasks:

1. [Configuring an Input Policer on page 65](#)
2. [Configuring the ATM IMA Interface on page 67](#)

### Configuring an Input Policer

To configure policing on an ATM IMA pseudowire:

1. Define the ATM IMA pseudowire. For information about defining the ATM IMA pseudowire, see [“Configuring Inverse Multiplexing for ATM \(IMA\)” on page 204](#).
2. In configuration mode, go to the **[edit firewall]** hierarchy level:

```
[edit]
user@host# edit firewall
```

3. Define the policer:

```
[edit firewall]
user@host# edit atm-policer atm-policer-name
```

The following steps describe the ATM policer options that you can configure. The options include: **atm-service**, **cdvt**, **logical-interface-policer**, **max-burst-size**, **peak-rate**, **policing-action**, and **sustained-rate**.

4. Specify the ATM service category:

```
[edit firewall atm-policer atm-policer-name]
user@host# set atm-service (cbr | nrt-vbr | rt-vbr | ubr)
```

Select one of the following service categories, depending on the policing needs of your network: constant bit rate (**cbr**), nonreal-time variable bit rate (**nrtvbr**), real-time variable bit rate (**rtvbr**), and unspecified bit rate **ubr**. All service categories must include the **peak-rate** and **cdvt** statements for the configuration to work. The **peak-rate** statement limits the maximum traffic allowed and the **cdvt** statement ensures that the configuration functions correctly.

5. Apply limits to the traffic flow by configuring the cell delay variation tolerance (**cdvt**), from 1 microsecond through 1,800,000,000 microseconds:

```
[edit firewall atm-policer atm-policer-name]
user@host# set cdvt cdvt-time
```

6. (Optional) Define the policer as a logical interface policer:

```
[edit firewall atm-policer atm-policer-name]
user@host# set logical-interface-policer
```

The logical interface policer is associated with the interface on which the policer is applied. To configure the policer on multiple interfaces, you must apply this policer on each interface explicitly.

7. (Optional) Define the maximum number of cells that a burst of traffic can contain, from 1 through 4000 cells:

```
[edit firewall atm-policer atm-policer-name]
user@host# set max-burst-size max-burst-size
```

8. Apply limits to the traffic flow by specifying the largest number of cells per second that the policer processes before it drops packets, from 61 cells per second (cps) through 38,641 cps:

```
[edit firewall atm-policer atm-policer-name]
user@host# set peak-rate peak-rate
```

The maximum peak rate value depends on the number of links in the IMA bundle—the more links, the higher the possible peak rate.

9. Define the policing-action parameter to set a consequence for the packets that exceed the traffic limits:

```
[edit firewall atm-policer atm-policer-name]
user@host# set policing-action (discard | discard-tag | count)
```

10. Define the normal traffic rate averaged over time, from 61 cps through 38,641 cps):

```
[edit firewall atm-policer atm-policer-name]
user@host# set sustained-rate cps
```

After you have configured policing, enter the **commit** command from configuration mode.

## Configuring the ATM IMA Interface

To create the ATM IMA interface on which to apply the ATM policer:

1. In configuration mode, go to the **[edit interfaces]** hierarchy level:

```
[edit]
user@host# edit interfaces
```

2. Define the ATM interface:

```
[edit interfaces]
user@host# edit at-fpc/pic/port
```

3. Specify the ATM interface unit:

```
[edit interfaces at-fpc/pic/port]
user@host# edit unit logical-unit-number
```

4. Apply the ATM policer:

```
[edit interfaces at-fpc/pic/port unit logical-unit-number]
user@host# set atm-policer input-atm-policer policer-name
```

5. Specify the encapsulation family type:

```
[edit interfaces at-fpc/pic/port unit logical-unit-number]
user@host# set family ccc
```

After you have configured the ATM IMA interface, enter the **commit** command from configuration mode.

### Related Documentation

- [CoS on ATM IMA Pseudowire Interfaces Overview on page 54](#)
- [Example: Configuring Policing on an ATM IMA Pseudowire on page 71](#)
- [Configuring Fixed Classification on an ATM IMA Pseudowire on page 64](#)
- [Configuring Shaping on an ATM IMA Pseudowire on page 68](#)

## Configuring Shaping on an ATM IMA Pseudowire

On ACX Series routers, ATM shaping is applied in the egress direction only. Only cell-based shaping is supported. A traffic control profile, which defines the ATM scheduling parameters, is configured at the `[edit class-of-service]` hierarchy level. The traffic control profile is then applied to the ATM logical interface configured at the `[edit class-of-service]` hierarchy level.



**NOTE:** The configuration of ATM shaping requires the inclusion of the `per-unit scheduler` statement at the `[edit interfaces interface-name]` hierarchy level.

The following steps require you to navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the *CLI User Guide*.

To configure a traffic-shaping profile on an ATM IMA pseudowire:

1. Define the ATM IMA pseudowire. For information about defining the ATM IMA pseudowire, see [“Configuring Inverse Multiplexing for ATM \(IMA\)” on page 204](#).
2. In configuration mode, go to the `[edit class-of-service]` hierarchy level:

```
[edit]
user@host# edit class-of-service
```

3. Specify the traffic -shaping profile:

```
[edit class-of-service]
user@host# edit traffic-control-profiles profile-name
```

The following steps describe the traffic control profile options that you can configure. The options include: **atm-service**, **delay-buffer-rate**, **max-burst-size**, **peak-rate**, and **sustained-rate**.

4. (Optional) Specify the service category that determines the traffic-shaping parameter for the ATM queue at the ATM IMA pseudowire:

```
[edit class-of-service traffic-control-profiles profile-name]
user@host# set atm-service (cbr | nrt-vbr | rt-vbr)
```

Select one of the following service traffic categories, depending on the needs of your network: constant bit rate (**cbr**), nonreal-time variable bit rate (**nrtvbr**), or real-time variable bit rate (**rtvbr**). All service traffic categories must include the **peak-rate** and **cdvt** statements for the configuration to work. The **peak-rate** statement limits the maximum traffic allowed and the **cdvt** statement ensures that the configuration functions correctly.

5. (Optional) Specify the delay-buffer calculation:

```
[edit class-of-service traffic-control-profiles profile-name]
user@host# set delay-buffer-rate cps
```

The delay-buffer calculation can be specified as cells per second—1000 cells per second (cps) through 160,000,000,000 cps.

6. (Optional) Define the maximum number of cells that a burst of traffic can contain, from 1 through 4000 cells:

```
[edit class-of-service traffic-control-profiles profile-name]
user@host# set max-burst-size max-burst-size
```

7. Define the largest number of cells per second that the shaper processes before it drops packets, from 61 cps through 38,641 cps:

```
[edit class-of-service traffic-control-profiles profile-name]
user@host# set peak-rate peak-rate
```

The maximum peak rate value depends on the number of links in the IMA bundle—the more links, the higher the possible peak rate.

8. (Optional) Define the normal traffic rate averaged over time, from 61 cps through 38,641 cps:

```
[edit class-of-service traffic-control-profiles profile-name]
user@host# set sustained-rate cps
```

9. To complete the configuration, configure the per-unit scheduler:

```
[edit interfaces interface-name]
user@host# set per-unit scheduler
```

After you have configured shaping on the ATM IMA interface, enter the **commit** command from configuration mode.

#### Related Documentation

- [CoS on ATM IMA Pseudowire Interfaces Overview on page 54](#)
- [Example: Configuring Shaping on an ATM IMA Pseudowire on page 76](#)
- [Configuring Fixed Classification on an ATM IMA Pseudowire on page 64](#)
- [Configuring Policing on an ATM IMA Pseudowire on page 65](#)

## Example: Configuring Fixed Classification on an ATM IMA Pseudowire

This example shows the configuration of fixed classification on an ATM IMA pseudowire. Fixed classification is configured on the logical interface (unit) of the ATM IMA pseudowire. The software assigns the fixed classification to packets on the basis of the fixed classification parameters associated with the logical interface on which the ATM cells are received.

- [Requirements on page 69](#)
- [Overview on page 70](#)
- [Configuration on page 70](#)

### Requirements

This example uses the following hardware and software components:

- ACX Series router
- Junos OS Release 12.2 or later

- A previously configured ATM IMA pseudowire. For steps to configure an ATM IMA pseudowire, see [“Configuring Inverse Multiplexing for ATM \(IMA\)” on page 204](#).

## Overview

In this example, the configured forwarding class **fc-1** is applied to all packets received on the ingress logical interface **at-0/0/16 unit 0**. The fixed classification classifies all traffic on the logical interface unit zero (0) to **queue-num 1**.

## Configuration

The following example requires you to navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the *CLI User Guide*.

To configure fixed classification on an ATM IMA Pseudowire, perform these tasks:

- [Configuring a Forwarding Class on page 70](#)
- [Applying the Forwarding Class on page 70](#)
- [Results on page 71](#)

### CLI Quick Configuration

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

```
set class-of-service forwarding-classes class fc-1 queue-num 1
set class-of-service interfaces at-0/0/16 unit 0 forwarding-class fc-1
```

---

### Configuring a Forwarding Class

#### Step-by-Step Procedure

To define a forwarding class, which is applied to the ingress logical interface:

1. In configuration mode, go to the following hierarchy level:  

```
[edit]
user@host# edit class-of-service forwarding-classes
```
2. Define the forwarding class to apply to the input logical interface:  

```
[edit class-of-service forwarding-classes]
user@host# set class fc-1 queue-num 1
```

---

### Applying the Forwarding Class

#### Step-by-Step Procedure

To apply the forwarding class to the logical ATM IMA pseudowire:

1. Specify the ATM IMA interface on which to include the forwarding class:  

```
[edit class-of-service]
user@host# edit interfaces at-0/0/16
```
2. Configure the logical interface:  

```
[edit class-of-service interfaces at-0/0/16 ]
```

```
user@host# edit unit 0
```

3. Apply the previously configured forwarding class to the logical interface:

```
[edit class-of-service interfaces at-0/0/16 unit 0]
```

```
user@host# set forwarding-class fc-1
```

## Results

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

In the following example, all packets coming into the router from the **at-0/0/16 unit 0** interface are assigned to the **fc-1** forwarding class:

```
[edit class-of-service]
user@host# show
forwarding-classes {
    class fc-1 queue-num 1;
}
interfaces {
    at-0/0/16 {
        unit 0 {
            forwarding-class fc-1;
        }
    }
}
```

After you have completed the configuration, enter the **commit** command from configuration mode.

### Related Documentation

- [CoS on ATM IMA Pseudowire Interfaces Overview on page 54](#)
- [Configuring Fixed Classification on an ATM IMA Pseudowire on page 64](#)
- [Example: Configuring Policing on an ATM IMA Pseudowire on page 71](#)
- [Example: Configuring Shaping on an ATM IMA Pseudowire on page 76](#)

## Example: Configuring Policing on an ATM IMA Pseudowire

This example shows the configuration of policing on an ATM IMA pseudowire. On ACX Series routers, the ATM policer is an input policer that is applied to the ATM IMA logical interface. The ATM IMA logical interface must have the circuit cross-connect (CCC) encapsulation family configured for the configuration to work.

- [Requirements on page 72](#)
- [Overview on page 72](#)
- [Configuration on page 72](#)

## Requirements

This example uses the following hardware and software components:

- ACX Series router
- Junos OS Release 12.2 or later
- A previously configured ATM IMA pseudowire. For steps to configure an ATM IMA pseudowire, see [“Configuring Inverse Multiplexing for ATM \(IMA\)” on page 204](#).

## Overview

In this example, the ATM IMA pseudowire logical interfaces (**unit 0**, **unit 1** and **unit 2**) are configured with three input ATM policers—**policer-1**, **policer-2**, and **policer-3**. The ATM policers are configured with the following parameters:

- **logical-interface-policer**—The logical interface policer is configured explicitly on each logical interface (unit).
- **atm-service**—The ATM service category used to define the bit rate at which traffic is policed.
- **peak-rate**—The peak rate is the top rate at which traffic can burst. This is a mandatory statement that must be included for the configuration to work correctly.
- **sustained-rate**—The sustained rate is the normal traffic rate averaged over time.
- **maximum-burst-size**—The maximum burst size is the maximum number of cells that a burst of traffic can contain.
- **cdvt**—The Cell Delay Variation Tolerance is a mandatory statement that must be included for the configuration to work correctly.
- **policing-action**—The specified policing action used when the traffic exceeds the limits set for the policer.

## Configuration

The following steps require you to navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the *CLI User Guide*.

To configure policing on an ATM IMA pseudowire, perform these tasks:

- [Configuring an ATM Policer on page 73](#)
- [Applying the ATM Policer on the ATM IMA Logical Interface on page 74](#)
- [Results on page 74](#)

### CLI Quick Configuration

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



```

set firewall atm-policer policer-1 logical-interface-policer
set firewall atm-policer policer-1 atm-service rtvbr
set firewall atm-policer policer-1 peak-rate 2k
set firewall atm-policer policer-1 sustained-rate 1800
set firewall atm-policer policer-1 max-burst-size 400
set firewall atm-policer policer-1 cdvt 900001
set firewall atm-policer policer-1 policing-action discard-tag
set firewall atm-policer policer-2 logical-interface-policer
set firewall atm-policer policer-2 atm-service nrtvbr
set firewall atm-policer policer-2 peak-rate 1800
set firewall atm-policer policer-2 sustained-rate 1500
set firewall atm-policer policer-2 max-burst-size 300
set firewall atm-policer policer-2 cdvt 999991
set firewall atm-policer policer-2 policing-action discard
set firewall atm-policer policer-3 logical-interface-policer
set firewall atm-policer policer-3 atm-service cbr
set firewall atm-policer policer-3 peak-rate 2k
set firewall atm-policer policer-3 cdvt 800001
set firewall atm-policer policer-3 policing-action count
set interfaces at-0/0/16 unit 0 atm-policer input-atm-policer policer-1
set interfaces at-0/0/16 unit 0 family ccc
set interfaces at-0/0/16 unit 1 atm-policer input-atm-policer policer-2
set interfaces at-0/0/16 unit 1 family ccc
set interfaces at-0/0/16 unit 2 atm-policer input-atm-policer policer-3
set interfaces at-0/0/16 unit 2 family ccc

```

### Configuring an ATM Policer

#### Step-by-Step Procedure

To configure the ATM policer, which is applied to the logical ATM IMA pseudowire:

1. Define the policer:
 

```

[edit]
user@host# edit firewall atm-policer policer-1

```
2. Specify the parameters for **policer-1**:
 

```

[edit firewall atm-policer policer-1]
user@host# set logical-interface-policer
user@host# set atm-service rtvbr
user@host# set peak-rate 2k
user@host# set sustained-rate 1800
user@host# set max-burst-size 400
user@host# set cdvt 900001
user@host# set policing-action discard-tag

```
3. Specify the parameters for **policer-2**:
 

```

[edit firewall atm-policer policer-2]
user@host# set logical-interface-policer
user@host# set atm-service nrtvbr
user@host# set peak-rate 1800
user@host# set sustained-rate 1500
user@host# set max-burst-size 300
user@host# set cdvt 999991
user@host# set policing-action discard

```
4. Specify the parameters for **policer-3**:

```
[edit firewall atm-policer policer-3]
user@host# set logical-interface-policer
user@host# set atm-service cbr
user@host# set peak-rate 2k
user@host# set cdvt 999991
user@host# set policing-action count
```

After you have configured the ATM policers, enter the **commit** command from configuration mode.

---

### Applying the ATM Policer on the ATM IMA Logical Interface

---

#### Step-by-Step Procedure

To create the ATM IMA logical interface on which to apply the ATM policers:

1. Define the ATM interface:

```
[edit interfaces]
user@host# edit interfaces at-0/0/16
```
2. Specify the ATM interface unit and apply the first input policer:

```
[edit interfaces at-0/0/16]
user@host# set unit 0 atm-policer input-atm-policer policer-1
```
3. Specify the encapsulation family type for **unit 0**:

```
[edit interfaces at-0/0/16]
user@host# set unit 0 family ccc
```
4. Specify the ATM interface unit and apply the second input policer:

```
[edit interfaces at-0/0/16]
user@host# set unit 1 atm-policer input-atm-policer policer-2
```
5. Specify the encapsulation family type for **unit 1**:

```
[edit interfaces at-0/0/16]
user@host# set unit 1 family ccc
```
6. Specify the ATM interface unit and apply the third input policer:

```
[edit interfaces at-0/0/16]
user@host# set unit 2 atm-policer input-atm-policer policer-3
```
7. Specify the encapsulation family type for **unit 2**:

```
[edit interfaces at-0/0/16]
user@host# set unit 2 family ccc
```

---

### Results

---

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

```
[edit firewall]
user@host# show
atm-policer policer-1 {
    logical-interface-policer;
    atm-service rtvbr;
```

```

        peak-rate 2k;
        sustained-rate 1800;
        max-burst-size 400;
        cdvt 900001;
        policing-action discard-tag;
    }
    atm-policer policer-2 {
        logical-interface-policer;
        atm-service nrtvbr;
        peak-rate 1800;
        sustained-rate 1500;
        max-burst-size 300;
        cdvt 999991;
        policing-action discard;
    }
    atm-policer policer-3 {
        logical-interface-policer;
        atm-service cbr;
        peak-rate 2k;
        cdvt 800001;
        policing-action count;
    }
}

[edit interfaces]
user@host# show
at-0/0/16 {
    unit 0 {
        atm-policer {
            input-atm-policer policer-1;
        }
        family ccc;
    }
    unit 1 {
        atm-policer {
            input-atm-policer policer-2;
        }
        family ccc;
    }
    unit 2 {
        atm-policer {
            input-atm-policer policer-3;
        }
        family ccc;
    }
}

```

After you have completed the configuration, enter the **commit** command from configuration mode.

#### Related Documentation

- [CoS on ATM IMA Pseudowire Interfaces Overview on page 54](#)
- [Configuring Policing on an ATM IMA Pseudowire on page 65](#)
- [Example: Configuring Fixed Classification on an ATM IMA Pseudowire on page 69](#)
- [Example: Configuring Shaping on an ATM IMA Pseudowire on page 76](#)

## Example: Configuring Shaping on an ATM IMA Pseudowire

---

The following example shows the configuration of shaping on an ATM IMA pseudowire. On ACX Series routers, the ATM shaper is applied on the egress logical (unit) interface.

- [Requirements on page 76](#)
- [Overview on page 76](#)
- [Configuration on page 76](#)

### Requirements

This example uses the following hardware and software components:

- ACX Series router
- Junos OS Release 12.2 or later
- A previously configured ATM IMA pseudowire. For steps to configure an ATM IMA pseudowire, see [“Configuring Inverse Multiplexing for ATM \(IMA\)” on page 204](#).

### Overview

In this example, an ATM IMA pseudowire logical interfaces (**unit 0**) is configured with two egress ATM shapers—**profile-1** and **profile-2**. The ATM shaping profiles are configured with the following parameters:

- **atm-service**—ATM service category used to define the bit rate at which traffic is policed.
- **peak-rate**—Top rate at which traffic can burst. This is a mandatory statement that must be included for the configuration to work correctly.
- **sustained-rate**—Normal traffic rate averaged over time.
- **maximum-burst-size**—Maximum number of cells that a burst of traffic can contain.

In addition to the configuration of shaping, this example includes the configuration of tracing operations for the class-of-service (CoS) configuration.

### Configuration

To configure shaping on an ATM IMA pseudowire, perform these tasks:

- [Configuring Shaping on an ATM IMA Pseudowire on page 77](#)
- [Configuring Tracing Operations on page 78](#)
- [Results on page 78](#)

#### CLI Quick Configuration

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

```
set class-of-service traffic-control-profiles profile-1 atm-service rtvbr
set class-of-service traffic-control-profiles profile-1 peak-rate 5k
```

```

set class-of-service traffic-control-profiles profile-1 sustained-rate 3k
set class-of-service traffic-control-profiles profile-1 max-burst-size 400
set class-of-service traffic-control-profiles profile-2 atm-service cbr
set class-of-service traffic-control-profiles profile-2 peak-rate 1k
set class-of-service interfaces at-0/0/16 unit 0 output-traffic-control-profile profile-1
set interfaces at-0/0/16 per-unit-scheduler
set class-of-service traceoptions file cos
set class-of-service traceoptions file size 1000000000
set class-of-service traceoptions flag all

```

### Configuring Shaping on an ATM IMA Pseudowire

**Step-by-Step Procedure** The following steps require you to navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the *CLI User Guide*.

To configure shaping on an ATM IMA pseudowire:

1. In configuration mode, go to the **[edit class-of-service]** hierarchy level:  

```
[edit]
user@host# edit class-of-service
```
2. Specify the first traffic control profile:  

```
[edit class-of-service]
user@host# edit traffic-control-profiles profile-1
```
3. Specify the ATM real-time variable bit rate **rtvbr** service traffic category:  

```
[edit class-of-service traffic-control-profiles profile-1]
user@host# set atm-service rtvbr
```
4. Define the largest number of cells per second that the shaper processes before it drops packets:  

```
[edit class-of-service traffic-control-profiles profile-1]
user@host# set peak-rate 5k
```
5. Define the normal traffic rate averaged over time, from 61 cps through 38,641 cps:  

```
[edit class-of-service traffic-control-profiles profile-1]
user@host# set sustained-rate 3k
```
6. Define the maximum number of cells that a burst of traffic can contain, from 1 through 4000 cells:  

```
[edit class-of-service traffic-control-profiles profile-1]
user@host# set max-burst-size 400
```
7. Specify the second traffic control profile:  

```
[edit class-of-service traffic-control-profiles profile-2]
user@host# edit traffic-control-profiles profile-2
```
8. Specify the ATM constant bit rate **cbr** service traffic category:  

```
[edit class-of-service traffic-control-profiles profile-2]
user@host# set atm-service cbr
```

9. Define the largest number of cells per second that the shaper processes before it drops packets:  

```
[edit class-of-service traffic-control-profiles profile-2]  
user@host# set peak-rate 1k
```
10. Define the largest number of cells per second that the shaper processes before it drops packets:  

```
[edit class-of-service traffic-control-profiles profile-2]  
user@host# set peak-rate 1k
```
11. Apply the first shaping traffic profile to the ATM IMA pseudowire logical interface:  

```
[edit class-of-service]  
user@host# edit interfaces at-0/0/16 unit 101 output-traffic-control-profile profile-1
```
12. Configure the per-unit scheduler:  

```
[edit interfaces at-0/0/16]  
user@host# set interfaces at-0/0/16 per-unit-scheduler
```

---

### Configuring Tracing Operations

---

#### Step-by-Step Procedure

To define tracing operations for the class-of-service (CoS) configuration:

1. Configure class-of-service (CoS) tracing options:  

```
[edit]  
user@host# edit class of service traceoptions
```
2. Create the file to receive the tracing operation output:  

```
[edit class-of-service traceoptions]  
user@host# set file cos
```
3. Define the maximum size of the file:  

```
[edit class-of-service traceoptions]  
user@host# set file size 1000000000
```
4. Specify the tracing operation to perform:  

```
[edit class-of-service traceoptions]  
user@host# set flag all
```

---

### Results

---

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

```
[edit class-of-service]  
user@host# show  
traffic-control-profiles {  
  profile-1 {  
    atm-service rtvbr;  
    peak-rate 5k;  
    sustained-rate 3k;  
    max-burst-size 400;
```

```

    }
    profile-2 {
        atm-service cbr;
        peak-rate 1k;
    }
}
interfaces {
    at-0/0/16 {
        unit 101 {
            output-traffic-control-profile profile-1;
        }
    }
}
traceoptions {
    file cos size 1000000000;
    flag all;
}

[edit interfaces]
user@host# show
at-0/0/16 {
    per-unit-scheduler;
}
}

```

After you have completed the configuration, enter the **commit** command from configuration mode.

#### Related Documentation

- [CoS on ATM IMA Pseudowire Interfaces Overview on page 54](#)
- [Configuring Shaping on an ATM IMA Pseudowire on page 68](#)
- [Example: Configuring Fixed Classification on an ATM IMA Pseudowire on page 69](#)
- [Example: Configuring Policing on an ATM IMA Pseudowire on page 71](#)





## CHAPTER 5

# Firewall Filters

- [Standard Firewall Filter Match Conditions and Actions on ACX Series Routers Overview on page 81](#)
- [Standard Firewall Filter Match Conditions for IPv4 Traffic on ACX Series Routers on page 83](#)
- [Standard Firewall Filter Match Conditions for MPLS Traffic on ACX Series Routers on page 86](#)
- [Standard Firewall Filter Terminating Actions on ACX Series Routers on page 86](#)
- [Standard Firewall Filter Nonterminating Actions on ACX Series Routers on page 88](#)
- [Filter-Based Forwarding for Routing Instances on page 90](#)
- [Forwarding Table Filters for Routing Instances on ACX Series Routers on page 91](#)
- [Bridge Family Firewall Filters on ACX Series Routers on page 92](#)

## Standard Firewall Filter Match Conditions and Actions on ACX Series Routers Overview

On ACX Series Universal Access Routers, you can configure firewall filters to filter packets and to perform an action on packets that match the filter. The match conditions specified to filter the packets are specific to the type of traffic being filtered.



**NOTE:** On ACX Series routers, the filter for the exiting traffic (egress filter) can be applied only for interface-specific instances of the firewall filter.

[Table 12 on page 81](#) describes the types of traffic for which you can configure standard stateless firewall filters.

**Table 12: Standard Firewall Filter Match Conditions by Protocol Family for ACX Series Routers**

Traffic Type	Hierarchy Level at Which Match Conditions Are Specified
Protocol-independent	<code>[edit firewall family any filter <i>filter-name</i> term <i>term-name</i>]</code>  No match conditions are supported for this traffic type on ACX Series routers.

Table 12: Standard Firewall Filter Match Conditions by Protocol Family for ACX Series Routers (*continued*)

Traffic Type	Hierarchy Level at Which Match Conditions Are Specified
IPv4	<b>[edit firewall family inet filter <i>filter-name</i> term <i>term-name</i></b>  For the complete list of match conditions, see “ <a href="#">Standard Firewall Filter Match Conditions for IPv4 Traffic on ACX Series Routers</a> ” on page 83.
MPLS	<b>[edit firewall family mpls filter <i>filter-name</i> term <i>term-name</i>]</b>  For the complete list of match conditions, see “ <a href="#">Standard Firewall Filter Match Conditions for MPLS Traffic on ACX Series Routers</a> ” on page 86.
Layer 2 CCC	<b>[edit firewall family ccc filter <i>filter-name</i> term <i>term-name</i>]</b>  No match conditions are supported for this traffic type on ACX Series routers.

Under the **then** statement for a standard stateless firewall filter term, you can specify the actions to be taken on a packet that matches the term.

[Table 13 on page 82](#) summarizes the types of actions you can specify in a standard stateless firewall filter term.

Table 13: Standard Firewall Filter Action Categories for ACX Series Routers

Type of Action	Description	Comment
Terminating	Halts all evaluation of a firewall filter for a specific packet. The router performs the specified action, and no additional terms are used to examine the packet.  You can specify only one <i>terminating action</i> in a standard firewall filter. You can, however, specify one terminating action with one or more <i>nonterminating actions</i> in a single term. For example, within a term, you can specify <b>accept</b> with <b>count</b> and <b>syslog</b> .	See “ <a href="#">Standard Firewall Filter Terminating Actions on ACX Series Routers</a> ” on page 86.
Nonterminating	Performs other functions on a packet (such as incrementing a counter, logging information about the packet header, sampling the packet data, or sending information to a remote host using the system log functionality), but any additional terms are used to examine the packet.	See “ <a href="#">Standard Firewall Filter Nonterminating Actions on ACX Series Routers</a> ” on page 88.

- Related Documentation**
- [Guidelines for Configuring Firewall Filters](#)
  - [Interface-Specific Firewall Filter Instances Overview](#)

## Standard Firewall Filter Match Conditions for IPv4 Traffic on ACX Series Routers

On ACX Series routers, you can configure a standard stateless firewall filter with match conditions for IP version 4 (IPv4) traffic (**family inet**). [Table 14 on page 83](#) describes the match conditions you can configure at the `[edit firewall family inet filter filter-name term term-name from]` hierarchy level.

**Table 14: Standard Firewall Filter Match Conditions for IPv4 Traffic on ACX Series Routers**

Match Condition	Description
<b>destination-address</b> <i>address</i>	<p>Match the IPv4 destination address field.</p> <p><b>NOTE:</b> On ACX Series routers, you can specify only one destination address. A list of IPv4 destination addresses is not supported.</p>
<b>destination-port</b> <i>number</i>	<p>Match the UDP or TCP destination port field.</p> <p>If you configure this match condition, we recommend that you also configure the <b>protocol udp</b> or <b>protocol tcp</b> match statement in the same term to specify which protocol is being used on the port.</p> <p><b>NOTE:</b> On ACX Series routers, you can specify only one destination port number. A list of port numbers is not supported.</p> <p>In place of the numeric value, you can specify one of the following text synonyms (the port numbers are also listed): <b>afs</b> (1483), <b>bgp</b> (179), <b>biff</b> (512), <b>bootpc</b> (68), <b>bootps</b> (67), <b>cmd</b> (514), <b>cvspserver</b> (2401), <b>dhcp</b> (67), <b>domain</b> (53), <b>eklogin</b> (2105), <b>ekshell</b> (2106), <b>exec</b> (512), <b>finger</b> (79), <b>ftp</b> (21), <b>ftp-data</b> (20), <b>http</b> (80), <b>https</b> (443), <b>ident</b> (113), <b>imap</b> (143), <b>kerberos-sec</b> (88), <b>klogin</b> (543), <b>kpasswd</b> (761), <b>krb-prop</b> (754), <b>krbupdate</b> (760), <b>kshell</b> (544), <b>ldap</b> (389), <b>ldp</b> (646), <b>login</b> (513), <b>mobileip-agent</b> (434), <b>mobileip-mn</b> (435), <b>msdp</b> (639), <b>netbios-dgm</b> (138), <b>netbios-ns</b> (137), <b>netbios-ssn</b> (139), <b>nfsd</b> (2049), <b>nntp</b> (119), <b>ntalk</b> (518), <b>ntp</b> (123), <b>pop3</b> (110), <b>pptp</b> (1723), <b>printer</b> (515), <b>radacct</b> (1813), <b>radius</b> (1812), <b>rip</b> (520), <b>rkinit</b> (2108), <b>smtp</b> (25), <b>snmp</b> (161), <b>snmptrap</b> (162), <b>snpp</b> (444), <b>socks</b> (1080), <b>ssh</b> (22), <b>sunrpc</b> (111), <b>syslog</b> (514), <b>tacacs</b> (49), <b>tacacs-ds</b> (65), <b>talk</b> (517), <b>telnet</b> (23), <b>tftp</b> (69), <b>timed</b> (525), <b>who</b> (513), or <b>xmcp</b> (177).</p>
<b>dscp</b> <i>number</i>	<p>Match the Differentiated Services code point (DSCP). The DiffServ protocol uses the type-of-service (ToS) byte in the IP header. The most significant 6 bits of this byte form the DSCP. For more information, see <i>BA Classifier Overview</i>.</p> <p>You can specify a numeric value from 0 through 63. To specify the value in hexadecimal form, include 0x as a prefix. To specify the value in binary form, include b as a prefix.</p> <p>In place of the numeric value, you can specify one of the following text synonyms (the field values are also listed):</p> <ul style="list-style-type: none"> <li>• RFC 3246, <i>An Expedited Forwarding PHB (Per-Hop Behavior)</i>, defines one code point: <b>ef</b> (46).</li> <li>• RFC 2597, <i>Assured Forwarding PHB Group</i>, defines 4 classes, with 3 drop precedences in each class, for a total of 12 code points: <ul style="list-style-type: none"> <li>• <b>af11</b> (10), <b>af12</b> (12), <b>af13</b> (14)</li> <li>• <b>af21</b> (18), <b>af22</b> (20), <b>af23</b> (22)</li> <li>• <b>af31</b> (26), <b>af32</b> (28), <b>af33</b> (30)</li> <li>• <b>af41</b> (34), <b>af42</b> (36), <b>af43</b> (38)</li> </ul> </li> </ul>

**Table 14: Standard Firewall Filter Match Conditions for IPv4 Traffic on ACX Series Routers (*continued*)**

Match Condition	Description
<b>fragment-flags <i>number</i></b>	<p>(Ingress only) Match the three-bit IP fragmentation flags field in the IP header.</p> <p>In place of the numeric field value, you can specify one of the following keywords (the field values are also listed): <b>dont-fragment</b> (0x4), <b>more-fragments</b> (0x2), or <b>reserved</b> (0x8).</p>
<b>icmp-code <i>number</i></b>	<p>Match the ICMP message code field.</p> <p>If you configure this match condition, we recommend that you also configure the <b>protocol icmp</b> match condition in the same term.</p> <p>If you configure this match condition, you must also configure the <b>icmp-type <i>message-type</i></b> match condition in the same term. An ICMP message code provides more specific information than an ICMP message type, but the meaning of an ICMP message code is dependent on the associated ICMP message type.</p> <p>In place of the numeric value, you can specify one of the following text synonyms (the field values are also listed). The keywords are grouped by the ICMP type with which they are associated:</p> <ul style="list-style-type: none"> <li>parameter-problem: <b>ip-header-bad</b> (0), <b>required-option-missing</b> (1)</li> <li>redirect: <b>redirect-for-host</b> (1), <b>redirect-for-network</b> (0), <b>redirect-for-tos-and-host</b> (3), <b>redirect-for-tos-and-net</b> (2)</li> <li>time-exceeded: <b>ttl-eq-zero-during-reassembly</b> (1), <b>ttl-eq-zero-during-transit</b> (0)</li> <li>unreachable: <b>communication-prohibited-by-filtering</b> (13), <b>destination-host-prohibited</b> (10), <b>destination-host-unknown</b> (7), <b>destination-network-prohibited</b> (9), <b>destination-network-unknown</b> (6), <b>fragmentation-needed</b> (4), <b>host-precedence-violation</b> (14), <b>host-unreachable</b> (1), <b>host-unreachable-for-TOS</b> (12), <b>network-unreachable</b> (0), <b>network-unreachable-for-TOS</b> (11), <b>port-unreachable</b> (3), <b>precedence-cutoff-in-effect</b> (15), <b>protocol-unreachable</b> (2), <b>source-host-isolated</b> (8), <b>source-route-failed</b> (5)</li> </ul>
<b>icmp-type <i>number</i></b>	<p>Match the ICMP message type field.</p> <p>If you configure this match condition, we recommend that you also configure the <b>protocol icmp</b> match condition in the same term.</p> <p>In place of the numeric value, you can specify one of the following text synonyms (the field values are also listed): <b>echo-reply</b> (0), <b>echo-request</b> (8), <b>info-reply</b> (16), <b>info-request</b> (15), <b>mask-request</b> (17), <b>mask-reply</b> (18), <b>parameter-problem</b> (12), <b>redirect</b> (5), <b>router-advertisement</b> (9), <b>router-solicit</b> (10), <b>source-quench</b> (4), <b>time-exceeded</b> (11), <b>timestamp</b> (13), <b>timestamp-reply</b> (14), or <b>unreachable</b> (3).</p>
<b>ip-options <i>values</i></b>	<p>Match the 8-bit IP option field, if present, to the specified value.</p> <p>ACX Series routers support only the <b>ip-options_any</b> match condition, which ensures that the packets are sent to the Packet Forwarding Engine for processing.</p> <p><b>NOTE:</b> On ACX Series routers, you can specify only one IP option value. Configuring multiple values is not supported.</p>

**Table 14: Standard Firewall Filter Match Conditions for IPv4 Traffic on ACX Series Routers (*continued*)**

Match Condition	Description
<b>precedence</b> <i>ip-precedence-field</i>	<p>Match the IP precedence field.</p> <p>In place of the numeric field value, you can specify one of the following text synonyms (the field values are also listed): <b>critical-ecp</b> (0xa0), <b>flash</b> (0x60), <b>flash-override</b> (0x80), <b>immediate</b> (0x40), <b>internet-control</b> (0xc0), <b>net-control</b> (0xe0), <b>priority</b> (0x20), or <b>routine</b> (0x00). You can specify precedence in hexadecimal, binary, or decimal form.</p>
<b>protocol number</b>	<p>Match the IP protocol type field. In place of the numeric value, you can specify one of the following text synonyms (the field values are also listed): <b>ah</b> (51), <b>dstopts</b> (60), <b>egp</b> (8), <b>esp</b> (50), <b>fragment</b> (44), <b>gre</b> (47), <b>hop-by-hop</b> (0), <b>icmp</b> (1), <b>icmp6</b> (58), <b>icmpv6</b> (58), <b>igmp</b> (2), <b>ipip</b> (4), <b>ip6</b> (41), <b>ospf</b> (89), <b>pim</b> (103), <b>rsvp</b> (46), <b>sctp</b> (132), <b>tcp</b> (6), <b>udp</b> (17), or <b>vrp</b> (112).</p>
<b>source-address address</b>	Match the IPv4 address of the source node sending the packet.
<b>source-port number</b>	<p>Match the UDP or TCP source port field.</p> <p>If you configure this match condition for IPv4 traffic, we recommend that you also configure the <b>protocol udp</b> or <b>protocol tcp</b> match statement in the same term to specify which protocol is being used on the port.</p> <p>In place of the numeric value, you can specify one of the text synonyms listed with the <b>destination-port number</b> match condition.</p>
<b>tcp-flags value</b>	<p>Match one or more of the low-order 6 bits in the 8-bit TCP flags field in the TCP header.</p> <p>To specify individual bit fields, you can specify the following text synonyms or hexadecimal values:</p> <ul style="list-style-type: none"> <li>• <b>fin</b> (0x01)</li> <li>• <b>syn</b> (0x02)</li> <li>• <b>rst</b> (0x04)</li> <li>• <b>push</b> (0x08)</li> <li>• <b>ack</b> (0x10)</li> <li>• <b>urgent</b> (0x20)</li> </ul> <p>In a TCP session, the SYN flag is set only in the initial packet sent, while the ACK flag is set in all packets sent after the initial packet.</p> <p>You can string together multiple flags using the bit-field logical operators.</p> <p>For combined bit-field match conditions, see the <b>tcp-initial</b> match conditions.</p> <p>If you configure this match condition, we recommend that you also configure the <b>protocol tcp</b> match statement in the same term to specify that the TCP protocol is being used on the port.</p>
<b>tcp-initial</b>	<p>Match the initial packet of a TCP connection. This is an alias for <b>tcp-flags "(lack &amp; syn)"</b>.</p> <p>This condition does not implicitly check that the protocol is TCP. If you configure this match condition, we recommend that you also configure the <b>protocol tcp</b> match condition in the same term.</p>

Table 14: Standard Firewall Filter Match Conditions for IPv4 Traffic on ACX Series Routers (*continued*)

Match Condition	Description
<b>ttl</b> <i>number</i>	Match the IPv4 time-to-live number. Specify a TTL value or a range of TTL values. For <i>number</i> , you can specify one or more values from 2 through 255.

**Related Documentation**

- [Guidelines for Configuring Firewall Filters](#)
- [Standard Firewall Filter Match Conditions and Actions on ACX Series Routers Overview on page 81](#)
- [Standard Firewall Filter Terminating Actions on ACX Series Routers on page 86](#)
- [Standard Firewall Filter Nonterminating Actions on ACX Series Routers on page 88](#)

## Standard Firewall Filter Match Conditions for MPLS Traffic on ACX Series Routers

On ACX Series routers, you can configure a standard stateless firewall filter with match conditions for MPLS traffic (**family mpls**).



**NOTE:** The input-list *filter-names* and output-list *filter-names* statements for firewall filters for the mpls protocol family are supported on all interfaces with the exception of management interfaces and internal Ethernet interfaces (fxp or em0), loopback interfaces (lo0), and USB modem interfaces (umd).

Table 15 on page 86 describes the match conditions you can configure at the [edit firewall family mpls filter *filter-name* term *term-name* from] hierarchy level.

Table 15: Standard Firewall Filter Match Conditions for MPLS Traffic on ACX Series Routers

Match Condition	Description
<b>exp</b> <i>number</i>	Experimental (EXP) bit number or range of bit numbers in the MPLS header. For <i>number</i> , you can specify one or more values from 0 through 7 in decimal, binary, or hexadecimal format.

**Related Documentation**

- [Guidelines for Configuring Firewall Filters](#)
- [Standard Firewall Filter Match Conditions and Actions on ACX Series Routers Overview on page 81](#)
- [Standard Firewall Filter Terminating Actions on ACX Series Routers on page 86](#)
- [Standard Firewall Filter Nonterminating Actions on ACX Series Routers on page 88](#)

## Standard Firewall Filter Terminating Actions on ACX Series Routers

Standard stateless firewall filters support different sets of terminating actions for each protocol family.



**NOTE:** ACX Series routers do not support the `next term` action.

Table 16 on page 87 describes the terminating actions you can specify in a standard firewall filter term.

**Table 16: Terminating Actions for Standard Firewall Filters on ACX Series Routers**

Terminating Action	Description	Protocols
<code>accept</code>	Accept the packet.	<ul style="list-style-type: none"> <li>family any</li> <li>family inet</li> <li>family mpls</li> <li>family ccc</li> </ul>
<code>discard</code>	Discard a packet silently, without sending an Internet Control Message Protocol (ICMP) message. Discarded packets are available for logging and sampling.	<ul style="list-style-type: none"> <li>family any</li> <li>family inet</li> <li>family mpls</li> <li>family ccc</li> </ul>
<code>reject message-type</code>	<p>Reject the packet and return an ICMPv4 or ICMPv6 message:</p> <ul style="list-style-type: none"> <li>If no message type is specified, a <b>destination-unreachable</b> message is returned by default.</li> <li>If <b>tcp-reset</b> is specified as the message type, <b>tcp-reset</b> is returned only if the packet is a TCP packet. Otherwise, the <b>administratively-prohibited</b> message, which has a value of 13, is returned.</li> <li>If any other message type is specified, that message is returned.</li> </ul> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>Rejected packets can be sampled or logged if you configure the <b>sample</b> or <b>syslog</b> action.</li> <li>This action is supported on ingress only.</li> </ul> <p>The <b>message-type</b> option can have one of the following values: <b>address-unreachable</b>, <b>administratively-prohibited</b>, <b>bad-host-tos</b>, <b>bad-network-tos</b>, <b>beyond-scope</b>, <b>fragmentation-needed</b>, <b>host-prohibited</b>, <b>host-unknown</b>, <b>host-unreachable</b>, <b>network-prohibited</b>, <b>network-unknown</b>, <b>network-unreachable</b>, <b>no-route</b>, <b>port-unreachable</b>, <b>precedence-cutoff</b>, <b>precedence-violation</b>, <b>protocol-unreachable</b>, <b>source-host-isolated</b>, <b>source-route-failed</b>, or <b>tcp-reset</b>.</p>	family inet
<code>routing-instance</code> <code>routing-instance-name</code>	Direct the packet to the specified routing instance.	<ul style="list-style-type: none"> <li>family inet</li> </ul>

**Related Documentation**

- Guidelines for Configuring Firewall Filters
- Standard Firewall Filter Match Conditions and Actions on ACX Series Routers Overview on page 81
- Standard Firewall Filter Nonterminating Actions on ACX Series Routers on page 88

## Standard Firewall Filter Nonterminating Actions on ACX Series Routers

Standard stateless firewall filters support different sets of nonterminating actions for each protocol family.



**NOTE:** ACX Series routers do not support the next term action.

Table 17 on page 88 describes the nonterminating actions you can configure for a standard firewall filter term.

**Table 17: Nonterminating Actions for Standard Firewall Filters on ACX Series Routers**

Nonterminating Action	Description	Protocol Families
<code>count counter-name</code>	Count the packet in the named counter.	<ul style="list-style-type: none"> <li>family any</li> <li>family inet</li> <li>family mpls</li> <li>family ccc</li> </ul>
<code>forwarding-class class-name</code>	Classify the packet based on the specified forwarding class: <ul style="list-style-type: none"> <li>assured-forwarding</li> <li>best-effort</li> <li>expedited-forwarding</li> <li>network-control</li> </ul> <p><b>NOTE:</b> This action is supported on ingress only.</p>	<ul style="list-style-type: none"> <li>family inet</li> <li>family any</li> <li>family mpls</li> <li>family ccc</li> </ul>
<code>log</code>	Log the packet header information in a buffer within the Packet Forwarding Engine. You can access this information by issuing the <b>show firewall log</b> command at the command-line interface (CLI). <p><b>NOTE:</b> This action is supported on ingress only.</p>	family inet



Table 17: Nonterminating Actions for Standard Firewall Filters on ACX Series Routers (*continued*)

Nonterminating Action	Description	Protocol Families
<b>loss-priority</b> (high   medium-high   low)	<p>Set the packet loss priority (PLP) level.</p> <p>You cannot also configure the <b>three-color-policer</b> nonterminating action for the same firewall filter term. These two nonterminating actions are mutually exclusive.</p> <p>You must include the <b>tri-color</b> statement at the <b>[edit class-of-service]</b> hierarchy level to commit a PLP configuration with any of the four levels specified. If the <b>tri-color</b> statement is not enabled, you can configure only the <b>high</b> and <b>low</b> levels. This applies to all protocol families.</p> <p>For information about the <b>tri-color</b> statement, see <i>Configuring Tricolor Marking</i>. For information about using behavior aggregate (BA) classifiers to set the PLP level of incoming packets, see <i>Overview of Forwarding Classes</i>.</p> <p><b>NOTE:</b> This action is supported on ingress only.</p>	<ul style="list-style-type: none"> <li>• <b>family any</b></li> <li>• <b>family inet</b></li> <li>• <b>family mpls</b></li> <li>• <b>family ccc</b></li> </ul>
<b>policer</b> <i>policer-name</i>	<p>Name of policer to use to rate-limit traffic.</p>	<ul style="list-style-type: none"> <li>• <b>family any</b></li> <li>• <b>family inet</b></li> <li>• <b>family mpls</b></li> <li>• <b>family ccc</b></li> </ul>
<b>port-mirror</b>	<p>Port-mirror the packet based on the specified family.</p> <p><b>NOTE:</b> This action is supported on ingress only.</p>	<b>family inet</b>
<b>syslog</b>	<p>Log the packet to the system log file.</p> <p><b>NOTE:</b> This action is supported on ingress only.</p>	<b>family inet</b>

**Table 17: Nonterminating Actions for Standard Firewall Filters on ACX Series Routers (*continued*)**

Nonterminating Action	Description	Protocol Families
<b>three-color-policer (single-rate   two-rate) <i>policer-name</i></b>	<p>Police the packet using the specified single-rate or two-rate three-color policer.</p> <p>You cannot also configure the <b>loss-priority</b> action for the same firewall filter term. These two actions are mutually exclusive.</p>	<ul style="list-style-type: none"> <li>• <b>family any</b></li> <li>• <b>family inet</b></li> <li>• <b>family mpls</b></li> <li>• <b>family ccc</b></li> </ul>

**Related Documentation**

- [Guidelines for Configuring Firewall Filters](#)
- [Standard Firewall Filter Match Conditions and Actions on ACX Series Routers Overview on page 81](#)
- [Standard Firewall Filter Terminating Actions on ACX Series Routers on page 86](#)

## Filter-Based Forwarding for Routing Instances

For IPv4 traffic only, you can use stateless firewall filters in routing instances to control how packets travel in a network. This is called filter-based forwarding.

You can define a firewall filtering term that directs matching packets to a specified routing instance. This type of filtering can be configured to route specific types of traffic through a firewall or other security device before the traffic continues on its path. To configure a stateless firewall filter to direct traffic to a routing instance, configure a term with the **routing-instance *routing-instance-name*** terminating action at the **[edit firewall family inet]** hierarchy level to specify the routing instance to which matching packets will be forwarded. You can apply a forwarding table filter to a routing instance of type forwarding and also to the default routing instance **inet.0**. To configure the filter to direct traffic to the master routing instance, use the **routing-instance default** statement at the **[edit firewall family inet]** hierarchy level.

The following limitations apply to filter-based forwarding table configured on routing instances:

- You cannot configure any of the following actions in a firewall filtering term when the filtering term contains the **routing-instance *routing-instance-name*** terminating action:
  - **count *counter-name***
  - **discard**
  - **forwarding-class *class-name***
  - **log**
  - **loss-priority (high | medium-high | low)**
  - **policer *policer-name***

- **port-mirror**
- **reject *message-type***
- **syslog**
- **three-color-policer (single-rate | two-rate) *policer-name***
- You cannot configure the **fragment-flags *number*** match condition in the filter term.
- You cannot attach a filter that is either default or physical interface-specific.
- You cannot attach a filter to the egress direction of routing instances.

Although you can configure forwarding of packets from one VRF to another VRF, you cannot configure forwarding from a VRF to the global routing instance.

You can configure a maximum of 256 firewall filter terms for filter-based forwarding. The maximum number of routing instances supported is 64, which is the same as the maximum number of virtual routers supported. Forwarding packets to the global table (default VRF) is not supported for filter-based forwarding.

**Related  
Documentation**

- *Example: Configuring Filter-Based Forwarding on the Source Address*
- *Statement Hierarchy for Configuring FBF for IPv4 Traffic on ACX Series Routers*

## Forwarding Table Filters for Routing Instances on ACX Series Routers

Forwarding table filter is a mechanism by which all the packets forwarded by a certain forwarding table are subjected to filtering and if a packet matches the filter condition, the configured action is applied on the packet. You can use the forwarding table filter mechanism to apply a filter on all interfaces associated with a single routing instance with a simple configuration. You can apply a forwarding table filter to a routing instance of type forwarding and also to the default routing instance **inet.0**. To configure a forwarding table filter, include the **filter *filter-name*** statement at the **[edit firewall family inet]** hierarchy level.

The following limitations apply to forwarding table filters configured on routing instances:

- You cannot attach the same filter to more than one routing instance.
- You cannot attach the same filter at both the **[edit interfaces *interface-name* family inet filter input *filter-name*]** and **[edit routing-instances *instance-name* forwarding-options family inet filter input *filter-name*]** hierarchy level.
- You cannot attach a filter that is either interface-specific or a physical interface filter.
- You cannot attach a filter to the egress direction of routing instances.

**Related  
Documentation**

- *Configuring Forwarding Table Filters*

## Bridge Family Firewall Filters on ACX Series Routers

- [\[xref target has no title\]](#)

Bridge family firewall filters can be configured at the IFL-family level on ACX Series routers. Bridge filters are used to configure bridge domains. The packets that are forwarded within a bridge domain are determined by the VLAN ID of the packets and the VLAN ID of the bridge domain. Only the packets with VLAN IDs that match the VLAN ID configured for a bridge domain are forwarded within the bridge domain.

The following match conditions are supported for bridge family filters:

**Table 18: Bridge Family Firewall Filter Match Conditions for ACX Series Routers**

Match Condition	Description
apply-groups	Set the groups from which to inherit configuration data
apply-groups-except	Set which groups will not broadcast configuration data
destination-mac-address	Set the destination MAC address
destination-port	Match the TCP/UDP destination port
dscp	Match the Differentiated Services (DiffServ) code point
ether-type	Match the Ethernet type
icmp-code	Match a ICMP message code
icmp-type	Match a ICMP message type
interface-group	Match an interface group
ip-destination-address	Match an IP destination address
ip-precedence	Match an IP precedence value
ip-protocol	Match an IP protocol type
ip-source-address	Match an IP source address
learn-vlan-ip-priority	Match the learned 802.1p VLAN Priority
learn-vlan-dei	Match user VLAN ID DEI bit
learn-vlan-id	Match a learnt VLAN ID
source-mac-address	Set the source MAC address

Table 18: Bridge Family Firewall Filter Match Conditions for ACX Series Routers (*continued*)

Match Condition	Description
source-port	Match a TCP/UDP source port
user-vlan-1p-priority	Match user 802.1p VLAN Priority
user-vlan-id	Match a user VLAN ID
vlan-ether-type	Match a VLAN Ethernet type

The following action fields are supported:

Table 19: Bridge Family Firewall Filter Action Fields for ACX Series Routers

Action Field	Description
accept	Accept the packet
count	Count the packet in the named counter
discard	Discard the packet
forwarding-class	Classify packet to forwarding class
loss-priority	Packet's loss priority
policer	Name of policer to use to rate-limit traffic
three-color-policer	Police the packet using a three-color-policer



**NOTE:** When the bridge-domain is configured with `vlan-id`, ACX Series routers will match the `user-vlan-id` match specified in the output filter

#### Related Documentation

- [\[edit routing-instances\] Hierarchy Level for ACX Series Routers](#)
- [show firewall](#)
- [clear firewall](#)



## CHAPTER 6

# Interfaces

- [BERT Support on CT1 and CE1 Interfaces on page 95](#)
- [Checklist for Monitoring Fast Ethernet and Gigabit Ethernet Interfaces on page 96](#)
- [Checklist for Monitoring T1 Interfaces on page 96](#)
- [Configuring the Media MTU on ACX Series Routers on page 97](#)
- [Gigabit Ethernet Autonegotiation Overview on page 100](#)
- [Understanding Interfaces on ACX Series Universal Access Routers on page 100](#)
- [Understanding Encapsulation on an Interface on page 103](#)
- [SAtOP Emulation on T1 and E1 Interfaces Overview on page 103](#)

### BERT Support on CT1 and CE1 Interfaces

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For ACX Series routers, BERT is supported on **ct1** and **ce1** interfaces. The following BERT algorithms are supported:

- **all-ones-repeating**
- **all-zeros-repeating**
- **alternating-double-ones-zeros**
- **alternating-ones-zeros**
- **repeating-1-in-4**
- **repeating-1-in-8**
- **repeating-3-in-24**
- **pseudo-2e11-o152**
- **pseudo-2e15-o151**
- **pseudo-2e20-o151**



**NOTE:** User-defined BERT patterns are not supported.

---

- Related Documentation**
- [Configuring E1 BERT Properties on page 209](#)
  - [Configuring T1 BERT Properties on page 211](#)

## Checklist for Monitoring Fast Ethernet and Gigabit Ethernet Interfaces

**Purpose** To monitor Fast Ethernet and Gigabit Ethernet interfaces and begin the process of isolating interface problems when they occur.

**Action** [Table 20 on page 96](#) provides links and commands for monitoring Fast Ethernet and Gigabit Ethernet interfaces.

**Table 20: Checklist for Monitoring Fast Ethernet and Gigabit Ethernet Interfaces**

Tasks	Command or Action
<i>Monitor Fast Ethernet and Gigabit Ethernet Interfaces</i>	
1. <i>Display the Status of Fast Ethernet Interfaces</i>	<code>show interfaces terse (fe*   ge*)</code>
2. <i>Display the Status of a Specific Fast Ethernet or Gigabit Ethernet Interface</i>	<code>show interfaces (fe-fpc/pic/port   ge-fpc/pic/port)</code>
3. <i>Display Extensive Status Information for a Specific Fast Ethernet or Gigabit Ethernet Interface</i>	<code>show interfaces (fe-fpc/pic/port   ge-fpc/pic/port) extensive</code>
4. <i>Monitor Statistics for a Fast Ethernet or Gigabit Ethernet Interface</i>	<code>monitor interface (fe-fpc/pic/port   ge-fpc/pic/port)</code>
5. <i>Fiber-Optic Ethernet Interface Specifications</i>	

**Meaning** You can use the above described commands to monitor and to display the configurations for Fast Ethernet and Gigabit Ethernet interfaces.

- Related Documentation**
- [Display the Status of Gigabit Ethernet Interfaces](#)
  - [Display the Status of Fast Ethernet Interfaces](#)

## Checklist for Monitoring T1 Interfaces

**Purpose** To monitor T1 interfaces and beginning the process of isolating T1 interface problems when they occur.

**Action** [Table 21 on page 96](#) provides the links and commands for monitoring T1 interfaces.

**Table 21: Checklist for Monitoring T1 Interfaces**

Tasks	Command or Action
<i>Monitor T1 Interfaces</i>	



Table 21: Checklist for Monitoring T1 Interfaces (*continued*)

Tasks	Command or Action
1. <i>Display the Status of T1 Interfaces</i>	<b>show interfaces terse t1*</b>
2. <i>Display the Status of a Specific T1 Interface</i>	<b>show interfaces t1-fpc/pic/port</b>
3. <i>Display Extensive Status Information for a Specific T1 Interface</i>	<b>show interfaces t1-fpc/pic/port extensive</b>
4. <i>Monitor Statistics for a T1 Interface</i>	<b>monitor interface t1-fpc/pic/port</b>

**Related Documentation**

- [T1 Interfaces Overview](#)

## Configuring the Media MTU on ACX Series Routers

- [Media MTU Overview on page 97](#)
- [How to Configure the Media MTU on page 98](#)
- [Encapsulation Overhead by Encapsulation Type on page 98](#)
- [Media MTU Sizes by Interface Type for ACX Series Routers on page 99](#)

### Media MTU Overview

The default media MTU size used on a physical interface depends on the encapsulation used on that interface. In some cases, the default IP Protocol MTU depends on whether the protocol used is IP version 4 (IPv4) or International Organization for Standardization (ISO).

The default media MTU is calculated as follows:

**Default media MTU = Default IP MTU + encapsulation overhead**

When you are configuring point-to-point connections, the MTU sizes on both sides of the connections must be the same. Also, when you are configuring point-to-multipoint connections, all interfaces in the subnet must use the same MTU size. For details about encapsulation overhead, see [“Encapsulation Overhead by Encapsulation Type” on page 98](#).



**NOTE:** The actual frames transmitted also contain cyclic redundancy check (CRC) bits, which are not part of the media MTU. For example, the media MTU for a Gigabit Ethernet Version 2 interface is specified as 1514 bytes, but the largest possible frame size is actually 1518 bytes; you need to consider the extra bits in calculations of MTUs for interoperability.

The physical MTU for Ethernet interfaces does not include the 4-byte frame check sequence (FCS) field of the Ethernet frame.

If you do not configure an MPLS MTU, the Junos OS derives the MPLS MTU from the physical interface MTU. From this value, the software subtracts the encapsulation-specific overhead and space for the maximum number of labels that might be pushed in the Packet Forwarding Engine. Currently, the software provides for three labels of four bytes each, for a total of 12 bytes.

In other words, the formula used to determine the MPLS MTU is the following:

$$\text{MPLS MTU} = \text{physical interface MTU} - \text{encapsulation overhead} - 12$$

If you configure an MTU value by including the `mtu` statement at the `[edit interfaces interface-name unit logical-unit-number family mpls]` hierarchy level, the configured value is used.

## How to Configure the Media MTU

To modify the default media MTU size for a physical interface, include the `mtu` statement at the `[edit interfaces interface-name]` hierarchy level:

```
[edit interfaces interface-name
mtu bytes;
```

If you change the size of the media MTU, you must ensure that the size is equal to or greater than the sum of the protocol MTU and the encapsulation overhead.



**NOTE:** Changing the media MTU or protocol MTU causes an interface to be deleted and added again.

You configure the protocol MTU by including the `mtu` statement at the following hierarchy levels:

- `[edit interfaces interface-name unit logical-unit-number family family]`

## Encapsulation Overhead by Encapsulation Type

Table 22: Encapsulation Overhead by Encapsulation Type

Interface Encapsulation	Encapsulation Overhead (Bytes)
802.1Q/Ethernet 802.3	21

Table 22: Encapsulation Overhead by Encapsulation Type (*continued*)

Interface Encapsulation	Encapsulation Overhead (Bytes)
802.1Q/Ethernet Subnetwork Access Protocol (SNAP)	26
802.1Q/Ethernet version 2	18
ATM Cell Relay	4
ATM permanent virtual connection (PVC)	12
Cisco HDLC	4
Ethernet 802.3	17
Ethernet circuit cross-connect (CCC) and virtual private LAN service (VPLS)	4
Ethernet over ATM	32
Ethernet SNAP	22
Ethernet translational cross-connect (TCC)	18
Ethernet version 2	14
Extended virtual local area network (VLAN) CCC and VPLS	4
Extended VLAN TCC	22
Frame Relay	4
PPP	4
VLAN CCC	4
VLAN VPLS	4
VLAN TCC	22

### Media MTU Sizes by Interface Type for ACX Series Routers

Table 23: Media MTU Sizes by Interface Type for ACX Series Routers

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
Gigabit Ethernet	1514	9192	1500 (IPv4), 1497 (ISO)

**Table 23: Media MTU Sizes by Interface Type for ACX Series Routers** (*continued*)

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
10-Gigabit Ethernet	1514	9192	1500 (IPv4), 1497 (ISO)

- Related Documentation**
- *Configuring Interface Encapsulation on Physical Interfaces*
  - *Setting the Protocol MTU*

## Gigabit Ethernet Autonegotiation Overview

Autonegotiation is enabled by default on all Gigabit Ethernet and Tri-Rate Ethernet copper interfaces. However, you can explicitly enable autonegotiation to configure remote fault options manually.



### NOTE:

- For Gigabit Ethernet interfaces installed in J4350 and J6350 Services Routers, when you manually configure either the link mode or speed settings, the system ignores the configuration and generates a system log message. When autonegotiation is enabled and you specify the link mode and speed, the link autonegotiates with the manually configured settings. When autonegotiation is disabled and you configure both the link mode and speed, the link operates with the manually configured settings. If you disable autonegotiation and do not manually configure the link mode and speed, the link operates at 1000 Mbps full duplex.
- When you configure the Tri-Rate Ethernet copper interface to operate at 1 Gbps, autonegotiation must be enabled.
- On ACX Series Universal Access Routers, when the autonegotiation is disabled, the speed has to be explicitly configured to 10–100 Mbps.
- On T4000 routers, the auto-negotiation command is ignored for interfaces other than Gigabit Ethernet.

- Related Documentation**
- *Configuring Gigabit Ethernet Autonegotiation*
  - *Ethernet Interfaces*

## Understanding Interfaces on ACX Series Universal Access Routers

The ACX Series routers support time-division multiplexing (TDM) T1 and E1 interfaces and Ethernet (10GbE, 100GbE, 1000GbE copper, and 1GbE and 10GbE fiber) interfaces to support both the legacy and evolution needs of the mobile network. Support for Power

over Ethernet (PoE+) at 65 watts per port mitigates the need for additional electrical cabling for microwaves or other access interfaces.

The ACX Series routers support the following:

- TDM T1 and E1 ports:
  - The ACX1000 router contains eight T1 or E1 ports.
  - The ACX2000 router contains 16 T1 or E1 ports.
  - Inverse Multiplexing for ATM (IMA)
- Gigabit Ethernet ports:
  - The ACX1000 router contains eight Gigabit Ethernet ports. The ACX1000 router also supports either four RJ45 (Cu) ports or installation of four Gigabit Ethernet small form-factor pluggable (SFP) transceivers.
  - The ACX2000 router contains 16 Gigabit Ethernet ports and two PoE ports. The ACX2000 router also supports installation of two Gigabit Ethernet SFP transceivers and two 10-Gigabit Ethernet SFP+ transceivers.

## T1 and E1 Time-Division Multiplexing (TDM) Interfaces

On the ACX Series routers, existing Junos OS TDM features are supported without changes to statements or functionality. The following key TDM features for T1 (**ct1**) interfaces and E1 (**ce1**) interfaces are supported:

- T1 and E1 channelization
- T1 and E1 encapsulation
- Alarms, defects, and statistics
- External and internal loopback
- TDM class of service (CoS)

T1 and E1 mode selection is at the PIC level. To set the T1 or E1 mode at the PIC level, include the **framing** statement with the **t1** or **e1** option at the [**chassis fpc slot-number pic slot-number**] hierarchy level. All ports can be T1 or E1. Mixing T1s and E1s is not supported.

### T1 or E1 BITS Interface (ACX2000)

The ACX2000 router has a T1 or E1 building-integrated timing supply (BITS) interface that you can connect to an external clock. After you connect the interface to the external clock, you can configure the BITS interface so that the BITS interface becomes a candidate source for chassis synchronization to the external clock. The frequency of the BITS interface depends on the Synchronous Ethernet equipment slave clock (EEC) selected with the **network-option** statement at the [**edit chassis synchronization**] hierarchy level.



**NOTE:** The ACX1000 router does not support the BITS interface.

## Inverse Multiplexing for ATM (IMA)

Defined by the ATM Forum, IMA specification version 1.1 is a standardized technology used to transport ATM traffic over a bundle of T1 and E1 interfaces, also known as an IMA group. Up to eight links per bundle and 16 bundles per PIC are supported. The following key IMA features are supported:

- IMA Layer 2 encapsulation
- ATM CoS
- ATM policing and shaping
- Denied packets counter in the output for the **show interfaces at-fpc/pic/port extensive** command

## Gigabit Ethernet interfaces

On the ACX Series routers, existing Junos OS Ethernet features are supported without changes to statements or functionality. The following key features are supported:

- Media type specification (ACX1000 router with Gigabit Ethernet SFP and RJ45 interfaces)
- Autonegotiation for RJ45 Gigabit Ethernet interfaces
- Event handling of SFP insertion and removal
- Explicit disabling of the physical interface
- Flow control



**NOTE:** The ACX Series router does not support flow control based on PAUSE frames.

- Loopback
- Loss of signal (LOS) alarm
- Media access control (MAC) layer features
- Maximum transmission unit (MTU)
- Remote fault notification for 10-Gigabit Ethernet interfaces
- Statistics collection and handling
- Power over Ethernet (PoE) (ACX2000 router)
- High power mode

The Gigabit Ethernet ports on the router have the capacity to work as a 1 or 10-Gigabit Ethernet interface, depending on the type of small form-factor pluggable (SFP) transceiver inserted. When you insert an SFP+ transceiver, the interface works at the 10-Gigabit speed. When you insert an SFP transceiver, the interface works at the 1-Gigabit speed. Configuration is not required because the speed is determined automatically.

based on the type of inserted SFP transceiver. The dual-speed interface is automatically created with the **xe** prefix, for example, **xe-4/0/0**.

The same configuration statements are used for both speeds and CoS parameters are scaled as a percentage of the port speed. To configure a dual-speed Gigabit Ethernet interface, include the **interface xe-fpc/pic/port** statement at the [edit interfaces] hierarchy level. To display the interface speed and other details, issue the **show interfaces** command.



**NOTE:** You need to use industrial grade of SFP below 0dC for ACX 1100 and ACX 2100 boards.

**Related  
Documentation**

- [Understanding Encapsulation on an Interface on page 103](#)
- [Configuring Inverse Multiplexing for ATM \(IMA\) on page 204](#)
- [Interface Names for ACX Series Universal Access Routers](#)

## Understanding Encapsulation on an Interface

*Encapsulation* is the process by which a lower-level protocol accepts a message from a higher-level protocol and places it in the data portion of the lower-level frame. As a result, datagrams transmitted through a physical network have a sequence of headers: the first header for the physical network (or Data Link Layer) protocol, the second header for the Network Layer protocol (for example, IP), the third header for the Transport Layer protocol, and so on.

The following topics are general topics about the way encapsulation works on interfaces and the Junos OS. For the ACX Series routers, keep the following points in mind when referring to these topics:

- The [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number*] hierarchy level is not supported on the ACX Series routers.
- Not all encapsulation types or features are supported on the ACX Series routers, refer to the documentation about the specific statement or feature for support details.

**Related  
Documentation**

- [Configuring Interface Encapsulation on Logical Interfaces](#)
- [Configuring Interface Encapsulation on Physical Interfaces](#)
- [encapsulation \(Physical Interface\)](#)
- [encapsulation \(Logical Interface\)](#)

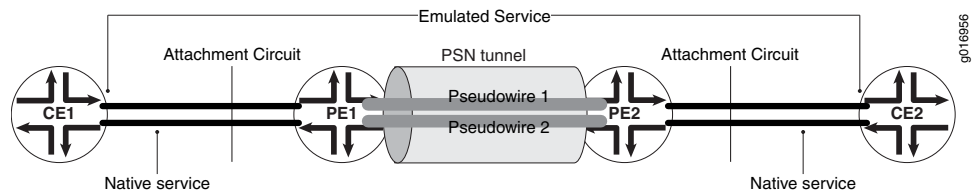
## SAToP Emulation on T1 and E1 Interfaces Overview

Structure-Agnostic time-division multiplexing (TDM) over Packet (SAToP), as defined in RFC 4553, *Structure-Agnostic TDM over Packet (SAToP)* is supported on the ACX Series Universal Access routers with built-in T1 and E1 interfaces. SAToP is used for pseudowire

encapsulation for TDM bits (T1, E1). The encapsulation disregards any structure imposed on the T1 and E1 streams, in particular the structure imposed by standard TDM framing. SAToP is used over packet-switched networks, where the provider edge (PE) routers do not need to interpret TDM data or participate in the TDM signaling.

Figure 8 on page 104 shows a packet-switched network (PSN) in which two PE routers (PE1 and PE2) provide one or more pseudowires to customer edge (CE) routers (CE1 and CE2), establishing a PSN tunnel to provide a data path for the pseudowire.

**Figure 8: Pseudowire Encapsulation with SAToP**



Pseudowire traffic is invisible to the core network, and the core network is transparent to the CEs. Native data units (bits, cells, or packets) arrive via the attachment circuit, are encapsulated in a pseudowire protocol data unit (PDU), and carried across the underlying network via the PSN tunnel. The PEs perform the necessary encapsulation and the decapsulation of the pseudowire PDUs and handle any other function required by the pseudowire service, such as sequencing or timing.

#### Related Documentation

- [Configuring SAToP Emulation on Channelized T1 and E1 Interfaces on page 197](#)



## CHAPTER 7

# Layer 2 and Layer 3

- [Configuring Interfaces for Layer 2 Circuits Overview on page 105](#)
- [Configuring the Address for the Neighbor of the Layer 2 Circuit on page 106](#)
- [Configuring the Neighbor Interface for the Layer 2 Circuit on page 106](#)
- [Configuring a Community for the Layer 2 Circuit on page 107](#)
- [Configuring the Control Word for Layer 2 Circuits on page 107](#)
- [Configuring the Encapsulation Type for the Layer 2 Circuit Neighbor Interface on page 108](#)
- [Configuring the MTU Advertised for a Layer 2 Circuit on page 109](#)
- [Configuring the Protect Interface on page 109](#)
- [Configuring the Virtual Circuit ID on page 110](#)
- [Configuring the Interface Encapsulation Type for Layer 2 Circuits on page 110](#)
- [Configuring Layer 2 Circuits over Both RSVP and LDP LSPs on page 111](#)
- [Enabling the Layer 2 Circuit When the MTU Does Not Match on page 112](#)
- [Enabling the Layer 2 Circuit When the Encapsulation Does Not Match on page 112](#)

### Configuring Interfaces for Layer 2 Circuits Overview

---

A Layer 2 circuit or pseudowire is a point-to-point Layer 2 connection transported by means of MPLS or another tunneling technology on the service provider's network. Layer 2 circuits are also called *pseudowires*. A Layer 2 circuit is similar to a circuit cross-connect (CCC), except that multiple Layer 2 circuits can be transported over a single label-switched path (LSP) tunnel between two provider edge (PE) routers. In contrast, each CCC requires a dedicated LSP.

The Junos OS implementation of Layer 2 circuits supports only the remote form of a Layer 2 circuit; that is, a connection from a local customer edge (CE) router to a remote CE router.

#### Related Documentation

- [Configuring the Address for the Neighbor of the Layer 2 Circuit on page 106](#)
- [Configuring the Neighbor Interface for the Layer 2 Circuit on page 106](#)
- [Configuring the Interface Encapsulation Type for Layer 2 Circuits on page 110](#)

## Configuring the Address for the Neighbor of the Layer 2 Circuit

---

All the Layer 2 circuits using a particular remote PE router designated for remote CE routers are listed under the **neighbor** statement (“neighbor” designates the PE router). Each neighbor is identified by its IP address and is usually the end-point destination for the label-switched path (LSP) tunnel transporting the Layer 2 circuit.

To configure a PE router as a neighbor for a Layer 2 circuit, specify the neighbor address using the **neighbor** statement:

```
neighbor address {  
  ...  
}
```

You can include this statement at the following hierarchy levels:

- **[edit protocols l2circuit]**

### Related Documentation

- [Configuring Interfaces for Layer 2 Circuits Overview on page 105](#)
- [Configuring the Neighbor Interface for the Layer 2 Circuit on page 106](#)
- [Configuring the Interface Encapsulation Type for Layer 2 Circuits on page 110](#)

## Configuring the Neighbor Interface for the Layer 2 Circuit

---

Each Layer 2 circuit is represented by the logical interface connecting the local provider edge (PE) router to the local customer edge (CE) router. This interface is tied to the Layer 2 circuit neighbor configured in “[Configuring the Address for the Neighbor of the Layer 2 Circuit](#)” on page 106.

To configure the interface for a Layer 2 circuit neighbor, include the **interface** statement:

```
interface interface-name {  
  bandwidth (bandwidth | ctnumber bandwidth);  
  community community-name;  
  (control-word | no-control-word);  
  description text;  
  encapsulation-type type;  
  ignore-encapsulation-mismatch;  
  ignore-mtu-mismatch;  
  mtu mtu-number;  
  no-revert;  
  protect-interface interface-name;  
  pseudowire-status-tlv;  
  psn-tunnel-endpoint address;  
  virtual-circuit-id identifier;  
}
```

You can include this statement at the following hierarchy levels:

- **[edit protocols l2circuit neighbor *address*]**

**Related  
Documentation**

- [Configuring Interfaces for Layer 2 Circuits Overview on page 105](#)
- [Configuring a Community for the Layer 2 Circuit on page 107](#)
- [Configuring the Control Word for Layer 2 Circuits on page 107](#)
- [Configuring the Encapsulation Type for the Layer 2 Circuit Neighbor Interface on page 108](#)
- [Configuring the Protect Interface on page 109](#)
- [Configuring the Virtual Circuit ID on page 110](#)

## Configuring a Community for the Layer 2 Circuit

To configure a community for a Layer 2 circuit, include the **community** statement:

```
community community-name;
```

You can include this statement at the following hierarchy levels:

- **[edit protocols l2circuit neighbor *address* interface *interface-name*]**

**Related  
Documentation**

- [Configuring Interfaces for Layer 2 Circuits Overview on page 105](#)
- [Configuring Policies for Layer 2 Circuits](#)

## Configuring the Control Word for Layer 2 Circuits

To emulate the virtual circuit (VC) encapsulation for Layer 2 circuits, a 4-byte control word is added between the Layer 2 protocol data unit (PDU) being transported and the VC label that is used for demultiplexing. For most protocols, a null control word consisting of all zeroes is sent between Layer 2 circuit neighbors.

However, individual bits are available in a control word that can carry Layer 2 protocol control information. The control information is mapped into the control word, which allows the header of a Layer 2 protocol to be stripped from the frame. The remaining data and control word can be sent over the Layer 2 circuit, and the frame can be reassembled with the proper control information at the egress point of the circuit.

The following Layer 2 protocols map Layer 2 control information into special bit fields in the control word:

- **Frame Relay**—The control word supports the transport of discard eligible (DE), forward explicit congestion notification (FECN), and backward explicit congestion notification (BECN) information.



**NOTE:** Frame Relay is not supported on the ACX Series routers.

- ATM AAL5 mode—The control word supports the transport of sequence number processing, ATM cell loss priority (CLP), and explicit forward congestion indication (EFCI) information. When you configure an AAL5 mode Layer 2 circuit, the control information is carried by default and no additional configuration is needed.
- ATM cell-relay mode—The control word supports sequence number processing only. When you configure a cell-relay mode Layer 2 circuit, the sequence number information is carried by default and no additional configuration is needed.

The Junos OS implementation of sequence number processing for ATM cell-relay mode and AAL5 mode is not the same as that described in Sec. 3.1.2 of the IETF draft *Encapsulation Methods for Transport of Layer 2 Frames Over IP and MPLS Networks*. The differences are as follows:

- A packet with a sequence number of 0 is considered as out of sequence.
- A packet that does not have the next incremental sequence number is considered out of sequence.
- When out-of-sequence packets arrive, the sequence number in the Layer 2 circuit control word increments by one and becomes the expected sequence number for the neighbor.

The Junos OS can typically determine whether a neighboring router supports the control word. However, if you want to explicitly disable its use on a specific interface, include the **no-control-word** statement in the configuration.

**Related  
Documentation**

- [Configuring the Neighbor Interface for the Layer 2 Circuit on page 106](#)
- [Configuring the Encapsulation Type for the Layer 2 Circuit Neighbor Interface on page 108](#)

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## Configuring the Encapsulation Type for the Layer 2 Circuit Neighbor Interface

---

You can specify the Layer 2 circuit encapsulation type for the interface receiving traffic from a Layer 2 circuit neighbor. The encapsulation type is carried in the LDP-signaling messages exchanged between Layer 2 circuit neighbors when pseudowires are created. The encapsulation type you configure for each Layer 2 circuit neighbor varies depending on the type of networking equipment or the type of Layer 2 protocol you have deployed in your network. If you do not specify an encapsulation type for the Layer 2 circuit, the encapsulation of the CE device interface is used by default.

Specify the encapsulation type for the Layer 2 circuit neighbor interface by including the **encapsulation-type** statement:

```
encapsulation-type (atm-aal5 | atm-cell | atm-cell-port-mode | atm-cell-vc-mode |  
    atm-cell-vp-mode | cesop | ethernet | ethernet-vlan | interworking | satop-e1 | satop-e3  
    | satop-t1 | satop-t3);
```

You can include this statement at the **[edit protocols l2circuit neighbor address interface interface-name]** hierarchy levels:

**Related  
Documentation**

- [Enabling the Layer 2 Circuit When the Encapsulation Does Not Match on page 112](#)

- [Enabling the Layer 2 Circuit When the MTU Does Not Match on page 112](#)
- [Configuring the MTU Advertised for a Layer 2 Circuit on page 109](#)

## Configuring the MTU Advertised for a Layer 2 Circuit

By default, the MTU used to advertise a Layer 2 circuit is determined by taking the interface MTU for the associated physical interface and subtracting the encapsulation overhead for sending IP packets based on the encapsulation.

However, encapsulations that support multiple logical interfaces (and multiple Layer 2 circuits) rely on the same interface MTU (since they are all associated with the same physical interface). This can prove to be a limitation for VLAN Layer 2 circuits using the same Ethernet interface or for Layer 2 circuit DLCIs using the same Frame Relay interface.

This can also affect multivendor environments. For example, if you have three PE devices supplied by different vendors and one of the devices only supports an MTU of 1500, even if the other devices support larger MTUs you must to configure the MTU as 1500 (the smallest MTU of the three PE devices).

You can explicitly configure which MTU is advertised for a Layer 2 circuit, even if the Layer 2 circuit is sharing a physical interface with other Layer 2 circuits. When you explicitly configure an MTU for a Layer 2 circuit, be aware of the following:

- An explicitly configured MTU is signaled to the remote PE device. The configured MTU is also compared to the MTU received from the remote PE device. If there is a conflict, the Layer 2 circuit is taken down.
- If you configure an MTU for an ATM cell relay interface on an ATM II PIC, the configured MTU is used to compute the cell bundle size advertised for that Layer 2 circuit, instead of the default interface MTU.
- A configured MTU is used only in the control plane. It is not enforced in the data plane. You need to ensure that the CE device for a given Layer 2 circuit uses the correct MTU for data transmission.

To configure the MTU for a Layer 2 circuit, include the **mtu** statement at the **[edit protocols l2circuit neighbor address interface interface-name]** hierarchy level.

```
mtu mtu-number;
```

### Related Documentation

- [Configuring Interfaces for Layer 2 Circuits Overview on page 105](#)
- [Enabling the Layer 2 Circuit When the MTU Does Not Match on page 112](#)
- [Configure the Layer 2 Circuit on page 203](#)

## Configuring the Protect Interface

You can configure a protect interface for the logical interface linking a virtual circuit to its destination, whether the destination is remote or local. A protect interface provides a backup for the protected interface in case of failure. Network traffic uses the primary

interface only so long as the primary interface functions. If the primary interface fails, traffic is switched to the protect interface. The protect interface is optional.

To configure the protect interface, include the **protect-interface** statement:

```
protect-interface interface-name;
```

For a list of hierarchy levels at which you can include this statement, see the statement summary section for this statement.

**Related Documentation**

- [Example: Configuring Layer 2 Circuit Protect Interfaces](#)

---

## Configuring the Virtual Circuit ID

You configure a virtual circuit ID on each interface. Each virtual circuit ID uniquely identifies the Layer 2 circuit among all the Layer 2 circuits to a specific neighbor. The key to identifying a particular Layer 2 circuit on a PE router is the neighbor address and the virtual circuit ID. An LDP-FEC-to-label binding is associated with a Layer 2 circuit based on the virtual circuit ID in the FEC and the neighbor that sent this binding. The LDP-FEC-to-label binding enables the dissemination of the VPN label used for sending traffic on that Layer 2 circuit to the remote CE device. When an LDP peer sends a Label Withdraw message for a Layer 2 circuit FEC with a non zero group ID, the Junos OS software sends the Label Release message with the group ID for the Layer 2 circuit associated with the FEC.

You also configure a virtual circuit ID for each redundant pseudowire. A redundant pseudowire is identified by the backup neighbor address and the virtual circuit ID.

To configure the virtual circuit ID, include the **virtual-circuit-id** statement:

```
virtual-circuit-id identifier;
```

For a list of hierarchy levels at which you can include this statement, see the statement summary section for this statement.

**Related Documentation**

- [Configuring Pseudowire Redundancy on the PE Router on page 121](#)

---

## Configuring the Interface Encapsulation Type for Layer 2 Circuits

The Layer 2 encapsulation type is carried in the LDP forwarding equivalence class (FEC). You can configure either circuit cross-connect (CCC) or translational cross-connect (TCC) encapsulation types for Layer 2 circuits. For more information, see the *Junos OS MPLS Applications Library for Routing Devices and Router Interfaces*.

To configure the interface encapsulation for a Layer 2 circuit, include the **encapsulation** statement:

```
encapsulation encapsulation;
```

You can include this statement at the following hierarchy levels:

- **[edit interfaces *interface-name*]**

**Related  
Documentation**

- [Configure the Layer 2 Circuit on page 203](#)
- [Configuring the Encapsulation Type for the Layer 2 Circuit Neighbor Interface on page 108](#)

## Configuring Layer 2 Circuits over Both RSVP and LDP LSPs

You can configure two Layer 2 circuits between the same two routers, and have one Layer 2 circuit traverse an RSVP LSP and the other traverse an LDP LSP. To accomplish this, you need to configure two loopback addresses on the local router. You configure one of the loopback address for the Layer 2 circuit traversing the RSVP LSP. You configure the other loopback address to handle the Layer 2 circuit traversing the LDP LSP.

You also need to configure a packet switched network (PSN) tunnel endpoint for one of the Layer 2 circuits. It can be either the Layer 2 circuit traversing the RSVP LSP or the one traversing the LDP LSP. The PSN tunnel endpoint address is the destination address for the LSP on the remote router.

To configure the address for the PSN tunnel endpoint, include the **psn-tunnel-endpoint** statement:

```
psn-tunnel-endpoint address;
```

You can include this statement at the following hierarchy levels:

- **[edit protocols l2circuit neighbor *address* interface *interface-name*]**

By default, the PSN tunnel endpoint for a Layer 2 circuit is identical to the neighbor address, which is also the same as the LDP neighbor address.

The tunnel endpoints on the remote router do not need to be loopback addresses.

The following example illustrates how you might configure a PSN tunnel endpoint:

```
[edit protocols l2circuit]
neighbor 10.255.0.6 {
  interface t1-0/2/2.0 {
    psn-tunnel-endpoint 20.20.20.20;
    virtual-circuit-id 1;
  }
  interface t1-0/2/1.0 {
    virtual-circuit-id 10;
  }
}
```

The Layer 2 circuit configured for the **t1-0/2/2.0** interface resolves in the inet3 routing table to **20.20.20.20**. This could be either an RSVP route or a static route with an LSP next hop.

- Related Documentation**
- [Configuring Logical Units on the Loopback Interface for Routing Instances in Layer 3 VPNs](#)

---

## Enabling the Layer 2 Circuit When the MTU Does Not Match

You can configure the Junos OS to allow a Layer 2 circuit to be established even though the MTU configured on the PE router does not match the MTU configured on the remote PE router by including the **ignore-mtu-mismatch** statement at the **[edit protocols l2circuit neighbor address interface *interface-name*]** hierarchy level.

- Related Documentation**
- [Configuring the MTU Advertised for a Layer 2 Circuit on page 109](#)
  - [Configuring the Media MTU](#)

---

## Enabling the Layer 2 Circuit When the Encapsulation Does Not Match

You can configure the Junos OS to allow a Layer 2 circuit to be established even though the encapsulation configured on the CE device interface does not match the encapsulation configured on the Layer 2 circuit interface by including the **ignore-encapsulation-mismatch** statement. You can configure the **ignore-encapsulation-mismatch** statement for the connection to the remote connection by including the statement at the **[edit protocols l2circuit neighbor address interface *interface-name*]** hierarchy level or for the local connection by including this statement at the **[edit protocols l2circuit local-switching interface *interface-name*]** hierarchy level.

**ignore-encapsulation-mismatch;**

For a list of hierarchy levels at which you can include this statement, see the statement summary section for this statement.

- Related Documentation**
- [Configuring the Encapsulation Type for the Layer 2 Circuit Neighbor Interface on page 108](#)



## CHAPTER 8

# MPLS, VPNs, and Pseudowires

- [MPLS Overview for ACX Series Universal Access Routers on page 113](#)
- [TTL Processing on Incoming MPLS Packets on page 114](#)
- [ATM Pseudowire Overview on page 116](#)
- [Ethernet Pseudowire Overview on page 117](#)
- [TDM Pseudowires Overview on page 118](#)
- [Redundant Pseudowires for Layer 2 Circuits and VPLS on page 119](#)
- [Configuring Redundant Pseudowires for Layer 2 Circuits and VPLS on page 121](#)
- [Configuring the Pseudowire Status TLV on page 123](#)
- [Example: TDM Pseudowire Base Configuration on page 124](#)
- [Example: ATM Pseudowire Base Configuration on page 127](#)
- [Example: Ethernet Pseudowire Base Configuration on page 130](#)
- [Example: Configuring the Pseudowire Status TLV on page 133](#)

## MPLS Overview for ACX Series Universal Access Routers

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Multiprotocol Label Switching (MPLS) provides a mechanism for engineering network traffic patterns that is independent of routing tables by assigning short labels to network packets, which describe how to forward them through the network. MPLS is independent of any routing protocol and can be used for unicast packets. On the ACX Series routers, the following MPLS features are supported:

- The configuration of a label-switching router (LSR) for processing of label-switched packets and forwarding of packets based on their labels.
- The configuration of an ingress label edge router (LER) where IP packets are encapsulated within MPLS packets and forwarded to the MPLS domain, and as an egress LER where MPLS packets are decapsulated and the IP packets contained within the MPLS packets are forwarded using information in the IP forwarding table. Configuring MPLS on the LER is the same as configuring an LSR.
- Uniform and pipe mode configuration providing different types of visibility in the MPLS network. Uniform mode makes all the nodes that a label-switched path (LSP) traverses visible to nodes outside the LSP tunnel. Uniform mode is the default. Pipe mode makes only the LSP ingress and egress points visible to nodes outside the LSP tunnel. Pipe mode acts like a circuit and must be enabled with the global **no-propagate-ttl** statement

at the `[edit protocols mpls]` hierarchy level on each router that is in the path of the LSP. The `no-propagate-ttl` statement disables time-to-live (TTL) propagation at the router level and affects all RSVP-signalled or LDP-signalled LSPs. Only the global configuration of TTL propagation is supported.

- Exception packet handling of IP packets not processed by the normal packet flow through the Packet Forwarding Engine. The following types of exception packet handling are supported:
  - Router alert
  - Time-to-live (TTL) expiry value
  - Virtual circuit connection verification (VCCV)
- LSP hot standby for secondary paths configuration to maintain a path in a hot-standby state enabling swift cut over to the secondary path when downstream routers on the current active path indicate connectivity problems.
- Redundancy for a label-switched path (LSP) path with the configuration of fast reroute.
- Configuration of link protection to ensure that traffic traversing a specific interface from one router to another can continue to reach its destination in the event that this interface fails.

**Related  
Documentation**

- *Minimum MPLS Configuration*
- *MPLS Feature Guide for Routing Devices*
- *RSVP Feature Guide for Routing Devices*
- *Disabling Normal TTL Decrementing*
- *Fast Reroute Overview*
- *Configuring Fast Reroute*
- *MPLS and Traffic Protection*
- *Configuring Link Protection on Interfaces Used by LSPs*
- *Configuring Hot Standby of Secondary Paths*

---

## TTL Processing on Incoming MPLS Packets

---

The flow chart on [Figure 9 on page 116](#) illustrates TTL processing on incoming MPLS packets. On a transit LSR or an egress LER, MPLS pops one or more labels and can push one or more labels. The incoming TTL of the packet is determined by the configured TTL processing tunnel model.

When all of the following conditions are met, the incoming TTL is set to the TTL value found in the immediate inner header:

- The outer label is popped as opposed to being swapped
- The TTL processing model is configured to pipe

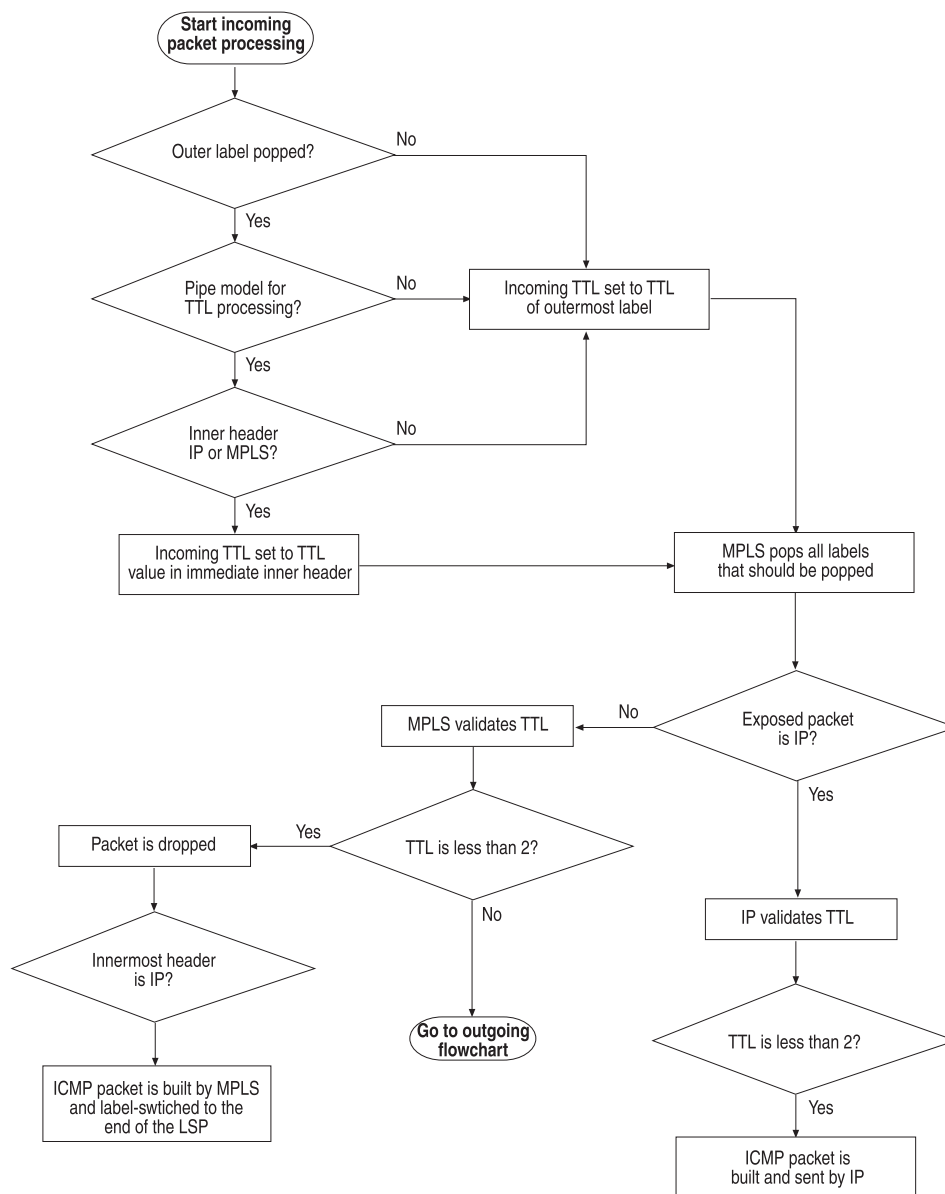
- The inner header is MPLS or IP

If any of those conditions is not met, then the incoming TTL is set to the TTL value found in the outermost label. In all cases, the TTL values of any further inner labels are ignored.

When an IP packet is exposed after MPLS pops all the labels that should be popped, MPLS passes the packet to IP for further processing, including TTL checking. When the uniform tunnel model for TTL processing is in effect, MPLS sets the TTL value of the IP packet to the incoming TTL value that was just set. In other words, the TTL value is copied from the outermost label to the IP packet. When the pipe model for TTL processing is in effect, the TTL value in the IP header is left unchanged.

If an IP packet is not exposed by the label popping, then MPLS performs the TTL validation. If the incoming TTL is less than 2, the packet is dropped. If innermost packet is IP, an ICMP packet is built and sent. If the TTL does not expire and the packet needs to be sent out, the outgoing TTL is determined by the rules for outgoing MPLS packets.

Figure 9: TTL Processing on Incoming MPLS Packets



**Related Documentation**

- *Disabling Normal TTL Decrementing*
- *no-propagate-ttl*

## ATM Pseudowire Overview

An Asynchronous Transfer Mode (ATM) pseudowire acts as a Layer 2 circuit or service, which allows the migration of ATM services to an MPLS packet-switched network without having to provision the ATM subscriber or customer edge (CE) device. When you configure an ATM pseudowire, the network between the customer edge (CE) routers appears transparent to the CE routers, making it seem that the CE routers are directly connected

across a time-division multiplex (TDM) leased line. ATM pseudowires are primarily used in an ATM service provider's network to connect existing ATM switches across a higher speed packet-switched network or to provide ATM backhaul services for remote access to existing ATM networks.

On ACX series routers, you configure an ATM pseudowire with Layer 2 encapsulation for Inverse Multiplexing for ATM (IMA).

**Related  
Documentation**

- [Understanding Encapsulation on an Interface on page 103](#)
- [Inverse Multiplexing for ATM \(IMA\) Overview on page 29](#)
- [Configuring Inverse Multiplexing for ATM \(IMA\) on page 204](#)
- [Pseudowire Overview for ACX Series Universal Access Routers on page 32](#)
- [TDM Pseudowires Overview on page 118](#)
- [Ethernet Pseudowire Overview on page 117](#)

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## Ethernet Pseudowire Overview

An Ethernet pseudowire is used to carry Ethernet or 802.3 Protocol Data Units (PDUs) over an MPLS network enabling service providers to offer emulated Ethernet services over existing MPLS networks. Ethernet or 802.3 PDUs are encapsulated within the pseudowire to provide a point-to-point Ethernet service. For the point-to-point Ethernet service, the following fault management features are supported:

- The IEEE 802.3ah standard for Operation, Administration, and Management (OAM). You can configure IEEE 802.3ah OAM link-fault management on Ethernet point-to-point direct links or links across Ethernet repeaters.

Ethernet OAM link-fault management can be used for physical link-level fault detection and management. It uses a new, optional sublayer in the data link layer of the OSI model. Ethernet OAM can be implemented on any full-duplex point-to-point or emulated point-to-point Ethernet link. A system-wide implementation is not required; OAM can be deployed on particular interfaces of a router. Transmitted Ethernet OAM messages or OAM PDUs are of standard length, untagged Ethernet frames within the normal frame length limits in the range 64–1518 bytes.

- Ethernet connectivity fault management (CFM) to monitor the physical link between two routers.
  - Connection protection using the continuity check protocol for fault monitoring . The continuity check protocol is a neighbor discovery and health check protocol that discovers and maintains adjacencies at the VLAN or link level.
  - Path protection using the linktrace protocol for path discovery and fault verification . Similar to IP traceroute, the linktrace protocol maps the path taken to a destination MAC address through one or more bridged networks between the source and destination.

- Related Documentation**
- [Configuring 802.3ah OAM Link-Fault Management](#)
  - [Pseudowire Overview for ACX Series Universal Access Routers on page 32](#)
  - [TDM Pseudowires Overview on page 118](#)
  - [ATM Pseudowire Overview on page 116](#)

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## TDM Pseudowires Overview

A TDM pseudowire acts as Layer 2 circuit or service for T1 and E1 circuit signals across an MPLS packet-switched network. On ACX Series routers, you configure a TDM pseudowire with Structure-Agnostic Time Division Multiplexing (TDM) over Packet (SAToP) on the ACX Series built-in channelized T1 and E1 interfaces. When you configure a TDM pseudowire, the network between the customer edge (CE) routers appears transparent to the CE routers, making it seem that the CE routers are directly connected. With the SAToP configuration on the provider edge (PE) router's T1 and E1 interfaces, the interworking function (IWF) forms a payload (frame) that contains the CE router's T1 and E1 Layer 1 data and control word. This data is transported to the remote PE over the pseudowire. The remote PE removes all the Layer 2 and MPLS headers added in the network cloud and forwards the control word and the Layer 1 data to the remote IWF, which in turn forwards the data to the remote CE router.

- Related Documentation**
- [Understanding Encapsulation on an Interface on page 103](#)
  - [SAToP Emulation on T1 and E1 Interfaces Overview on page 103](#)
  - [Configuring SAToP Emulation on Channelized T1 and E1 Interfaces on page 197](#)
  - [Pseudowire Overview for ACX Series Universal Access Routers on page 32](#)
  - [ATM Pseudowire Overview on page 116](#)
  - [Ethernet Pseudowire Overview on page 117](#)

## Redundant Pseudowires for Layer 2 Circuits and VPLS

A redundant pseudowire can act as a backup connection between PE routers and CE devices, maintaining Layer 2 circuit and VPLS services after certain types of failures. This feature can help improve the reliability of certain types of networks (metro for example) where a single point of failure could interrupt service for multiple customers. Redundant pseudowires cannot reduce traffic loss to zero. However, they provide a way to gracefully recover from pseudowire failures in such a way that service can be restarted within a known time limit.



**NOTE:** VPLS is not supported on ACX Series routers.

When you configure redundant pseudowires to remote PE routers, you configure one to act as the primary pseudowire over which customer traffic is being transmitted and you configure another pseudowire to act as a backup in the event the primary fails. You configure the two pseudowires statically. A separate label is allocated for the primary and backup neighbors.

For information about how to configure redundant pseudowires, see [“Configuring Redundant Pseudowires for Layer 2 Circuits and VPLS” on page 121](#).

The following sections provide an overview of redundant pseudowires for Layer 2 circuits and VPLS:

- [Types of Redundant Pseudowire Configurations on page 119](#)
- [Pseudowire Failure Detection on page 120](#)

### Types of Redundant Pseudowire Configurations

You can configure redundant pseudowires for Layer 2 circuits and VPLS in either of the following manners:



**NOTE:** VPLS is not supported on ACX Series routers.

- You can configure a single active pseudowire. The PE router configured as the primary neighbor is given preference and this connection is the one used for customer traffic. For the LDP signalling, labels are exchanged for both incoming and outgoing traffic with the primary neighbor. The LDP label advertisement is accepted from the backup neighbor, but no label advertisement is forwarded to it, leaving the pseudowire in an incomplete state. The pseudowire to the backup neighbor is completed only when the primary neighbor fails. The decision to switch between the two pseudowires is made by the device configured with the redundant pseudowires. The primary remote PE router is unaware of the redundant configuration, ensuring that traffic is always switched using just the active pseudowire.
- Alternatively, you can configure two active pseudowires, one to each of the PE routers. Using this approach, control plane signalling is completed and active pseudowires are

established with both the primary and backup neighbors. However, the data plane forwarding is done only over a one of the pseudowires (designated as the active pseudowire by the local device). The other pseudowire is on standby. The active pseudowire is preferably established with the primary neighbor and can switch to the backup pseudowire if the primary fails.

The decision to switch between the active and standby pseudowires is controlled by the local device. The remote PE routers are unaware of the redundant connection, and so both remote PE routers send traffic to the local device. The local device only accepts traffic from the active pseudowire and drops the traffic from the standby. In addition, the local device only sends traffic to the active pseudowire. If the active pseudowire fails, traffic is immediately switched to the standby pseudowire.

The two configurations available for pseudowire redundancy have the following limitations:

- For the single active pseudowire configuration, it takes more time (compared to the two active pseudowire configuration) to switchover to the backup pseudowire when a failure is detected. This approach requires additional control plane signalling to complete the pseudowire with the backup neighbor and traffic can be lost during the switchover from primary to backup.
- If you configure two active pseudowires, bandwidth is lost on the link carrying the backup pseudowire between the remote PE router and the local device. Traffic is always duplicated over both the active and standby pseudowires. The single active pseudowire configuration does not waste bandwidth in this fashion.
- You cannot enable GRES (graceful Routing Engine switchover) for redundant pseudowires.
- You cannot enable NSR (nonstop active routing) for redundant pseudowires.



**NOTE:** GRES and NSR are not supported on ACX Series routers.

---

## Pseudowire Failure Detection

The following events are used to detect a failure (control and data plane) of the pseudowire configured between a local device and a remote PE router and initiates the switch to a redundant pseudowire:

- Manual switchover (user initiated)
- Remote PE router withdraws the label advertisement
- LSP to the remote PE router goes down
- LDP session with the remote PE router goes down
- Local configuration changes
- Periodic pseudowire OAM procedure fails (Layer 2 circuit-based MPLS ping to the PE router fails)



When you configure a redundant pseudowire between a CE device and a PE router, a periodic (once a minute) ping packet is forwarded through the active pseudowire to verify data plane connectivity. If the ping fails, traffic is automatically switched to the redundant pseudowire.

When a failure is detected, traffic is switched to the redundant pseudowire which is then also designated as the active pseudowire. The switch is nonreversible, meaning that once traffic has been switched to the redundant pseudowire, it remains active unless it also fails unless the switch to the redundant pseudowire is never done unless there is a failure in the currently active pseudowire. For example, a primary pseudowire has failed and traffic has been successfully switched to the redundant pseudowire. After a period of time, the cause of the failure of the primary pseudowire has been resolved and it is now possible to reestablish the original connection. However, traffic is not switched back to the original pseudowire unless a failure is detected on the now active pseudowire.

**Related  
Documentation**

- [Example: Configuring H-VPLS Without VLANs](#)

## Configuring Redundant Pseudowires for Layer 2 Circuits and VPLS

A redundant pseudowire can act as a backup connection between PE routers and CE devices, maintaining Layer 2 circuit and VPLS services after certain types of failures. This feature can help improve the reliability of certain types of networks (metro for example) where a single point of failure could interrupt service for multiple customers. Redundant pseudowires cannot reduce traffic loss to zero. However, they provide a way to gracefully recover from pseudowire failures in such a way that service can be restarted within a known time limit.



**NOTE:** VPLS is not supported on ACX Series routers.

For an overview of how redundant pseudowires work, see [“Redundant Pseudowires for Layer 2 Circuits and VPLS” on page 119](#).

To configure pseudowire redundancy for Layer 2 circuits and VPLS, complete the procedures in the following sections:

- [Configuring Pseudowire Redundancy on the PE Router on page 121](#)
- [Configuring the Switchover Delay for the Pseudowires on page 122](#)
- [Configuring a Revert Time for the Redundant Pseudowire on page 122](#)

### Configuring Pseudowire Redundancy on the PE Router

You configure pseudowire redundancy on the PE router acting as the egress for the primary and standby pseudowires using the **backup-neighbor** statement.

To configure pseudowire redundancy on the PE router, include the **backup-neighbor** statement:

```
backup-neighbor {
    community name;
```

```
    psn-tunnel-endpoint address;  
    standby;  
    virtual-circuit-id number;  
}
```

For a list of hierarchy levels at which you can include this statement, see the statement summary for this statement.

The **backup-neighbor** statement includes the following configuration options:

- **community**—Specifies the community for the backup neighbor.
- **psn-tunnel-endpoint**—Specifies the endpoint address for the packet switched network (PSN) tunnel on the remote PE router. The PSN tunnel endpoint address is the destination address for the LSP on the remote PE router.
- **standby**—Configures the pseudowire to the specified backup neighbor as the standby. When you configure this statement, traffic flows over both the active and standby pseudowires to the CE device. The CE device drops the traffic from the standby pseudowire, unless the active pseudowire fails. If the active pseudowire fails, the CE device automatically switches to the standby pseudowire.
- **virtual-circuit-id**—Uniquely identifies the primary and standby Layer 2 circuits. This option is configurable for Layer 2 circuits only.

## Configuring the Switchover Delay for the Pseudowires

To configure the time the router waits before switching traffic from the failed primary pseudowire to a backup pseudowire, include the **switchover-delay** statement:

```
    switchover-delay milliseconds;
```

For a list of hierarchy levels at which you can include this statement, see the statement summary for this statement.

## Configuring a Revert Time for the Redundant Pseudowire

You can specify a revert time for redundant Layer 2 circuit and VPLS pseudowires. When you have configured redundant pseudowires for Layer 2 circuits or VPLS, traffic is switched to the backup pseudowire in the event that the primary pseudowire fails. If you configure a revert time, when the configured time expires traffic is reverted back to the primary pseudowire, assuming the primary pseudowire has been restored.

To configure a revert time for redundant pseudowires, specify the time in seconds using the **revert-time** statement:

```
    revert-time (Protocols Layer 2 Circuits) seconds maximum seconds;
```

With the **maximum** option, specify a maximum reversion interval to add after the **revert-time** delay. If a revert-time delay is defined but a maximum timer is not defined, VCs are restored upon the revert-timer's expiration.

To reduce as much as possible the amount of traffic discarded, and potential data-path asymmetries observed during primary-to-backup transition periods, you can use this restoration timer. This restoration timer is activated when the backup path is performing

as active, and then the primary path is restored. The goal is to avoid moving traffic back to the primary path right away, to make sure that the control plane's related tasks (such as IGP, LDP, RSVP, and internal BGP) have enough time to complete their updating cycle.

By enabling a gradual return of traffic to the primary path, you can ensure that the relatively-slow control-plane processing and updating does not have a negative impact on the restoration process.

The **maximum** option extends the revert timer's functionality to provide a jittered interval over which a certain number of circuits can be transitioned back to the primary path. By making use of this maximum value, you can define a time interval during which circuits are expected to switch over. As a consequence, circuits' effective transitions are scattered during restoration periods.

When making use of **revert-time x maximum y** statement, you can ensure that the corresponding circuit that is active is moved to the primary path within a time-slot (t1) such as that:  $x \leq t1 \leq y$ . In other words, by activating this statement, you can ensure the following:

- VCs stay in the backup path for at least x seconds after the primary path comes back up.
- VCs are moved back to the primary path before y seconds have elapsed.
- y maximum value = x maximum value \* 2 = 1200 seconds.

The ideal values for x and y will be conditioned to internal aspects of your network. For this reason, there are no default values for these settings. If no revert-time is set, the default behavior is non-revertive. That is, circuits are not returned to the primary path upon restoration. They are kept on the backup path.

For a list of hierarchy levels at which you can include this statement, see the statement summary for this statement.

- Related Documentation**
- *Example: Configuring Pseudowire Redundancy for Mobile Backhaul Scenarios*
  - *Example: Configuring H-VPLS Without VLANs*

---

## Configuring the Pseudowire Status TLV

The pseudowire status type length variable (TLV) is used to communicate the status of a pseudowire back and forth between two provider edge (PE) routers. For Layer 2 circuit configurations, you can configure the PE router to negotiate the pseudowire with its neighbor using the pseudowire status TLV. The pseudowire status TLV is configurable for each pseudowire connection and is disabled by default. The pseudowire status negotiation process assures that a PE router reverts back to the label withdraw method for pseudowire status if its remote PE router neighbor does not support the pseudowire status TLV.

Unlike the control word, a PE router's ability to support the pseudowire status TLV is communicated when the initial label mapping message is sent to its remote PE router. Once the PE router transmits its support for the pseudowire status TLV to its remote PE

router, it includes the pseudowire status TLV in every label mapping message sent to the remote PE router. If you disable support for the pseudowire status TLV on the PE router, a label withdraw message is sent to the remote PE router and then a new label mapping message without the pseudowire status TLV follows.

To configure the pseudowire status TLV for the pseudowire to the neighbor PE router, include the *pseudowire-status-tlv* statement at an appropriate hierarchy level.

For a list of the hierarchy levels at which you can include this statement, see the *statement summary* section for this statement.

**Related Documentation**

- [Example: Configuring the Pseudowire Status TLV on page 133](#)
- *pseudowire-status-tlv*
- *Configuring Interfaces for Layer 2 Circuits*

---

## Example: TDM Pseudowire Base Configuration

- [Requirements on page 124](#)
- [Overview of a TDM Pseudowire Base Configuration on page 124](#)
- [Configuring an TDM Pseudowire on page 124](#)

### Requirements

The following is a list of the hardware and software requirements for this configuration.

- One ACX Series router
- Junos OS Release 12.2 or later

### Overview of a TDM Pseudowire Base Configuration

The configuration shown here is the base configuration of an TDM pseudowire with T1 framing on an ACX Series router. This configuration is for one provider edge router. To complete the TDM pseudowire configuration, you need to repeat this configuration on an other provider edge router in the Multiprotocol Label Switched (MPLS) network.

### Configuring an TDM Pseudowire

**CLI Quick Configuration**

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

```
set chassis fpc 0 pic 0 framing t1
set interfaces ct1-0/0/0 no-partition interface-type t1
set interfaces t1-0/0/0 encapsulation satop
set interfaces t1-0/0/0 unit 0
set interfaces ge-0/2/0 unit 0 family inet address 20.1.1.2/24
set interfaces ge-0/2/0 unit 0 family mpls
set interfaces lo0 unit 0 family inet address 70.1.1.1/32
set protocols rsvp interface ge-0/2/0.0
set protocols mpls no-cspf
```

```

set protocols mpls label-switched-path PE1-to-PE2 to 40.1.1.1
set protocols mpls interface ge-0/2/0.0
set protocols ospf traffic-engineering
set protocols ospf area 0.0.0.0 interface ge-0/2/0.0
set protocols ospf area 0.0.0.0 interface lo0.0 passive
set protocols ldp interface ge-0/2/0.0
set protocols ldp interface lo0.0
set protocols l2circuit neighbor 40.1.1.1 interface t1-0/0/0.0 virtual-circuit-id
1

```



**NOTE:** To configure a TDM pseudowire with E1 framing, include the `e1` statement at the [edit chassis fpc 0 pic 0 framing] hierarchy level instead of the `t1` statement shown in this example.

#### Step-by-Step Procedure

1. Configure the framing format:
 

```

[edit]
user@host# edit chassis
[edit chassis]
user@host# set fpc 0 pic 0 framing t1

```
2. Create a T1 interface on a channelized T1 interface (`ct1`) and enable full channelization with the `no-partition` statement. On the logical T1 interface, set the Structure-Agnostic TDM over Packet (SAToP) encapsulation mode.
 

```

[edit]
user@host# edit interfaces
[edit interfaces]
user@host# set ct1-0/0/0 no-partition interface-type t1
user@host# set t1-0/0/0 encapsulation satop
user@host# set t1-0/0/0 unit 0

```
3. Create a Gigabit Ethernet interface and enable MPLS on that interface. Create the loopback (`lo0`) interface:
 

```

[edit interfaces]
user@host# set ge-0/2/0 unit 0 family inet address 20.1.1.2/24
user@host# set ge-0/2/0 unit 0 family mpls
user@host# set lo0 unit 0 family inet address 70.1.1.32

```
4. Enable the MPLS and RSVP protocols on the MPLS interface—`ge-0/2/0.0`:
 

```

[edit]
user@host# edit protocols
[edit protocols]
user@host# set rsvp interface ge-0/2/0.0
user@host# set mpls interface ge-0/2/0.0

```
5. Configure LDP. If you configure RSVP for a pseudowire, you must also configure LDP:
 

```

[edit protocols]
user@host# set ldp interface ge-0/2/0.0
user@host# set ldp interface lo0.0

```

6. Configure a point-to-point label-switched path (LSP) and disable constrained-path LSP computation:

```
[edit protocols]
user@host# set mpls label-switched-path PE1-to-PE2 to 40.1.1.1
user@host# set mpls no-cspf
```

7. Configure OSPF and enable traffic engineering on the MPLS interface—**ge-0/2/0.0**, and on the loopback (**lo0**) interface:

```
[edit protocols]
user@host# set ospf traffic-engineering
user@host# set ospf area 0.0.0.0 interface ge-0/2/0.0
user@host# set ospf area 0.0.0.0 interface lo0.0 passive
```

8. Uniquely identify a Layer 2 circuit for the TDM pseudowire:

```
[edit protocols]
user@host# set l2circuit neighbor 40.1.1.1 interface t1-0/0/0.0 virtual-circuit-id 1
```

---

## Results

```
[edit]
user@host# show
chassis {
  fpc 0 {
    pic 0 {
      framing t1;
    }
  }
}
interfaces {
  ct1-0/0/0 {
    no-partition interface-type t1;
  }
  t1-0/0/0 {
    encapsulation satop;
    unit 0;
  }
  ge-0/2/0 {
    unit 0 {
      family inet {
        address 20.1.1.2/24;
      }
      family mpls;
    }
  }
  lo0 {
    unit 0 {
      family inet {
        address 70.1.1.1/32;
      }
    }
  }
}
protocols {
  rsvp {
    interface ge-0/2/0.0;
  }
}
```

```
mpls {
  no-cspf;
  label-switched-path PE1-to-PE2 {
    to 40.1.1.1;
  }
  interface ge-0/2/0.0;
}
ospf {
  traffic-engineering;
  area 0.0.0.0 {
    interface ge-0/2/0.0;
    interface lo0.0 {
      passive;
    }
  }
}
ldp {
  interface ge-0/2/0.0;
  interface lo0.0;
}
l2circuit {
  neighbor 40.1.1.1 {
    interface t1-0/0/0.0 {
      virtual-circuit-id 1;
    }
  }
}
}
```

- Related Documentation**
- [Pseudowire Overview for ACX Series Universal Access Routers on page 32](#)
  - [TDM Pseudowires Overview on page 118](#)

---

## Example: ATM Pseudowire Base Configuration

- [Requirements on page 127](#)
- [Overview of an ATM Pseudowire With Cell Mode Base Configuration on page 127](#)
- [Configuring an ATM Pseudowire on page 128](#)

### Requirements

The following is a list of the hardware and software requirements for this configuration.

- One ACX Series router
- Junos OS Release 12.2 or later

### Overview of an ATM Pseudowire With Cell Mode Base Configuration

The configuration shown here is the base configuration of an ATM pseudowire with ATM cell-relay encapsulation on an ACX Series router. This configuration is for one provider edge router. To complete the configuration of an ATM pseudowire, you need to repeat this configuration on an other provider edge router in the MPLS network.

## Configuring an ATM Pseudowire

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

```
set interfaces at-0/0/0 atm-options vpi 0
set interfaces at-0/0/0 unit 0 encapsulation atm-ccc-cell-relay
set interfaces at-0/0/0 unit 0 vci 0.64
set interfaces ct1-0/0/0 no-partition interface-type at
set interfaces ge-0/2/0 unit 0 family inet address 20.1.1.2/24
set interfaces ge-0/2/0 unit 0 family mpls
set interfaces lo0 unit 0 family inet address 70.1.1.1/32
set protocols rsvp interface ge-0/2/0.0
set protocols mpls no-cspf
set protocols mpls label-switched-path PE1-to-PE2 to 40.1.1.1
set protocols mpls interface ge-0/2/0.0
set protocols ospf traffic-engineering
set protocols ospf area 0.0.0.0 interface ge-0/2/0.0
set protocols ospf area 0.0.0.0 interface lo0.0 passive
set protocols ldp interface ge-0/2/0.0
set protocols ldp interface lo0.0
set protocols l2circuit neighbor 40.1.1.1 interface at-0/0/0.0 virtual-circuit-id 1
```



**NOTE:** To configure an ATM pseudowire with ATM virtual circuit (VC) multiplex encapsulation on CCC circuits, include the `atm-ccc-vc-mux` statement at the [edit interfaces at-0/0/0 unit 0 encapsulation] hierarchy level instead of the `atm-ccc-cell-relay` statement shown in this example.

**Step-by-Step Procedure**

1. Create an ATM interface on a channelized T1 interface (**ct1**) and enable full channelization with the **no-partition** statement. On the ATM interface, set the ATM virtual circuit identifier (VCI), the virtual path identifier (VPI), and set the encapsulation cell mode.

```
[edit]
user@host# edit interfaces
[edit interfaces]
user@host# set ct1-0/0/0 no-partition interface-type at
user@host# set at-0/0/0 unit 0 vci 0.64
user@host# set at-0/0/0 atm-options vpi 0
user@host# set at-0/0/0 unit 0 encapsulation atm-ccc-cell-relay
```

2. Create a Gigabit Ethernet interface and enable MPLS on that interface. Create the loopback (**lo0**) interface:

```
[edit interfaces]
user@host# set ge-0/2/0 unit 0 family inet address 20.1.1.2/24
user@host# set ge-0/2/0 unit 0 family mpls
user@host# set lo0 unit 0 family inet address 70.1.1.1/32
```



3. Enable the MPLS and RSVP protocols on the MPLS interface—**ge-0/2/0.0**:

```
[edit]
user@host# edit protocols
[edit protocols]
user@host# set rsvp interface ge-0/2/0.0
user@host# set mpls interface ge-0/2/0.0
```

4. Configure LDP. If you configure RSVP for a pseudowire, you must also configure LDP:

```
[edit protocols]
user@host# set protocols ldp interface ge-0/2/0.0
user@host# set protocols ldp interface lo0.0
```

5. Configure a point-to-point label-switched path (LSP) and disable constrained-path LSP computation:

```
[edit protocols]
user@host# set mpls label-switched-path PE1-to-PE2 to 40.1.1.1
user@host# set mpls no-cspf
```

6. Configure OSPF and enable traffic engineering on the MPLS interface—**ge-0/2/0.0**, and on the loopback (**lo0**) interface:

```
[edit protocols]
user@host# set ospf traffic-engineering
user@host# set ospf area 0.0.0.0 interface ge-0/2/0.0
user@host# set ospf area 0.0.0.0 interface lo0.0 passive
```

7. Uniquely identify a Layer 2 circuit for the ATM pseudowire:

```
[edit protocols]
user@host# set l2circuit neighbor 40.1.1.1 interface at-0/0/0.0 virtual-circuit-id 1
```

## Results

```
[edit]
user@host# show
interfaces {
  at-0/0/0 {
    atm-options {
      vpi 0;
    }
    unit 0 {
      encapsulation atm-ccc-cell-relay;
      vci 0.64;
    }
  }
  ct1-0/0/0 {
    no-partition interface-type at;
  }
  ge-0/2/0 {
    unit 0 {
      family inet {
        address 20.1.1.2/24;
      }
      family mpls;
    }
  }
}
```

```
    }
    lo0 {
        unit 0 {
            family inet {
                address 70.1.1.1/32;
            }
        }
    }
}
protocols {
    rsvp {
        interface ge-0/2/0.0;
    }
    mpls {
        no-cspf;
        label-switched-path PE1-to-PE2 {
            to 40.1.1.1;
        }
        interface ge-0/2/0.0;
    }
    ospf {
        traffic-engineering;
        area 0.0.0.0 {
            interface ge-0/2/0.0;
            interface lo0.0 {
                passive;
            }
        }
    }
    ldp {
        interface ge-0/2/0.0;
        interface lo0.0;
    }
    l2circuit {
        neighbor 40.1.1.1 {
            interface at-0/0/0.0 {
                virtual-circuit-id 1;
            }
        }
    }
}
```

- Related Documentation**
- [Pseudowire Overview for ACX Series Universal Access Routers on page 32](#)
  - [ATM Pseudowire Overview on page 116](#)

---

## Example: Ethernet Pseudowire Base Configuration

- [Requirements on page 130](#)
- [Overview of an Ethernet Pseudowire Base Configuration on page 131](#)
- [Configuring an Ethernet Pseudowire on page 131](#)

### Requirements

The following is a list of the hardware and software requirements for this configuration.

- One ACX Series router

- Junos OS Release 12.2 or later

## Overview of an Ethernet Pseudowire Base Configuration

The configuration shown here is the base configuration of an Ethernet pseudowire with Ethernet cross-connect for physical interface encapsulation on an ACX Series router. This configuration is for one provider edge router. To complete the configuration of an Ethernet pseudowire, you need to repeat this configuration on an other provider edge router in the Multiprotocol Label Switched (MPLS) network.

## Configuring an Ethernet Pseudowire

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

```
set interfaces ge-0/1/1 encapsulation ethernet-ccc
set interfaces ge-0/1/1 unit 0
set interfaces ge-0/2/0 unit 0 family inet address 20.1.1.2/24
set interfaces ge-0/2/0 unit 0 family mpls
set interfaces lo0 unit 0 family inet address 70.1.1.1/32
set protocols rsvp interface ge-0/2/0.0
set protocols mpls no-cspf
set protocols mpls label-switched-path PE1-to-PE2 to 40.1.1.1
set protocols mpls interface ge-0/2/0.0
set protocols ospf traffic-engineering
set protocols ospf area 0.0.0.0 interface ge-0/2/0.0
set protocols ospf area 0.0.0.0 interface lo0.0 passive
set protocols ldp interface ge-0/2/0.0
set protocols ldp interface lo0.0
set protocols l2circuit neighbor 40.1.1.1 interface ge-0/1/1.0 virtual-circuit-id
1
```



**NOTE:** To configure an Ethernet pseudowire with 802.1Q tagging for cross-connect logical interface encapsulation, include the `vlan-ccc` statement at the `[edit interfaces ge-0/1/1 unit 0 encapsulation]` hierarchy level instead of the `ethernet-ccc` statement shown in this example.

**Step-by-Step Procedure** 1. Create two Gigabit Ethernet interfaces, set the encapsulation mode on one interface and MPLS on the other interface. Create the loopback (`lo0`) interface:

```
[edit]
user@host# edit interfaces
[edit interfaces]
user@host# set ge-0/1/1 encapsulation ethernet-ccc
user@host# set ge-0/1/1 unit 0
user@host# set ge-0/2/0 unit 0 family inet address 20.1.1.2/24
user@host# set ge-0/2/0 unit 0 family mpls
user@host# set lo0 unit 0 family inet address 70.1.1.1/32
```

2. Enable the MPLS and RSVP protocols on the interface configured with MPLS—**ge-0/2/0.0**:

```
[edit]
user@host# edit protocols
[edit protocols]
user@host# set rsvp interface ge-0/2/0.0
user@host# set mpls interface ge-0/2/0.0
```

3. Configure LDP. If you configure RSVP for a pseudowire, you must also configure LDP:

```
[edit protocols]
user@host# set protocols ldp interface ge-0/2/0.0
user@host# set protocols ldp interface lo0.0
```

4. Configure a point-to-point label-switched path (LSP) and disable constrained-path LSP computation:

```
[edit protocols]
user@host# set mpls label-switched-path PE1-to-PE2 to 40.1.1.1
user@host# set mpls no-cspf
```

5. Configure OSPF and enable traffic engineering on the MPLS interface—**ge-0/2/0.0**, and on the loopback (**lo0**) interface:

```
[edit protocols]
user@host# set ospf traffic-engineering
user@host# set ospf area 0.0.0.0 interface ge-0/2/0.0
user@host# set ospf area 0.0.0.0 interface lo0.0 passive
```

6. Uniquely identify a Layer 2 circuit for the Ethernet pseudowire:

```
[edit protocols]
user@host# set l2circuit neighbor 40.1.1.1 interface ge-0/1/1.0 virtual-circuit-id 1
```

---

## Results

```
[edit]
user@host# show
interfaces {
  ge-0/1/1 {
    encapsulation ethernet-ccc;
    unit 0;
  }
  ge-0/2/0 {
    unit 0 {
      family inet {
        address 20.1.1.2/24;
      }
      family mpls;
    }
  }
  lo0 {
    unit 0 {
      family inet {
        address 70.1.1.1/32;
      }
    }
  }
}
```

```

    }
  }
  protocols {
    rsvp {
      interface ge-0/2/0.0;
    }
    mpls {
      no-cspf;
      label-switched-path PE1-to-PE2 {
        to 40.1.1.1;
      }
      interface ge-0/2/0.0;
    }
    ospf {
      traffic-engineering;
      area 0.0.0.0 {
        interface ge-0/2/0.0;
        interface lo0.0 {
          passive;
        }
      }
    }
    ldp {
      interface ge-0/2/0.0;
      interface lo0.0;
    }
    l2circuit {
      neighbor 40.1.1.1 {
        interface ge-0/1/1.0 {
          virtual-circuit-id 1;
        }
      }
    }
  }
}

```

- Related Documentation**
- [Pseudowire Overview for ACX Series Universal Access Routers on page 32](#)
  - [Ethernet Pseudowire Overview on page 117](#)

## Example: Configuring the Pseudowire Status TLV

### Requirements

The following is a list of the hardware and software requirements for this configuration.

- One ACX Series Universal Access router
- Junos OS Release 12.2 or later

### Overview

The configuration shown here is the base configuration of a pseudowire with `pseudowire-status-tlv` enabled. The `pseudowire-status-tlv` is used to communicate the status of a pseudowire between PE routers.

## Configuration

**CLI Quick Configuration** To quickly configure this example, copy the following commands, paste them in 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:

```
edit protocols l2circuit
set neighbor 10.255.64.26
set neighbor 10.255.64.26 interface xe-0/0/0
set neighbor 10.255.64.26 interface xe-0/0/0 pseudowire-status-tlv
set neighbor 10.255.64.26 interface xe-0/0/0 virtual-circuit-id 1024
```

---

### Configuring the Pseudowire Status TLV

**Step-by-Step Procedure** 1. Navigate to the **[edit protocols l2circuit]** hierarchy level to configure Layer 2 circuits over MPLS.

```
[edit]
user@host# edit protocols l2circuit
```

2. Set the address for the neighbor provider edge router; this example uses a fictitious address, **10.255.64.26**.

```
[edit protocols l2circuit]
user@host# set neighbor 10.255.64.26
```

3. Specify the name of the interface forming the Layer 2 circuit; this example uses **xe-0/0/0**.

```
[edit protocols l2circuit]
user@host# set neighbor 10.255.64.26 interface xe-0/0/0
```

4. Enter the **pseudowire-status-tlv** statement.

```
[edit protocols l2circuit]
user@host# set neighbor 10.255.64.26 interface xe-0/0/0 pseudowire-status-tlv
```



**NOTE:** You need to configure the **virtual-circuit-id** statement in order for **pseudowire-status-tlv** to work.

5. Set the **virtual-circuit-id** statement to identify the pseudowire as regular or redundant. The identifier value can range from 1 through 4,294,967,295.

```
[edit protocols l2circuit]
user@host# set neighbor 10.255.64.26 interface xe-0/0/0 virtual-circuit-id 1024
```

6. Check your configuration by entering the **show** command.

---

### Results

```
[edit protocols l2circuit]
user@host# show
neighbor 10.255.64.26 {
```

```
interface xe-0-0-0 {  
  virtual-circuit-id 1024;  
  pseudowire-status-tlv;  
}
```

- Related Documentation**
- [Pseudowire Overview for ACX Series Universal Access Routers on page 32](#)
  - [Configuring the Pseudowire Status TLV on page 123](#)





## CHAPTER 9

# Network Management

- Standard SNMP MIBs Supported by Junos OS on page 137
- Juniper Networks Enterprise-Specific MIBs and Supported Devices on page 153

### Standard SNMP MIBs Supported by Junos OS

Table 24 on page 137 contains the list of standard SNMP MIBs and RFCs that are supported on various devices running Junos OS. RFCs can be found at <http://www.ietf.org>.



**NOTE:** In this table, a value of 1 in any of the platform columns (ACX, M, T, J, MX, EX, and SRX) denotes that the corresponding MIB is supported on that particular platform, and a value of 0 denotes that the MIB is not supported on the platform.

Table 24: Standard MIBs Supported on Devices Running Junos OS

MIB/RFC	Platforms								
	ACX	M	T	J	MX	EX	SRX		
							Low-End	Mid-Range	High-End

IEEE 802.1ab section 12.1, *Link Layer Discovery Protocol (LLDP) MIB*

0      0      0      0      1      1      0      0      0

EX Series implementation of LLDP MIB supports both IPv4 and IPv6 configuration.

For more information about LLDP MIB objects supported on EX Series devices, see *LLDP Standard MIB Objects Supported on EX Series Devices*.

Table 24: Standard MIBs Supported on Devices Running Junos OS (*continued*)

MIB/RFC	Platforms								
	ACX	M	T	J	MX	EX	SRX		
							Low-End	Mid-Range	High-End
IEEE, 802.3ad, <i>Aggregation of Multiple Link Segments</i>	0	1	1	1	1	1	1	1	1
Supported tables and objects:									
<ul style="list-style-type: none"> <li>dot3adAggPortTable, dot3adAggPortListTable, dot3adAggTable, and dot3adAggPortStatsTable</li> </ul>									
NOTE: EX Series switches do not support the dot3adAggPortTable and dot3adAggPortStatsTable.									
<ul style="list-style-type: none"> <li>dot3adAggPortDebugTable (only dot3adAggPortDebugRxState, dot3adAggPortDebugMuxState, dot3adAggPortDebugActorSyncTransitionCount, dot3adAggPortDebugPartnerSyncTransitionCount, dot3adAggPortDebugActorChangeCount, and dot3adAggPortDebugPartnerChangeCount)</li> </ul>									
NOTE: EX Series switches do not support the dot3adAggPortDebugTable.									
<ul style="list-style-type: none"> <li>dot3adTablesLastChanged</li> </ul>									
NOTE: Gigabit Ethernet interfaces on J Series Services Routers do not support the 802.3ad MIB.									
RFC 1155, <i>Structure and Identification of Management Information for TCP/IP-based Internets</i>	1	1	1	1	1	1	1	1	1
RFC 1157, <i>A Simple Network Management Protocol (SNMP)</i>	1	1	1	1	1	1	1	1	1
RFC 1195, <i>Use of OSI IS-IS for Routing in TCP/IP and Dual Environments</i> (only the objects isisSystem, isisMANAreaAddr, isisAreaAddr, isisSysProtSupp, isisSummAddr, isisCirc, isisCircLevel, isisPacketCount, isisISAdj, isisISAdjAreaAddr, isisAdjIPAddr, isisISAdjProtSupp, isisRa, and isisIPRA are supported)	1	1	1	1	1	1	1	1	1
RFC 1212, <i>Concise MIB Definitions</i>	1	1	1	1	1	1	0	0	1

Table 24: Standard MIBs Supported on Devices Running Junos OS (*continued*)

MIB/RFC	Platforms								
	ACX	M	T	J	MX	EX	SRX		
							Low-End	Mid-Range	High-End
RFC 1213, <i>Management Information Base for Network Management of TCP/IP-Based Internets: MIB-II</i> . Junos OS supports the following areas:	1	1	1	1	1	1	0	0	1
<ul style="list-style-type: none"> <li>MIB II and its SNMP version 2 derivatives, including: <ul style="list-style-type: none"> <li>Statistics counters</li> <li>IP, except for <b>ipRouteTable</b>, which has been replaced by <b>ipCidrRouteTable</b> (RFC 2096, <i>IP Forwarding Table MIB</i>)</li> <li>SNMP management</li> <li>Interface management</li> </ul> </li> <li>SNMPv1 <b>Get</b>, <b>GetNext</b> requests, and version 2 <b>GetBulk</b> request</li> <li>Junos OS-specific secured access list</li> <li>Master configuration keywords</li> <li>Reconfigurations upon SIGHUP</li> </ul>									
RFC 1215, <i>A Convention for Defining Traps for use with the SNMP</i> (only MIB II SNMP version 1 traps and version 2 notifications)	1	1	1	1	1	1	0	0	1
RFC 1406, <i>Definitions of Managed Objects for the DS1 and E1 Interface Types</i> (T1 MIB is supported)	1	1	1	1	0	0	1	0	0
RFC 1407, <i>Definitions of Managed Objects for the DS3/E3 Interface Type</i> (T3 MIB is supported)	0	1	1	1	0	0	0	0	0
RFC 1471, <i>Definitions of Managed Objects for the Link Control Protocol of the Point-to-Point Protocol</i> (only pppLink group is supported. The pppLink group consists of the <b>pppLcp1</b> object and the tables <b>pppLinkStatustable</b> and <b>pppLinkConfigTable</b> ).	0	1	0	0	1	0	0	0	0
RFC 1657, <i>Definitions of Managed Objects for the Fourth Version of the Border Gateway Protocol (BGP-4) using SMIv2</i>	1	1	1	1	1	1	0	0	0
RFC 1695, <i>Definitions of Managed Objects for ATM Management Version 8.0 Using SMIv2</i>	1	1	1	1	0	0	0	0	0

Table 24: Standard MIBs Supported on Devices Running Junos OS (*continued*)

MIB/RFC	Platforms								
	ACX	M	T	J	MX	EX	SRX		
							Low-End	Mid-Range	High-End
RFC 1850, <i>OSPF Version 2 Management Information Base</i> (except for the <b>ospfOriginateNewLsas</b> and <b>ospfRxNewLsas</b> objects, the Host Table, and the traps <b>ospfOriginateLSA</b> , <b>ospfLsdbOverflow</b> , and <b>ospfLsdbApproachingOverflow</b> )	1	1	1	1	1	1	1	0	0
RFC 1901, <i>Introduction to Community-based SNMPv2</i>	1	1	1	1	1	1	1	1	1
RFC 2011, <i>SNMPv2 Management Information Base for the Internet Protocol Using SMIv2</i>	1	1	1	1	1	1	0	0	0
RFC 2012, <i>SNMPv2 Management Information Base for the Transmission Control Protocol Using SMIv2</i>	1	1	1	1	1	1	1	0	1
RFC 2013, <i>SNMPv2 Management Information Base for the User Datagram Protocol Using SMIv2</i>	1	1	1	1	1	1	1	0	1
RFC 2024, <i>Definitions of Managed Objects for Data Link Switching Using SMIv2</i> (except for the <b>dlswInterface</b> and <b>dlswSdlc</b> object groups; the <b>dlswDirLocateMacTable</b> , <b>dlswDirNBTable</b> , and <b>dlswDirLocateNBTable</b> tables; the <b>dlswCircuitDiscReasonLocal</b> and <b>dlswCircuitDiscReasonRemote</b> tabular objects; and the <b>dlswDirMacCacheNextIndex</b> and <b>dlswDirNBCacheNextIndex</b> scalar objects; read-only access)	0	1	1	1	1	0	0	0	0
RFC 2096, <i>IP Forwarding Table MIB</i> (The <b>ipCidrRouteTable</b> has been extended to include the tunnel name when the next hop is through an RSVP-signaled LSP.)  <b>NOTE:</b> RFC 2096 has been replaced by RFC 4292. However, Junos OS currently supports both RFC 2096 and RFC 4292.	1	1	1	1	1	1	0	0	1
RFC 2115, <i>Management Information Base for Frame Relay DTEs Using SMIv2</i> ( <b>frDlcmiTable</b> only; <b>frCircuitTable</b> and <b>frErrTable</b> are not supported)	0	1	1	1	1	0	1	0	0
RFC 2233, <i>The Interfaces Group MIB Using SMIv2</i>  <b>NOTE:</b> RFC 2233 has been replaced by RFC 2863, IF MIB. However, Junos OS supports both RFC 2233 and RFC 2863.	1	1	1	1	1	1	1	0	1

Table 24: Standard MIBs Supported on Devices Running Junos OS (*continued*)

MIB/RFC	Platforms								
	ACX	M	T	J	MX	EX	SRX		
							Low-End	Mid-Range	High-End
RFC 2287, <i>Definitions of System-Level Managed Objects for Applications</i> (only the objects <b>sysApplInstallPkgTable</b> , <b>sysApplInstallElmtTable</b> , <b>sysApplElmtRunTable</b> , and <b>sysApplMapTable</b> )	1	1	1	1	1	1	1	0	1
RFC 2465, <i>Management Information Base for IP Version 6: Textual Conventions and General Group</i> (except for IPv6 interface statistics)	1	1	1	1	1	0	1	0	0
RFC 2495, <i>Definitions of Managed Objects for the DS1, E1, DS2, and E2 Interface Types</i> (except for <b>dsx1FarEndConfigTable</b> , <b>dsx1FarEndCurrentTable</b> , <b>dsx1FarEndIntervalTable</b> , <b>dsx1FarEndTotalTable</b> , and <b>dsx1FracTable</b> )	1	1	1	1	0	0	1	0	0
RFC 2515, <i>Definitions of Managed Objects for ATM Management</i> (except <b>atmVpCrossConnectTable</b> , <b>atmVcCrossConnectTable</b> , and <b>aal5VccTable</b> )	1	1	1	1	0	0	0	0	0
RFC 2570, <i>Introduction to Version 3 of the Internet-standard Network Management Framework</i>	1	1	1	1	1	1	0	0	1
RFC 2571, <i>An Architecture for Describing SNMP Management Frameworks</i> (read-only access)  <b>NOTE:</b> RFC 2571 has been replaced by RFC 3411. However, Junos OS supports both RFC 2571 and RFC 3411.	1	1	1	1	1	1	1	0	1
RFC 2572, <i>Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)</i> (read-only access)  <b>NOTE:</b> RFC 2572 has been replaced by RFC 3412. However, Junos OS supports both RFC 2572 and RFC 3412.	1	1	1	1	1	1	1	0	1
RFC 2576, <i>Coexistence between Version 1, Version 2, and Version 3 of the Internet-standard Network Management Framework</i>  <b>NOTE:</b> RFC 2576 has been replaced by RFC 3584. However, Junos OS supports both RFC 2576 and RFC 3584.	1	1	1	1	1	1	1	0	1
RFC 2578, <i>Structure of Management Information Version 2 (SMIv2)</i>	1	1	1	1	1	1	0	0	1

Table 24: Standard MIBs Supported on Devices Running Junos OS (*continued*)

MIB/RFC	Platforms								
	ACX	M	T	J	MX	EX	SRX		
							Low-End	Mid-Range	High-End
RFC 2579, <i>Textual Conventions for SMIv2</i>	1	1	1	1	1	1	0	0	1
RFC 2580, <i>Conformance Statements for SMIv2</i>	1	1	1	1	1	1	0	0	1
RFC 2662, <i>Definitions of Managed Objects for ADSL Lines</i> (J Series Services Routers. All MIB tables, objects, and traps are applicable for the ADSL ATU-R agent.)	0	1	1	1	1	0	1	0	0
RFC 2665, <i>Definitions of Managed Objects for the Ethernet-like Interface Types</i>	1	1	1	1	1	1	1	0	1
<p><b>NOTE:</b> For M, T and MX Series, the SNMP counters do not count the Ethernet header and frame check sequence (FCS). Therefore, the following four OIDs are not supported:</p> <ul style="list-style-type: none"> <li>• ifInOctets</li> <li>• ifOutOctets</li> <li>• ifHCInOctets</li> <li>• ifHCOctets</li> </ul> <p>However, the EX switches adhere to RFC 2665.</p>									
RFC 2787, <i>Definitions of Managed Objects for the Virtual Router Redundancy Protocol</i> (except row creation, the <b>Set</b> operation, and the object <b>vrpStatsPacketLengthErrors</b> )	1	1	1	1	1	1	1	0	1
RFC 2790, <i>Host Resources MIB</i>	1	1	1	1	1	1	1	0	1
<ul style="list-style-type: none"> <li>• Only the <b>hrStorageTable</b>. The file systems <b>/</b>, <b>/config</b>, <b>/var</b>, and <b>/tmp</b> always return the same index number. When SNMP restarts, the index numbers for the remaining file systems might change.</li> <li>• Only the objects of the <b>hrSystem</b> and <b>hrSWInstalled</b> groups.</li> </ul>									

Table 24: Standard MIBs Supported on Devices Running Junos OS (*continued*)

MIB/RFC	Platforms								
	ACX	M	T	J	MX	EX	SRX		
							Low-End	Mid-Range	High-End
RFC 2819, <i>Remote Network Monitoring Management Information Base</i>	1	1	1	1	1	1	1	0	1
<ul style="list-style-type: none"> <li>• <b>etherStatsTable</b> (for Ethernet interfaces only), <b>alarmTable</b>, <b>eventTable</b>, and <b>logTable</b> are supported on all devices running Junos OS.</li> <li>• <b>historyControlTable</b> and <b>etherHistoryTable</b> (except <b>etherHistoryUtilization</b> object) are supported only on EX Series switches.</li> </ul>									
RFC 2863, <i>The Interfaces Group MIB</i>	1	1	1	1	1	1	0	0	1
NOTE: RFC 2863 replaces RFC 2233. However, Junos OS supports both RFC 2233 and RFC 2863.									
RFC 2864, <i>The Inverted Stack Table Extension to the Interfaces Group MIB</i>	0	1	1	1	1	0	0	0	1
RFC 2922, <i>The Physical Topology (PTOPO) MIB</i>	0	0	0	0	0	1	1	0	1
Supported objects:									
ptopoConnDiscAlgorithm, ptopoConnAgentNetAddrType, ptopoConnAgentNetAddr, ptopoConnMultiMacSASeen, ptopoConnMultiNetSASeen, ptopoConnIsStatic, ptopoConnLastVerifyTime, ptopoConnRowStatus									
RFC 2925, <i>Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations</i> (only the objects <b>pingCtlTable</b> , <b>pingResultsTable</b> , <b>pingProbeHistoryTable</b> , <b>pingMaxConcurrentRequests</b> , <b>traceRouteCtlTable</b> , <b>traceRouteResultsTable</b> , <b>traceRouteProbeHistoryTable</b> , and <b>traceRouteHopsTable</b> )	1	1	1	1	1	1	1	0	1
RFC 2932, <i>IPv4 Multicast Routing MIB</i>	1	1	1	1	1	1	1	0	1

Table 24: Standard MIBs Supported on Devices Running Junos OS (*continued*)

MIB/RFC	Platforms								
	ACX	M	T	J	MX	EX	SRX		
							Low-End	Mid-Range	High-End
RFC 2934, <i>Protocol Independent Multicast MIB for IPv4</i>	1	1	1	1	1	1	1	0	0
<p><b>NOTE:</b> In Junos OS, RFC 2934 is implemented based on a draft version, <i>pimmib.mib</i>, of the now standard RFC.</p> <p>Support for the <b>pimNeighborLoss</b> trap was added in Release 11.4.</p>									
RFC 2981, <i>Event MIB</i>	1	1	1	1	1	0	0	0	0
RFC 3014, <i>Notification Log MIB</i>	1	1	1	1	1	0	0	0	0
RFC 3019, <i>IP Version 6 Management Information Base for The Multicast Listener Discovery Protocol</i>	0	1	1	1	1	0	0	0	1
RFC 3410 <i>Introduction and Applicability Statements for Internet-Standard Management Framework</i>	1	1	1	1	1	1	0	0	1
RFC 3411, <i>An Architecture for Describing Simple Network Management Protocol (SNMP) Management Frameworks</i>	1	1	1	1	1	1	0	0	1
<p><b>NOTE:</b> RFC 3411 replaces RFC 2571. However, Junos OS supports both RFC 3411 and RFC 2571.</p>									
RFC 3412, <i>Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)</i>	1	1	1	1	1	1	0	0	1
<p><b>NOTE:</b> RFC 3412 replaces RFC 2572. However, Junos OS supports both RFC 3412 and RFC 2572.</p>									
RFC 3413, <i>Simple Network Management Protocol (SNMP) Applications</i> (except for the Proxy MIB)	1	1	1	1	1	1	1	0	1
RFC 3414, <i>User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3)</i>	1	1	1	1	1	1	0	0	1
RFC 3415, <i>View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)</i>	1	1	1	1	1	1	0	0	1



Table 24: Standard MIBs Supported on Devices Running Junos OS (*continued*)

MIB/RFC	Platforms								
	ACX	M	T	J	MX	EX	SRX		
							Low-End	Mid-Range	High-End
RFC 3416, <i>Version 2 of the Protocol Operations for the Simple Network Management Protocol (SNMP)</i>	1	1	1	1	1	1	0	0	1
NOTE: RFC 3416 replaces RFC 1905, which was supported in earlier versions of Junos OS.									
RFC 3417, <i>Transport Mappings for the Simple Network Management Protocol (SNMP)</i>	1	1	1	1	1	1	1	0	1
RFC 3418, <i>Management Information Base (MIB) for the Simple Network Management Protocol (SNMP)</i>	1	1	1	1	1	1	0	0	1
NOTE: RFC 3418 replaces RFC 1907, which was supported in earlier versions of Junos OS.									
RFC 3498, <i>Definitions of Managed Objects for Synchronous Optical Network (SONET) Linear Automatic Protection Switching (APS) Architectures</i> (implemented under the Juniper Networks enterprise branch [jnxExperiment])	0	1	1	1	0	0	0	0	0
RFC 3584 <i>Coexistence between Version 1, Version 2, and Version 3 of the Internet-standard Network Management Framework</i>	1	1	1	1	1	1	0	0	1
RFC 3591 <i>Managed Objects for the Optical Interface Type</i>	0	1	1	1	0	0	0	0	0
optIfOTMnTable (except optIfOTMnOpticalReach, optIfOTMnInterfaceType, and optIfOTMnOrder), optIfOChConfigTable (except optIfOChDirectionality and optIfOChCurrentStatus), optIfOTUkConfigTable (except optIfOTUkTracelIdentifierAccepted, optIfOTUkTIMDetMode, optIfOTUkTIMActEnabled, optIfOTUkTracelIdentifierTransmitted, optIfOTUkDEGThr, optIfOTUkDEGM, optIfOTUkSinkAdaptActive, and optIfOTUkSourceAdaptActive), and optIfODUkConfigTable (except optIfODUkPositionSeqCurrentSize and optIfODUkTtpPresent)									
RFC 3592, <i>Definitions of Managed Objects for the Synchronous Optical Network/Synchronous Digital Hierarchy (SONET/SDH) Interface Type</i>	0	1	1	1	1	0	0	0	0
RFC 3621, <i>Power Ethernet MIB</i>	0	0	0	0	0	1	0	0	0

Table 24: Standard MIBs Supported on Devices Running Junos OS (*continued*)

MIB/RFC	Platforms								
	ACX	M	T	J	MX	EX	SRX		
							Low-End	Mid-Range	High-End
RFC 3637, <i>Definitions of Managed Objects for the Ethernet WAN Interface Sublayer</i> (except <b>etherWisDeviceTable</b> , <b>etherWisSectionCurrentTable</b> , and <b>etherWisFarEndPathCurrentTable</b> )	0	1	1	1	1	0	0	0	0
RFC 3811, <i>Definitions of Textual Conventions (TCs) for Multiprotocol Label Switching (MPLS) Management</i>	1	1	1	1	1	0	1	0	0
RFC 3812, <i>Multiprotocol Label Switching (MPLS) Traffic Engineering (TE) Management Information Base (MIB)</i> (read only access)	1	1	1	1	1	0	0	0	0
<ul style="list-style-type: none"> <li>MPLS tunnels as interfaces are not supported.</li> <li>The following objects in the <b>TunnelResource</b> table are not supported:  <b>mplsTunnelResourceMeanRate</b>,  <b>mplsTunnelResourceMaxBurstSize</b>,  <b>mplsTunnelResourceMeanBurstSize</b>,  <b>mplsTunnelResourceExBurstSize</b>,  <b>mplsTunnelResourceWeight</b>.</li> <li><b>mplsTunnelPerfTable</b> and <b>mplsTunnelCRLDPResTable</b> are not supported.</li> <li><b>mplsTunnelCHopTable</b> is supported on ingress routers only.</li> </ul> <p><b>NOTE:</b> The branch used by the proprietary LDP MIB (<b>ldpmib.mib</b>) conflicts with RFC 3812. <b>ldpmib.mib</b> has been deprecated and replaced by <b>jnx-mpls-ldp.mib</b>.</p>									
RFC 3813, <i>Multiprotocol Label Switching (MPLS) Label Switching Router (LSR) Management Information Base (MIB)</i> (read-only access). <b>mplsInterfacePerfTable</b> , <b>mplsInSegmentPerfTable</b> , <b>mplsOutSegmentPerfTable</b> , <b>mplsInSegmentMapTable</b> , <b>mplsXCUp</b> , and <b>mplsXCDown</b> are not supported.	1	1	1	1	1	0	1	0	0
RFC 3826, <i>The Advanced Encryption Standard (AES) Cipher Algorithm in the SNMP User-based Security Model</i>	1	1	1	1	1	1	0	0	1

Table 24: Standard MIBs Supported on Devices Running Junos OS (*continued*)

MIB/RFC	Platforms								
	ACX	M	T	J	MX	EX	SRX		
							Low-End	Mid-Range	High-End
RFC 3896, <i>Definitions of Managed Objects for the DS3/E3 Interface Type</i> (except <b>dsx3FarEndConfigTable</b> , <b>dsx3FarEndCurrentTable</b> , <b>dsx3FarEndIntervalTable</b> , <b>dsx3FarEndTotalTable</b> , and <b>dsx3FracTable</b> )	0	1	1	1	0	0	0	0	0
RFC 4087, <i>IP Tunnel MIB</i> —Describes MIB objects in the following tables for managing tunnels of any type over IPv4 and IPv6 networks: <ul style="list-style-type: none"> <li><b>tunnelIfTable</b>—Provides information about the tunnels known to a router.</li> <li><b>tunnelInetConfigTable</b>—Assists dynamic creation of tunnels and provides mapping from end-point addresses to the current interface index value.</li> </ul> <p><b>NOTE:</b> Junos OS supports <b>MAX-ACCESS</b> of read-only for all the MIB objects in <b>tunnelIfTable</b> and <b>tunnelInetConfigTable</b> tables.</p>	0	1	1	0	1	0	0	0	0
RFC 4188, <i>Definitions of Managed Objects for Bridges</i> —Supports 802.1D STP (1998). Supports only the following subtrees and objects: <ul style="list-style-type: none"> <li><b>dot1dStp</b> subtree is supported on MX Series 3D Universal Edge Routers.</li> <li><b>dot1dTpFdbAddress</b>, <b>dot1dTpFdbPort</b>, and <b>dot1dTpFdbStatus</b> objects from the <b>dot1dTpFdbTable</b> of the <b>dot1dTp</b> subtree are supported on EX Series Ethernet Switches.</li> </ul> <p><b>NOTE:</b> <b>dot1dTpLearnedEntryDiscards</b> and <b>dot1dTpAgingTime</b> objects are supported on M and T Series routers.</p>	0	0	0	0	1	1	0	0	0
RFC 4273, <i>Definitions of Managed Objects for BGP-4</i> (only <b>jnxBgpM2PrefixInPrefixes</b> , <b>jnxBgpM2PrefixInPrefixesAccepted</b> , and <b>jnxBgpM2PrefixInPrefixesRejected</b> objects)	1	1	1	1	1	1	0	0	1
RFC 4273, <i>Definitions of Managed Objects for BGP-4</i> (only <b>jnxBgpM2PrefixInPrefixes</b> , <b>jnxBgpM2PrefixInPrefixesAccepted</b> , and <b>jnxBgpM2PrefixInPrefixesRejected</b> objects)	1	1	1	1	1	1	0	0	1

Table 24: Standard MIBs Supported on Devices Running Junos OS (*continued*)

MIB/RFC	Platforms								
	ACX	M	T	J	MX	EX	SRX		
							Low-End	Mid-Range	High-End
RFC 4292, <i>IP Forwarding MIB</i> — Describes a table and MIB objects for forwarding IP packets that are version independent: <ul style="list-style-type: none"> <li>• <b>inetCidrRouteTable</b>—Provides the ability to display IP version-independent multipath CIDR routes and obsoletes the <b>ipCidrRouteTable</b> object.</li> <li>• <b>inetCidrRouteNumber</b>—Indicates the number of current routes and obsoletes the <b>ipCidrRouteNumber</b> object.</li> <li>• <b>inetCidrRouteDiscards</b>—Counts the number of valid routes that are discarded from <b>inetCidrRouteTable</b> and obsoletes the <b>ipCidrRouteDiscards</b> object.</li> </ul> <p><b>NOTE:</b> Junos OS currently supports these MIB objects that will be deprecated in future releases: <b>ipCidrRouteTable</b>, <b>ipCidrRouteNumber</b>, and <b>ipCidrRouteDiscards</b>.</p>	1	1	1	1	1	1	0	0	0
RFC 4293, <i>Management Information Base for the Internet Protocol (IP)</i> — Supports only the mandatory groups. For detailed information, see <a href="#">Standard IPv4/IPv6 MIBs</a> .	0	0	0	0	1	1	0	0	0
RFC 4318, <i>Definitions of Managed Objects for Bridges with Rapid Spanning Tree Protocol</i> —Supports 802.1w and 802.1t extensions for RSTP.	0	1	1	1	1	1	0	0	0
RFC 4363b, <i>Q-Bridge VLAN MIB</i>	0	0	0	0	1	1	0	0	0

Table 24: Standard MIBs Supported on Devices Running Junos OS (*continued*)

MIB/RFC	Platforms								
	ACX	M	T	J	MX	EX	SRX		
							Low-End	Mid-Range	High-End
RFC 4382 <i>MPLS/BGP Layer 3 Virtual Private Network (VPN) MIB</i>	0	1	1	1	1	1	0	0	0
<p>The Junos OS support for RFC 4382 includes the following scalar objects and tables:</p> <ul style="list-style-type: none"> <li>• <code>mplsL3VpnActiveVrfs</code></li> <li>• <code>mplsL3VpnConfiguredVrfs</code></li> <li>• <code>mplsL3VpnConnectedInterfaces</code></li> <li>• <code>mplsL3VpnVrfConfMidRteThresh</code></li> <li>• <code>mplsL3VpnVrfConfHighRteThresh</code></li> <li>• <code>mplsL3VpnIfConfRowStatus</code></li> <li>• <code>mplsL3VpnIILblRcvThrsh</code></li> <li>• <code>mplsL3VpnNotificationEnable</code></li> <li>• <code>mplsL3VpnVrfConfMaxPossRts</code></li> <li>• <code>mplsL3VpnVrfConfRteMxThrshTime</code></li> <li>• <code>mplsL3VpnVrfOperStatus</code></li> <li>• <code>mplsL3VpnVrfPerfCurrNumRoutes</code></li> <li>• <code>mplsL3VpnVrfPerfTable</code></li> <li>• <code>mplsL3VpnVrfRteTable</code></li> <li>• <code>mplsVpnVrfRTTable</code></li> <li>• <code>mplsL3VpnVrfTable</code></li> </ul> <p><b>NOTE:</b> The <code>mplsL3VpnIfConfTable</code> has not been implemented in the MPLS/BGP Layer 3 Virtual Private Network (VPN) MIB, because of limited utility and difficulty in representing the <code>DistProtocol</code> bit accurately.</p>									
RFC 4444, <i>IS-IS MIB</i>	1	1	1	1	1	1	1	0	0
RFC 4668, <i>RADIUS Accounting Client Management Information Base (MIB) for IPv6</i> (read-only access)	0	0	0	0	1	0	0	0	0
RFC 4670, <i>RADIUS Accounting Client Management Information Base (MIB)</i> (read-only access)	0	0	0	0	1	0	0	0	0
RFC 4801, <i>Definitions of Textual Conventions for Generalized Multiprotocol Label Switching (GMPLS) Management Information Base (MIB)</i> (read-only access)	0	1	1	1	1	0	0	0	0

Table 24: Standard MIBs Supported on Devices Running Junos OS (*continued*)

MIB/RFC	Platforms								
	ACX	M	T	J	MX	EX	SRX		
							Low-End	Mid-Range	High-End
RFC 4802, <i>Generalized Multiprotocol Label Switching (GMPLS) Traffic Engineering (TE) Management Information Base (MIB)</i> (read-only access). <b>gmplsTunnelReversePerfTable</b> , <b>gmplsTeScalars</b> , <b>gmplsTunnelTable</b> , <b>gmplsTunnelARHopTable</b> , <b>gmplsTunnelCHopTable</b> , and <b>gmplsTunnelErrorTable</b> are not supported.)	0	1	1	1	1	0	0	0	0
RFC 4803, <i>Generalized Multiprotocol Label Switching (GMPLS) Label Switching Router (LSR) Management Information Base (MIB)</i> (read-only access). <b>gmplsLabelTable</b> and <b>gmplsOutsegmentTable</b> are not supported.	0	1	1	1	1	0	0	0	0
<b>NOTE:</b> The tables in GMPLS TE (RFC 4802) and LSR (RFC 4803) MIBs are extensions of the corresponding tables from the MPLS TE (RFC 3812) and LSR (RFC 3813) MIBs and use the same index as the MPLS MIB tables.									

Table 24: Standard MIBs Supported on Devices Running Junos OS (*continued*)

MIB/RFC	Platforms								
	ACX	M	T	J	MX	EX	SRX		
							Low-End	Mid-Range	High-End
RFC 5643, <i>Management Information Base for OSPFv3</i>	0	1	1	1	1	0	0	0	1
<p><b>NOTE:</b> Junos OS support for this MIB is read-only.</p> <p>Junos OS does not support the following tables and objects defined in this MIB.</p> <ul style="list-style-type: none"> <li>ospfv3HostTable</li> <li>ospfv3CfgNbrTable</li> <li>ospfv3ExitOverflowInterval</li> <li>ospfv3ReferenceBandwidth</li> <li>ospfv3RestartSupport</li> <li>ospfv3RestartInterval</li> <li>ospfv3RestartStrictLsaChecking</li> <li>ospfv3RestartStatus</li> <li>ospfv3RestartAge</li> <li>ospfv3RestartExitReason</li> <li>ospfv3NotificationEnable</li> <li>ospfv3StubRouterSupport</li> <li>ospfv3StubRouterAdvertisement</li> <li>ospfv3DiscontinuityTime</li> <li>ospfv3RestartTime</li> <li>ospfv3AreaNssaTranslatorRole</li> <li>ospfv3AreaNssaTranslatorState</li> <li>ospfv3AreaNssaTranslatorStabInterval</li> <li>ospfv3AreaNssaTranslatorEvents</li> <li>ospfv3AreaTEEnabled</li> <li>ospfv3IfMetricValue</li> <li>ospfv3IfDemandNbrProbe</li> </ul>									
RFC 6527, <i>Definitions of Managed Objects for the Virtual Router Redundancy Protocol Version 3 (VRRPv3)</i> (except row creation, the <b>Set</b> operation, and the objects <b>vrrpv3StatisticsRowDiscontinuityTime</b> and <b>vrrpv3StatisticsPacketLengthErrors</b> )	1	0	0	1	0	0	0	0	0
Internet Assigned Numbers Authority, <i>IANAiftype Textual Convention MIB</i> (referenced by RFC 2233, available at <a href="http://www.iana.org/assignments/ianaiftype-mib">http://www.iana.org/assignments/ianaiftype-mib</a> )	1	1	1	1	1	1	1	0	0

Table 24: Standard MIBs Supported on Devices Running Junos OS (*continued*)

MIB/RFC	Platforms								
	ACX	M	T	J	MX	EX	SRX		
							Low-End	Mid-Range	High-End
Internet draft draft-ietf-atommib-sonetaps-mib-10.txt, <i>Definitions of Managed Objects for SONET Linear APS Architectures</i> (as defined under the Juniper Networks enterprise branch [jnxExperiment] only)	0	1	1	1	1	0	0	0	0
Internet draft draft-ietf-bfd-mib-02.txt, <i>Bidirectional Forwarding Detection Management Information Base</i> (Represented by <b>mib-jnx-bfd-exp.txt</b> and implemented under the Juniper Networks enterprise branch [jnxExperiment]. Read only. Includes <b>bfdSessUp</b> and <b>bfdSessDown</b> traps. Does not support <b>bfdSessPerfTable</b> and <b>bfdSessMapTable</b> .)	1	1	1	1	1	1	0	0	1
Internet draft draft-ietf-idmr-igmp-mib-13.txt, <i>Internet Group Management Protocol (IGMP) MIB</i>	0	1	1	1	1	1	0	0	1
Internet draft draft-reeder-snmpv3-usm-3desede-00.txt, <i>Extension to the User-Based Security Model (USM) to Support Triple-DES EDE in 'Outside' CBC Mode</i>	1	1	1	1	1	1	0	0	1
Internet draft draft-ietf-isis-wg-mib-07.txt, <i>Management Information Base for IS-IS</i> (only <b>isisSAdjTable</b> , <b>isisSAdjAreaAddrTable</b> , <b>isisSAdjIPAddrTable</b> , and <b>isisSAdjProtSuppTable</b> )  <b>NOTE:</b> Replaced with RFC 4444, <i>IS-IS MIB</i> in Junos OS Release 11.3 and later.	1	1	1	1	1	1	1	0	0
Internet draft draft-ietf-ppvpn-mpls-vpn-mib-04.txt, <i>MPLS/BGP Virtual Private Network Management Information Base Using SMIv2</i> (only <b>mplsVpnScalars</b> , <b>mplsVpnVrfTable</b> , <b>mplsVpnPerTable</b> , and <b>mplsVpnVrfRouteTargetTable</b> )	0	1	1	1	1	0	0	0	0
Internet draft draft-ietf-ospf-ospfv3-mib-11.txt, <i>Management Information Base for OSPFv3</i> (Represented by <b>mib-jnx-ospfv3mib.txt</b> and implemented under the Juniper Networks enterprise branch [jnxExperiment]. Support for <b>ospfv3NbrTable</b> only. Read only. Object names are prefixed by <b>jnx</b> . For example, <b>jnxOspfv3NbrTable</b> , <b>jnxOspfv3NbrAddressType</b> , and <b>jnxOspfv3NbrPriority</b> .)	0	1	1	1	1	0	0	0	1



Table 24: Standard MIBs Supported on Devices Running Junos OS (*continued*)

MIB/RFC	Platforms								
	ACX	M	T	J	MX	EX	SRX		
							Low-End	Mid-Range	High-End
Internet draft draft-ietf-idmr-pim-mib-09.txt, <i>Protocol Independent Multicast (PIM) MIB</i>	1	1	1	1	1	1	0	0	1
ESO Consortium MIB, which can be found at <a href="http://www.snmp.com/eso/">http://www.snmp.com/eso/</a>	1	1	1	1	1	1	1	0	0
NOTE: The ESO Consortium MIB has been replaced by RFC 3826.									
Internet Draft P2MP MPLS-TE MIB (draft-ietf-mpls-p2mp-te-mib-09.txt) (read-only access) (except <code>mplsTeP2mpTunnelBranchPerfTable</code> ).	1	1	1	1	1	0	0	0	0

- Related Documentation**
- *Juniper Networks Enterprise-Specific MIBs*
  - *Loading MIB Files to a Network Management System*

## Juniper Networks Enterprise-Specific MIBs and Supported Devices

Table 25 on page 154 lists the enterprise-specific MIBs that are supported on various devices running Junos OS.



NOTE: In this table, a value of 1 in any of the platform columns (ACX, M, MX, T, EX, J, and SRX) denotes that the corresponding MIB is supported on that particular platform. A value of 0 denotes that the MIB is not supported on the platform.



NOTE: This topic uses the following classification for SRX devices: Low-End (SRX100, SRX210, SRX220, and SRX240), Mid-Range (SRX550, SRX650 and SRX1400), and High-End (SRX3400, SRX3600, SRX5600, and SRX5800).

Table 25: Enterprise-Specific MIBs and Supported Devices

Enterprise-Specific MIB	Platforms									
	ACX	M	T	J	MX	EX	PTX	SRX		
								Low-End	Mid-Range	High-End
AAA Objects MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-user-aaa.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-user-aaa.txt</a>	0	1	1	0	0	0	0	0	1	1
Access Authentication Objects MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-js-auth.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-js-auth.txt</a>	0	0	0	0	0	1	0	1	1	1
Alarm MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-chassis-alarm.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-chassis-alarm.txt</a>	1	1	1	1	1	1	1	1	1	1
Analyzer MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-analyzer.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-analyzer.txt</a>	0	0	0	0	1	0	0	0	0	0
Antivirus Objects MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-js-utm-av.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-js-utm-av.txt</a>	0	0	0	0	0	0	0	1	0	0
ATM Class-of-Service MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-atm-cos.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-atm-cos.txt</a>	0	1	1	1	0	0	0	1	0	1
ATM MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-atm.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-atm.txt</a>	1	1	1	1	0	0	0	0	0	0
BGP4 V2 MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-bgpmib2.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-bgpmib2.txt</a>	1	1	1	1	1	1	1	1	1	1
Bidirectional Forwarding Detection MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-bfd.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-bfd.txt</a>	1	1	1	1	1	1	1	1	1	1

Table 25: Enterprise-Specific MIBs and Supported Devices (*continued*)

Enterprise-Specific MIB	Platforms									
	ACX	M	T	J	MX	EX	PTX	SRX		
								Low-End	Mid-Range	High-End
Chassis Forwarding MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-chassis-fwdd.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-chassis-fwdd.txt</a>	1	0	0	0	0	1	1	1	0	0
Chassis MIBs <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-chassis.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-chassis.txt</a> <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-chas-defines.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-chas-defines.txt</a>	1	1	1	1	1	1	1	1	1	1
Chassis Cluster MIBs <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-jsrpd.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-jsrpd.txt</a>	0	0	0	0	0	0	0	0	1	1
Class-of-Service MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-cos.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-cos.txt</a>	1	1	1	1	1	1	1	0	0	1
Configuration Management MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-cfgmgmt.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-cfgmgmt.txt</a>	1	1	1	1	1	1	1	1	1	1
Destination Class Usage MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-dcu.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-dcu.txt</a>	0	1	1	1	0	1	0	0	1	1
DHCP MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-jdhcp.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-jdhcp.txt</a>	0	1	1	1	0	0	0	0	0	0
DHCPv6 MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-jdhcpx6.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-jdhcpx6.txt</a>	0	1	1	1	0	0	0	0	0	0
Digital Optical Monitoring MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-dom.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-dom.txt</a>	1	1	1	1	1	1	0	1	1	1

Table 25: Enterprise-Specific MIBs and Supported Devices (*continued*)

Enterprise-Specific MIB	Platforms									
	ACX	M	T	J	MX	EX	PTX	SRX		
								Low-End	Mid-Range	High-End
DNS Objects MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-js-dns.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-js-dns.txt</a>	0	0	0	0	0	0	0	0	1	1
Dynamic Flow Capture MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-dfc.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-dfc.txt</a>	0	1	1	1	0	0	0	0	0	0
Ethernet MAC MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/jnx-mac.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/jnx-mac.txt</a>	0	1	1	1	1	1	0	0	0	1
Event MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-event.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-event.txt</a>	1	1	1	1	1	1	1	1	1	1
EX Series MAC Notification MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-ex-mac-notification.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-ex-mac-notification.txt</a>	0	0	0	0	1	0	0	0	0	0
EX Series SMI MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-ex-smi.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-ex-smi.txt</a>	0	0	0	0	1	0	0	0	0	0
Experimental MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-exp.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-exp.txt</a>	1	1	1	1	1	1	0	0	0	0
Firewall MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-firewall.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-firewall.txt</a>	1	1	1	1	1	1	1	1	1	1
Flow Collection Services MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-coll.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-coll.txt</a>	0	1	1	1	0	0	0	0	0	0

Table 25: Enterprise-Specific MIBs and Supported Devices (*continued*)

Enterprise-Specific MIB	Platforms									
	ACX	M	T	J	MX	EX	PTX	SRX		
								Low-End	Mid-Range	High-End
Host Resources MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-hostresources.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-hostresources.txt</a>	1	1	1	1	1	1	0	1	1	1
Interface MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-if-extensions.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-if-extensions.txt</a>	1	1	1	1	1	1	1	1	1	1
IP Forward MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-ipforward.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-ipforward.txt</a>	1	1	1	1	1	1	1	1	1	1
IPsec Generic Flow Monitoring Object MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-ipsec-flow-mon.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-ipsec-flow-mon.txt</a>	0	0	0	1	0	0	0	1	1	1
IPsec Monitoring MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-ipsec-monitor-asp.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-ipsec-monitor-asp.txt</a>	0	1	1	1	0	1	0	0	0	0
IPsec VPN Objects MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-js-ipsec-vpn.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-js-ipsec-vpn.txt</a>	0	0	0	1	0	0	0	1	1	1
IPv4 MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-ipv4.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-ipv4.txt</a>	1	1	1	1	1	1	1	1	1	1
IPv6 and ICMPv6 MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-ipv6.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-ipv6.txt</a>	0	1	1	1	1	0	1	1	1	1
L2ALD MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-l2ald.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-l2ald.txt</a>	0	0	1	0	1	0	0	0	0	0

Table 25: Enterprise-Specific MIBs and Supported Devices (*continued*)

Enterprise-Specific MIB	Platforms									
	ACX	M	T	J	MX	EX	PTX	SRX		
								Low-End	Mid-Range	High-End
L2CP MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-l2cp-features.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-l2cp-features.txt</a>	0	0	0	0	1	0	0	0	0	0
L2TP MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-l2tp.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-l2tp.txt</a>	0	1	1	0	0	0	0	0	0	0
LDP MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-ldp.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-ldp.txt</a>	1	1	1	1	0	0	1	0	0	1
License MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-license.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-license.txt</a>	0	1	1	1	0	0	0	1	1	1
Logical Systems MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-lsys-securityprofile.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-lsys-securityprofile.txt</a>	0	0	0	0	0	0	0	0	1	1
MIMSTP MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-mimstp.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-mimstp.txt</a>	0	0	1	0	1	0	0	0	0	0
MPLS LDP MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-mpls-ldp.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-mpls-ldp.txt</a>	1	1	1	1	1	1	1	0	0	0
MPLS MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-mpls.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-mpls.txt</a>	1	1	1	1	1	1	1	0	0	1
NAT Objects MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-js-nat.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-js-nat.txt</a>	0	0	0	0	0	1	0	1	1	1

Table 25: Enterprise-Specific MIBs and Supported Devices (*continued*)

Enterprise-Specific MIB	Platforms									
	ACX	M	T	J	MX	EX	PTX	SRX		
								Low-End	Mid-Range	High-End
NAT Resources-Monitoring MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-sp-nat.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-sp-nat.txt</a>	0	1	1	1	0	0	0	0	0	0
OTN Interface Management MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-otn.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-otn.txt</a>	0	1	1	1	0	0	0	0	0	0
Packet Forwarding Engine MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-pfe.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-pfe.txt</a>	1	1	1	1	0	1	1	1	1	1
Packet Mirror MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-js-packet-mirror.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-js-packet-mirror.txt</a>	0	0	0	0	1	0	0	0	0	0
PAE Extension MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-pae-extension.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-pae-extension.txt</a>	0	0	0	0	1	0	0	0	0	0
Passive Monitoring MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-pmon.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-pmon.txt</a>	0	1	1	1	0	0	0	0	0	0
Ping MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-ping.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-ping.txt</a>	1	1	1	1	1	1	0	1	1	1
Policy Objects MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-js-policy.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-js-policy.txt</a>	0	0	0	0	0	1	0	1	1	1
Power Supply Unit MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-power-supply-unit.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-power-supply-unit.txt</a>	0	0	0	0	1	0	1	0	0	0

Table 25: Enterprise-Specific MIBs and Supported Devices (*continued*)

Enterprise-Specific MIB	Platforms									
	ACX	M	T	J	MX	EX	PTX	SRX		
								Low-End	Mid-Range	High-End
PPP MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-ppp.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-ppp.txt</a>	0	1	1	0	0	0	0	0	0	0
PPPoE MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-pppoe.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-pppoe.txt</a>	0	1	1	0	0	0	0	0	0	0
Pseudowire ATM MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-pwatm.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-pwatm.txt</a>	0	1	0	0	1	0	0	0	0	0
Pseudowire TDM MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-pwtdm.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-pwtdm.txt</a>	1	1	1	1	0	0	0	0	0	0
Real-Time Performance Monitoring MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-rpm.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-rpm.txt</a>	0	1	1	1	1	1	0	1	0	0
Reverse-Path-Forwarding MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-rpf.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-rpf.txt</a>	1	1	1	1	1	1	1	1	1	1
RMON Events and Alarms MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-rmon.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-rmon.txt</a>	1	1	1	1	1	1	1	1	1	1
RSVP MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-rsvp.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-rsvp.txt</a>	1	1	1	1	1	0	1	0	0	0
Security Interface Extension Objects MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-js-if-ext.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-js-if-ext.txt</a>	0	0	0	0	0	1	0	1	1	1



Table 25: Enterprise-Specific MIBs and Supported Devices (*continued*)

Enterprise-Specific MIB	Platforms									
	ACX	M	T	J	MX	EX	PTX	SRX		
								Low-End	Mid-Range	High-End
Security Screening Objects MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-js-screening.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-js-screening.txt</a>	0	0	0	0	0	0	0	0	0	1
Services PIC MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-sp.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-sp.txt</a>	0	1	1	1	0	0	0	0	0	0
SNMP IDP MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-js-idp.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-js-idp.txt</a>	0	0	0	0	0	0	0	1	1	1
SONET APS MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-sonetaps.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-sonetaps.txt</a>	0	1	1	1	0	0	0	0	0	0
SONET/SDH Interface Management MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-sonet.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-sonet.txt</a>	0	1	1	1	0	0	0	0	0	0
Source Class Usage MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-scu.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-scu.txt</a>	0	1	1	1	0	0	0	0	0	1
SPU Monitoring MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-js-spu-monitoring.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-js-spu-monitoring.txt</a>	0	0	0	0	0	0	0	1	1	1
Structure of Management Information MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-smi.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-smi.txt</a>	1	1	1	1	1	1	0	1	1	1
Subscriber MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-subscriber.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-subscriber.txt</a>	1	0	1	0	0	0	0	0	0	0

Table 25: Enterprise-Specific MIBs and Supported Devices (*continued*)

Enterprise-Specific MIB	Platforms									
	ACX	M	T	J	MX	EX	PTX	SRX		
								Low-End	Mid-Range	High-End
System Log MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-syslog.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-syslog.txt</a>	0	1	1	1	1	1	1	1	1	1
Traceroute MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-traceroute.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-traceroute.txt</a>	0	1	1	1	1	1	0	1	1	1
Utility MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-util.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-util.txt</a>	0	1	1	1	1	1	0	1	1	1
Virtual Chassis MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-virtualchassis.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-virtualchassis.txt</a>	0	0	0	0	1	1	0	0	0	0
VLAN MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-vlan.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-vlan.txt</a>	0	0	0	0	1	0	0	0	0	0
VPLS MIBs <ul style="list-style-type: none"> <li><a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-vpls-generic.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-vpls-generic.txt</a></li> <li><a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-vpls-ldp.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-vpls-ldp.txt</a></li> <li><a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-vpls-bgp.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-vpls-bgp.txt</a></li> </ul>	0	1	1	1	1	0	0	0	0	0
VPN Certificate Objects MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-js-cert.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-js-cert.txt</a>	0	0	0	0	0	1	0	1	1	1
VPN MIB <a href="http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-vpn.txt">http://www.juniper.net/techpubs/en_US/junos13.2/topics/reference/mibs/mib-jnx-vpn.txt</a>	1	1	1	1	1	1	0	0	0	0

**Related Documentation** • [Juniper Networks Enterprise-Specific MIBs](#)

- *Juniper Networks Enterprise-Specific SNMP Traps*
- *Standard SNMP MIBs Supported by Junos OS on [page 137](#)*
- *Loading MIB Files to a Network Management System*



## CHAPTER 10

# Operations, Administration, and Management (OAM)

- [Understanding Ethernet OAM Link Fault Management for ACX Series Routers on page 165](#)
- [Configuring Ethernet Local Management Interface on page 167](#)
- [Ethernet Frame Delay Measurements Overview on page 174](#)
- [Ethernet Frame Loss Measurement Overview on page 180](#)
- [Ethernet OAM Connectivity Fault Management on page 181](#)
- [IEEE 802.1ag OAM Connectivity Fault Management Overview on page 182](#)
- [Example: Configuring IEEE 802.3ah OAM Support for an Interface on page 184](#)

### Understanding Ethernet OAM Link Fault Management for ACX Series Routers

The Juniper Networks Junos operating system (Junos OS) for Juniper Networks ACX Series routers allows the Ethernet interfaces on these routers to support the IEEE 802.3ah standard for the Operation, Administration, and Maintenance (OAM) of Ethernet in access networks. The standard defines OAM link fault management (LFM). You can configure IEEE 802.3ah OAM LFM on point-to-point Ethernet links that are connected either directly or through Ethernet repeaters. The IEEE 802.3ah standard meets the requirement for OAM capabilities even as Ethernet moves from being solely an enterprise technology to a WAN and access technology, and the standard remains backward compatible with the existing Ethernet technology.

Ethernet OAM provides tools that network management software and network managers can use to determine how a network of Ethernet links is functioning. Ethernet OAM should:

- Rely only on the media access control (MAC) address or virtual LAN identifier for troubleshooting.
- Work independently of the actual Ethernet transport and function over physical Ethernet ports or a virtual service such as a pseudowire.
- Isolate faults over a flat (or single-operator) network architecture or nested or hierarchical (or multiprovider) networks.

The following OAM LFM features are supported on ACX Series routers:

- Discovery and Link Monitoring

The discovery process is triggered automatically when OAM is enabled on the interface. The discovery process permits Ethernet interfaces to discover and monitor the peer on the link if it also supports the IEEE 802.3ah standard. You can specify the discovery mode used for IEEE 802.3ah OAM support. In active mode, the interface discovers and monitors the peer on the link if the peer also supports IEEE 802.3ah OAM functionality. In passive mode, the peer initiates the discovery process. After the discovery process has been initiated, both sides participate in the process. The router performs link monitoring by sending periodic OAM protocol data units (PDUs) to advertise OAM mode, configuration, and capabilities.

You can specify the number of OAM PDUs that an interface can skip before the link between peers is considered down.

- Remote Fault Detection

Remote fault detection uses flags and events. Flags are used to convey the following:

- **Link Fault** means a loss of signal
- **Dying Gasp** means an unrecoverable condition such as a power failure
- **Critical Event** means an unspecified vendor-specific critical event

You can specify the interval at which OAM PDUs are sent for fault detection.



**NOTE:** ACX Series routers support the receipt of dying-gasp packets, but cannot generate them.

- Remote Loopback Mode

Remote loopback mode ensures link quality between the router and a remote peer during installation or troubleshooting. In this mode, when the interface receives a frame that is not an OAM PDU or a PAUSE frame, it sends it back on the same interface on which it was received. The link appears to be in the active state. You can use the returned loopback acknowledgement to test delay, jitter, and throughput.

If a remote data terminal equipment (DTE) supports remote loopback mode, Junos OS can place the remote DTE into loopback mode. When you place a remote DTE into loopback mode, the interface receives the remote loopback request and puts the interface into remote loopback mode. When the interface is in remote loopback mode, all frames except OAM PDUs and PAUSE frames are looped back. No changes are made to the frames. OAM PDUs continue to be sent and processed.

**Related  
Documentation**

- [IEEE 802.1ag OAM Connectivity Fault Management Overview on page 182](#)
- [Configuring Ethernet Local Management Interface on page 167](#)
- [Ethernet OAM Connectivity Fault Management on page 181](#)

## Configuring Ethernet Local Management Interface

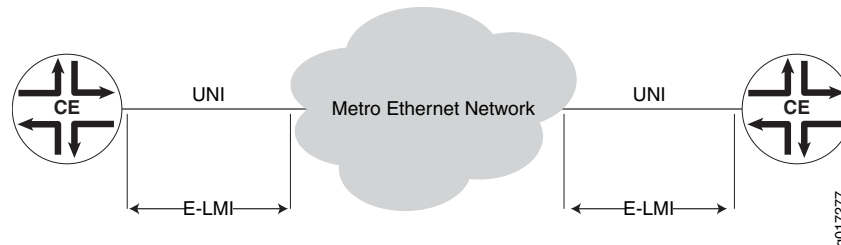
- [Ethernet Local Management Interface Overview on page 167](#)
- [Configuring the Ethernet Local Management Interface on page 168](#)
- [Example E-LMI Configuration on page 170](#)

### Ethernet Local Management Interface Overview

MX Series routers with Gigabit Ethernet (**ge**), 10-Gigabit Ethernet (**xe**), or Aggregated Ethernet (**ae**) interfaces support the Ethernet Local Management Interface (E-LMI). The E-LMI specification is available at the Metro Ethernet Forum. E-LMI procedures and protocols are used for enabling automatic configuration of the customer edge (CE) to support Metro Ethernet services. The E-LMI protocol also provides user-to-network interface (UNI) and Ethernet virtual connection (EVC) status information to the CE. The UNI and EVC information enables automatic configuration of CE operation based on the Metro Ethernet configuration.

The E-LMI protocol operates between the CE device and the provider edge (PE) device. It runs only on the PE-CE link and notifies the CE of connectivity status and configuration parameters of Ethernet services available on the CE port. The scope of the E-LMI protocol is shown in [Figure 10 on page 167](#).

Figure 10: Scope of the E-LMI Protocol



The E-LMI implementation on MX Series routers includes only the PE side of the E-LMI protocol.

E-LMI interoperates with an OAM protocol, such as Connectivity Fault Management (CFM), that runs within the provider network to collect OAM status. CFM runs at the provider maintenance level (UNI-N to UNI-N with up MEPs at the UNI). E-LMI relies on the CFM for end-to-end status of EVCs across CFM domains (SVLAN domain or VPLS).

The E-LMI protocol relays the following information:

- Notification to the CE of the addition/deletion of an EVC (active, not active, or partially active)
- Notification to the CE of the availability state of a configured EVC
- Communication of UNI and EVC attributes to the CE:
  - UNI attributes:
    - UNI identifier (a user-configured name for UNI)

- CE-VLAN ID/EVC map type (all-to-one bundling, service multiplexing with bundling, or no bundling)
- Bandwidth profile is not supported (including the following features):
  - CM (coupling mode)
  - CF (color flag)
  - CIR (committed Information rate)
  - CBR (committed burst size)
  - EIR (excess information rate)
  - EBS (excess burst size)
- EVC attributes:
  - EVC reference ID
  - EVC status type (active, not active, or partially active)
  - EVC type (point-to-point or multipoint-to-multipoint)
  - EVC ID (a user-configured name for EVC)
  - Bandwidth profile (not supported)
- CE-VLAN ID/EVC map

E-LMI on MX Series routers supports the following EVC types:

- Q-in-Q SVLAN (point-to-point or multipoint-to-multipoint)—Requires an end-to-end CFM session between UNI-Ns to monitor the EVS status.
- VPLS (BGP or LDP) (point-to-point or multipoint-to-multipoint)—Either VPLS pseudowire status or end-to-end CFM sessions between UNI-Ns can be used to monitor EVC status.
- L2 circuit/L2VPN (point-to-point)—Either VPLS pseudowire status or end-to-end CFM sessions between UNI-Ns can be used to monitor EVC status.



**NOTE:** l2-circuit and l2vpn are not supported.

---

## Configuring the Ethernet Local Management Interface

To configure E-LMI, perform the following steps:

- [Configuring an OAM Protocol \(CFM\) on page 169](#)
- [Assigning the OAM Protocol to an EVC on page 169](#)
- [Enabling E-LMI on an Interface and Mapping CE VLAN IDs to an EVC on page 169](#)



### Configuring an OAM Protocol (CFM)

For information on configuring the OAM protocol (CFM), see “IEEE 802.1ag OAM Connectivity Fault Management Overview” on page 182.

### Assigning the OAM Protocol to an EVC

To configure an EVC, you must specify a name for the EVC using the **evc***evc-id* statement at the **[edit protocols oam ethernet]** hierarchy level. You can set the EVC protocol for monitoring EVC statistics to **cfm** or **vpls** using the **evc-protocol** statement and its options at the **[edit protocols oam ethernet evcs]** hierarchy level.

You can set the number of remote UNIs in the EVC using the **remote-uni-count** *number* statement at the **[edit protocols oam ethernet evcs evcs-protocol]** hierarchy level. The **remote-uni-count** defaults to 1. Configuring a value greater than 1 makes the EVC multipoint-to-multipoint. If you enter a value greater than the actual number of endpoints, the EVC status will display as partially active even if all endpoints are up. If you enter a **remote-uni-count** less than the actual number of endpoints, the status will display as active, even if all endpoints are not up.

You can configure an EVC by including the **evcs** statement at the **[edit protocols oam ethernet]** hierarchy level:

```
[edit protocols oam ethernet]
evcs evc-id {
  evc-protocol (cfm (management-domain name management-association name) | vpls
    (routing-instance name)) {
    remote-uni-count <number>; # Optional, defaults to 1
    multipoint-to-multipoint;
    # Optional, defaults to point-to-point if remote-uni-count is 1
  }
}
```

### Enabling E-LMI on an Interface and Mapping CE VLAN IDs to an EVC

To configure E-LMI, include the **lmi** statement at the **[edit protocols oam ethernet]** hierarchy level:

```
[edit protocols oam ethernet]
lmi {
  polling-verification-timer value;
  # Polling verification timer (T392), defaults to 15 seconds
  status-counter count; # Status counter (N393), defaults to 4
  interface name {
    evc evc-id {
      default-evc;
      vlan-list [ vlan-ids ];
    }
    evc-map-type (all-to-one-bundling | bundling | service-multiplexing);
    polling-verification-time value; # Optional, defaults to global value
    status-counter count; # Optional, defaults to global value
    uni-id value; # Optional, defaults to interface-name
  }
}
```

You can set the status counter to count consecutive errors using the **status-counter count** statement at the **[edit protocols oam ethernet lmi]** hierarchy level. The status counter is used to determine if E-LMI is operational or not. The default value is 4.

You can set the **polling-verification-timer value** statement at the **[edit protocols oam ethernet lmi]** hierarchy level. The default value is 15 seconds.

You can enable an interface and set its options for use with E-LMI using the **interface name** statement at the **[edit protocols oam ethernet lmi]** hierarchy level. Only **ge**, **xe**, and **ae** interfaces are supported. You can use the interface **uni-id** option to specify a name for the UNI. If **uni-id** is not configured, it defaults to the name variable of **interface name**.

You can specify the CE-VLAN ID/EVC map type using the **evc-map-type type** interface option. The options are **all-to-one-bundling**, **bundling**, or **service-multiplexing**. Service multiplexing is with no bundling. The default type is **all-to-one-bundling**.

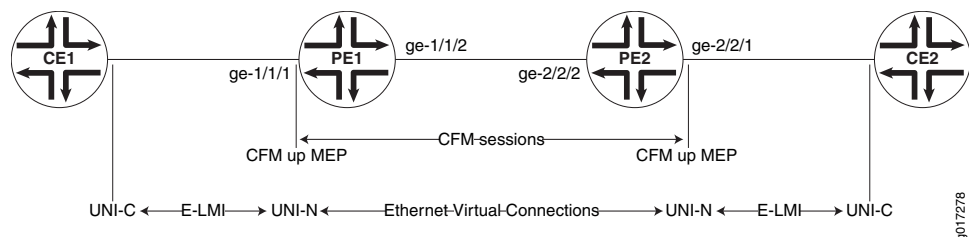
To specify the EVC that an interface uses, use the **evc evc-id** statement at the **[edit protocols oam ethernet lmi interface name]** hierarchy level. You can specify an interface as the default EVC interface using the **default-evc** statement at the **[edit protocols oam ethernet lmi interface name evc evc-id]** hierarchy level. All VLANs that are not mapped to any other EVCs are mapped to this EVC. Only one EVC can be configured as the default.

You can map a list of VLANs to an EVC using the **vlan-list vlan-id-list** statement at the **[edit protocols oam ethernet lmi interface name evc evc-id]** hierarchy level.

## Example E-LMI Configuration

Figure 11 on page 170 illustrates the E-LMI configuration for a point-to-point EVC (SVLAN) monitored by CFM. In this example, VLANs 1 through 2048 are mapped to **evc1** (SVLAN 100) and 2049 through 4096 are mapped to **evc2** (SVLAN 200). Two CFM sessions are created to monitor these EVCs.

Figure 11: E-LMI Configuration for a Point-to-Point EVC (SVLAN) Monitored by CFM



## Configuring PE1

```
[edit]
interfaces {
  ge-1/1/1 {
    unit 0 {
      family bridge {
        interface-mode trunk;
        vlan-id-list 1-2048;
      }
    }
  }
}
```

```

    }
    unit 1 {
        family bridge {
            interface-mode trunk;
            vlan-id-list 2049-4096;
        }
    }
}
ge-1/1/2 {
    unit 0 {
        vlan-id 100;
        family bridge {
            interface-mode trunk;
            inner-vlan-id-list 1-2048;
        }
    }
    unit 1 {
        vlan-id 200;
        family bridge {
            interface-mode trunk;
            inner-vlan-id-list 2049-4096;
        }
    }
}
}
protocols {
    oam {
        ethernet {
            connectivity-fault-management {
                maintenance-domain md {
                    level 0;
                    maintenance-association 1 {
                        name-format vlan;
                        mep 1 {
                            direction up;
                            interface ge-1/1/1.0 vlan 1;
                        }
                    }
                    maintenance-association 2049 {
                        name-format vlan;
                        mep 1 {
                            direction up;
                            interface ge-1/1/1.1 vlan 2049;
                        }
                    }
                }
            }
        }
    }
    evcs {
        evc1 {
            evc-protocol cfm management-domain md management-association 1;
            remote-uni-count 1;
        }
        evc2 {
            evc-protocol cfm management-domain md management-association 2049;
            remote-uni-count 1;
        }
    }
}

```

```
    }
    lmi {
      interface ge-1/1/1 {
        evc evc1 {
          vlan-list 1-2048;
        }
        evc evc2 {
          vlan-list 2049-4096;
        }
        evc-map-type bundling;
        uni-id uni-ce1;
      }
    }
  }
}
```

---

### Configuring PE2

```
[edit]
interfaces {
  ge-2/2/1 {
    unit 0 {
      family bridge {
        interface-mode trunk;
        vlan-id-list 1-2048;
      }
    }
    unit 1 {
      family bridge {
        interface-mode trunk;
        vlan-id-list 2049-4096;
      }
    }
  }
  ge-2/2/2 {
    unit 0 {
      vlan-id 100;
      family bridge {
        interface-mode trunk;
        inner-vlan-id-list 1-2048;
      }
    }
    unit 1 {
      vlan-id 200;
      family bridge {
        interface-mode trunk;
        inner-vlan-id-list 2049-4095;
      }
    }
  }
}
protocols {
  oam {
    ethernet {
      connectivity-fault-management {
```

```

maintenance-domain md {
  level 0;
  maintenance-association 1 {
    name-format vlan;
    mep 1 {
      direction up;
      interface ge-2/2/1.0 vlan 1;
    }
  }
  maintenance-association 2049 {
    name-format vlan;
    mep 1 {
      direction up;
      interface ge-2/2/1.1 vlan 2049;
    }
  }
}
}
}
evcs {
  evc1 {
    evc-protocol cfm management-domain md management-association 1;
    remote-uni-count 1;
  }
  evc2 {
    evc-protocol cfm management-domain md management-association 2049;
    uni-count 2;
  }
}
lmi {
  interface ge-2/2/1 {
    evc evc1 {
      vlan-list 1-2048;
    }
    evc evc2 {
      vlan-list 2049-4095;
    }
    evc-map-type bundling;
    uni-id uni-ce2;
  }
}
}
}
}
}

```

### Configuring Two UNIs Sharing the Same EVC

```

[edit protocols]
oam {
  ethernet {
    connectivity-fault-management { ...}
    evcs {
      evc1 {
        evc-protocol cfm management-domain md management-association 1;
        remote-uni-count 1;
      }
    }
  }
}

```

```
lmi {  
  interface ge-2/2/1 {  
    evc evc1 {  
      vlan-list 0-4095;  
    }  
    evc-map-type all-to-one-bundling;  
    uni-id uni-ce1;  
  }  
  interface ge-2/3/1 {  
    evc evc1 {  
      vlan-list 0-4095;  
    }  
    evc-map-type all-to-one-bundling;  
    uni-id uni-ce2;  
  }  
}  
}
```

**Related  
Documentation**

- [connectivity-fault-management](#)
- [IEEE 802.1ag OAM Connectivity Fault Management Overview on page 182](#)
- *Creating the Maintenance Domain*
- *Configuring Maintenance Intermediate Points*
- *Creating a Maintenance Association*
- *Continuity Check Protocol*
- *Configuring a Maintenance Endpoint*
- *Configuring a Connectivity Fault Management Action Profile*
- *Configuring Linktrace Protocol in CFM*
- *Configuring Port Status TLV and Interface Status TLV*
- *Configuring MAC Flush Message Processing in CET Mode*
- *Configuring M120 and MX Series Routers for CCC Encapsulated Packets*
- *Configuring Rate Limiting of Ethernet OAM Messages*
- *Configuring 802.1ag Ethernet OAM for VPLS*
- *Ethernet Interfaces*

---

## Ethernet Frame Delay Measurements Overview

- [ITU-T Y.1731 Frame Delay Measurement Feature on page 175](#)
- [One-Way Ethernet Frame Delay Measurement on page 176](#)
- [Two-Way Ethernet Frame Delay Measurement on page 178](#)
- [Choosing Between One-Way and Two-Way ETH-DM on page 179](#)
- [Restrictions for Ethernet Frame Delay Measurement on page 179](#)

## ITU-T Y.1731 Frame Delay Measurement Feature

The IEEE 802.3-2005 standard for Ethernet Operations, Administration, and Maintenance (OAM) defines a set of link fault management mechanisms to detect and report link faults on a single point-to-point Ethernet LAN.

Junos OS supports key OAM standards that provide for automated end-to-end management and monitoring of Ethernet service by service providers:

- *IEEE Standard 802.1ag*, also known as “Connectivity Fault Management (CFM).”
- *ITU-T Recommendation Y.1731*, which uses different terminology than IEEE 802.1ag and defines Ethernet service OAM features for fault monitoring, diagnostics, and performance monitoring.

These capabilities allow operators to offer binding service-level agreements (SLAs) and generate new revenues from rate- and performance-guaranteed service packages that are tailored to the specific needs of their customers.

### Ethernet CFM

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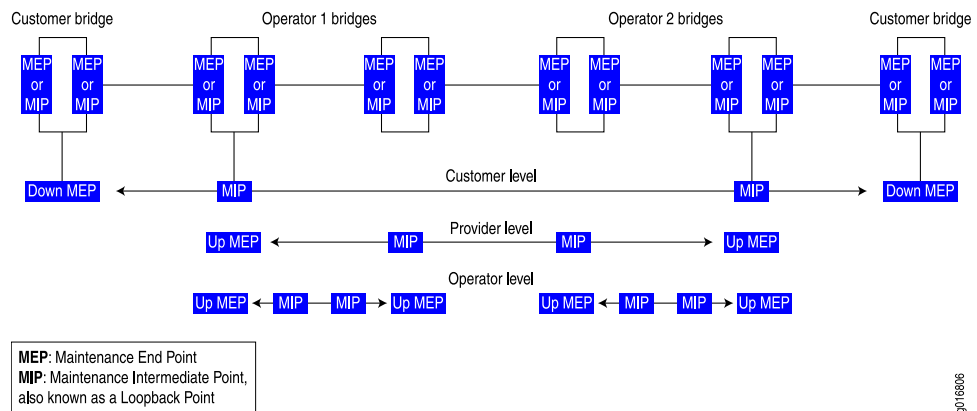
The IEEE 802.1ag standard for connectivity fault management (CFM) defines mechanisms to provide for end-to-end Ethernet service assurance over any path, whether a single link or multiple links spanning networks composed of multiple LANs.

For Ethernet interfaces on M320, MX Series, and T Series routers, Junos OS supports the following key elements of the Ethernet CFM standard:

- Fault monitoring using the IEEE 802.1ag Ethernet OAM Continuity Check protocol
- Path discovery and fault verification using the IEEE 802.1ag Ethernet OAM Linktrace protocol
- Fault isolation using the IEEE 802.1ag Ethernet OAM Loopback protocol

In a CFM environment, network entities such as network operators, service providers, and customers may be part of different administrative domains. Each administrative domain is mapped into one maintenance domain. Maintenance domains are configured with different level values to keep them separate. Each domain provides enough information for the entities to perform their own management and end-to-end monitoring, and still avoid security breaches.

[Figure 12 on page 176](#) shows the relationships among the customer, provider, and operator Ethernet bridges, maintenance domains, maintenance association end points (MEPs), and maintenance intermediate points (MIPs).

**Figure 12: Relationship of MEPs, MIPs, and Maintenance Domain Levels**

**NOTE:** Maintenance intermediate points (MIP) are not supported on the ACX Series routers.

## Ethernet Frame Delay Measurement

Two key objectives of OAM functionality are to measure quality-of-service attributes such as frame delay and frame delay variation (also known as "frame jitter"). Such measurements can enable you to identify network problems before customers are impacted by network defects.

Junos OS supports Ethernet frame delay measurement between MEPs configured on Ethernet physical or logical interfaces on MX Series routers. Ethernet frame delay measurement provides fine control to operators for triggering delay measurement on a given service and can be used to monitor SLAs. Ethernet frame delay measurement also collects other useful information, such as worst and best case delays, average delay, and average delay variation. The Junos OS implementation of Ethernet frame delay measurement (ETH-DM) is fully compliant with the ITU-T Recommendation Y.1731, *OAM Functions and Mechanisms for Ethernet-based Networks*. The recommendation defines OAM mechanisms for operating and maintaining the network at the Ethernet service layer, which is called the "ETH layer" in ITU-T terminology.

MX Series routers with modular port concentrators (MPCs) and 10-Gigabit Ethernet MPCs with SFP+ support ITU-T Y.1731 functionality on VPLS for frame-delay and delay-variation.

## One-Way Ethernet Frame Delay Measurement

In one-way ETH-DM mode, a series of frame delay and frame delay variation values are calculated based on the time elapsed between the time a measurement frame is sent from the initiator MEP at one router and the time when the frame is received at the receiver MEP at the other router.



### 1DM Transmission

When you start a one-way frame delay measurement, the router sends 1DM frames—frames that carry the protocol data unit (PDU) for a one-way delay measurement—from the initiator MEP to the receiver MEP at the rate and for the number of frames you specify. The router marks each 1DM frame as drop-ineligible and inserts a timestamp of the transmission time into the frame.

### 1DM Reception

When an MEP receives a 1DM frame, the router that contains the receiver MEP measures the one-way delay for that frame (the difference between the time the frame was received and the timestamp contained in the frame itself) and the delay variation (the difference between the current and previous delay values).

### One-Way ETH-DM Statistics

The router that contains the receiver MEP stores each set of one-way delay statistics in the ETH-DM database. The ETH-DM database collects up to 100 sets of statistics for any given CFM session (pair of peer MEPs). You can access these statistics at any time by displaying the ETH-DM database contents.

### One-Way ETH-DM Frame Counts

Each router counts the number of one-way ETH-DM frames sent and received:

- For an initiator MEP, the router counts the number of 1DM frames sent.
- For a receiver MEP, the router counts the number of valid 1DM frames received and the number of invalid 1DM frames received.

Each router stores ETH-DM frame counts in the CFM database. The CFM database stores CFM session statistics and, for interfaces that support ETH-DM, any ETH-DM frame counts. You can access the frame counts at any time by displaying CFM database information for Ethernet interfaces assigned to MEPs or for MEPs in CFM sessions.

### Synchronization of System Clocks

The accuracy of one-way delay calculations depends on close synchronization of the system clocks at the initiator MEP and receiver MEP.

The accuracy of one-way delay variation is not dependent on system clock synchronization. Because delay variation is simply the difference between consecutive one-way delay values, the out-of-phase period is eliminated from the frame jitter values.



**NOTE:** For a given one-way Ethernet frame delay measurement, frame delay and frame delay variation values are available only on the router that contains the receiver MEP.

## Two-Way Ethernet Frame Delay Measurement

In two-way ETH-DM mode, frame delay and frame delay variation values are based on the time difference between when the initiator MEP transmits a request frame and receives a reply frame from the responder MEP, subtracting the time elapsed at the responder MEP.

### DMM Transmission

---

When you start a two-way frame delay measurement, the router sends delay measurement message (DMM) frames— frames that carry the PDU for a two-way ETH-DM request—from the initiator MEP to the responder MEP at the rate and for the number of frames you specify. The router marks each DMM frame as drop-ineligible and inserts a timestamp of the transmission time into the frame.

### DMR Transmission

---

When an MEP receives a DMM frame, the responder MEP responds with a delay measurement reply (DMR) frame, which carries ETH-DM reply information and a copy of the timestamp contained in the DMM frame.

### DMR Reception

---

When an MEP receives a valid DMR, the router that contains the MEP measures the two-way delay for that frame based on the following sequence of timestamps:

1.  $TI_{TxDMM}$
2.  $TR_{Rx DMM}$
3.  $TR_{Tx DMR}$
4.  $TI_{Rx DMR}$

A two-way frame delay is calculated as follows:

$$[TI_{RxDMR} - TI_{TxDMM}] - [TR_{TxDMR} - TR_{Rx DMM}]$$

The calculation show that frame delay is the difference between the time at which the initiator MEP sends a DMM frame and the time at which the initiator MEP receives the associated DMR frame from the responder MEP, minus the time elapsed at the responder MEP.

The delay variation is the difference between the current and previous delay values.

### Two-Way ETH-DM Statistics

---

The router that contains the initiator MEP stores each set of two-way delay statistics in the ETH-DM database. The ETH-DM database collects up to 100 sets of statistics for any given CFM session (pair of peer MEPs). You can access these statistics at any time by displaying the ETH-DM database contents.

### Two-Way ETH-DM Frame Counts

Each router counts the number of two-way ETH-DM frames sent and received:

- For an initiator MEP, the router counts the number DMM frames transmitted, the number of valid DMR frames received, and the number of invalid DMR frames received.
- For a responder MEP, the router counts the number of DMR frames sent.

Each router stores ETH-DM frame counts in the CFM database. The CFM database stores CFM session statistics and, for interfaces that support ETH-DM, any ETH-DM frame counts. You can access the frame counts at any time by displaying CFM database information for Ethernet interfaces assigned to MEPs or for MEPs in CFM sessions.



**NOTE:** For a given two-way Ethernet frame delay measurement, frame delay and frame delay variation values are available only at the router that contains the initiator MEP.

### Choosing Between One-Way and Two-Way ETH-DM

One-way frame delay measurement requires that the system clocks at the initiator MEP and receiver MEP are closely synchronized. Two-way frame delay measurement does not require synchronization of the two systems. If it is not practical for the clocks to be synchronized, two-way frame delay measurements are more accurate.

When two systems are physically close to each other, their one-way delay values are very high compared to their two-way delay values. One-way delay measurement requires that the timing for the two systems be synchronized at a very granular level, and MX Series routers currently do not support this granular synchronization.

### Restrictions for Ethernet Frame Delay Measurement

The following restrictions apply to the Ethernet frame delay measurement feature:

- The ETH-DM feature is not supported on aggregated Ethernet interfaces or label-switched interface. (LSI) pseudowires.
- Hardware-assisted timestamping for ETH-DM frames in the reception path is only supported for MEP interfaces on Enhanced DPCs and Enhanced Queuing DPCs in MX Series routers. For information about hardware-assisted timestamping, see *Guidelines for Configuring Routers to Support an ETH-DM Session and Enabling the Hardware-Assisted Timestamping Option*.
- Ethernet frame delay measurements can be triggered only when the distributed periodic packet management daemon (**ppm**) is enabled. For more information about this limitation, see *Guidelines for Configuring Routers to Support an ETH-DM Session and Ensuring That Distributed ppm Is Not Disabled*.
- You can monitor only one session at a time to the same remote MEP or MAC address. For more information about starting an ETH-DM session, see *Starting an ETH-DM Session*.

- ETH-DM statistics are collected at only one of the two peer routers in the ETH-DM session. For a one-way ETH-DM session, you can display frame ETH-DM statistics at the receiver MEP only, using ETH-DM-specific **show** commands. For a two-way ETH-DM session, you can display frame delay statistics at the initiator MEP only, using the same ETH-DM-specific **show** commands. For more information, see *Managing ETH-DM Statistics and ETH-DM Frame Counts*.
- ETH-DM frame counts are collected at both MEPs and are stored in the respective CFM databases.
- If graceful Routing Engine switchover (GRES) occurs, any collected ETH-DM statistics are lost, and ETH-DM frame counts are reset to zeroes. Therefore, the collection of ETH-DM statistics and ETH-DM frame counters has to be restarted, after the switchover is complete. GRES enables a router with dual Routing Engines to switch from a master Routing Engine to a backup Routing Engine without interruption to packet forwarding. For more information, see the *Junos OS High Availability Library for Routing Devices*.
- Accuracy of frame delay statistics is compromised when the system is changing (such as from reconfiguration). We recommend performing Ethernet frame delay measurements on a stable system.

**Related Documentation**

- [Ethernet Frame Loss Measurement Overview on page 180](#)
- *Example: One-Way Ethernet Frame Delay Measurement*
- *Guidelines for Configuring Routers to Support an ETH-DM Session*
- *Guidelines for Starting an ETH-DM Session*
- *Guidelines for Managing ETH-DM Statistics and ETH-DM Frame Counts*
- *On-Demand Mode*
- *Proactive Mode*
- *Ethernet Interfaces*

---

## Ethernet Frame Loss Measurement Overview

The key objectives of the OAM functionality are to measure quality-of-service attributes such as frame delay, frame delay variation (also known as “frame jitter”), and frame loss. Such measurements enable you to identify network problems before customers are impacted by network defects. For more information about Ethernet frame delay measurement, see [“Ethernet Frame Delay Measurements Overview” on page 174](#).

Junos OS supports Ethernet frame loss measurement (ETH-LM) between maintenance association end points (MEPs) configured on Ethernet physical or logical interfaces on MX Series routers and is presently supported only for VPWS service. ETH-LM is used by operators to collect counter values applicable for ingress and egress service frames. These counters maintain a count of transmitted and received data frames between a pair of MEPs. Ethernet frame loss measurement is performed by sending frames with ETH-LM information to a peer MEP and similarly receiving frames with ETH-LM information

from the peer MEP. This type of frame loss measurement is also known as single-ended Ethernet loss measurement.

ETH-LM supports the following frame loss measurements:

- Near-end frame loss measurement—Measurement of frame loss associated with ingress data frames.
- Far-end frame loss measurement—Measurement of frame loss associated with egress data frames.



**NOTE:** The proactive and dual-ended loss measurement functionality of ITU-T Y1731 is not supported on the ACX Series routers.

The Junos OS implementation of Ethernet frame delay measurement (ETH-DM) is fully compliant with the ITU-T Recommendation Y.1731, as described in *OAM Functions and Mechanisms for Ethernet-Based Networks*. The recommendation defines OAM mechanisms for operating and maintaining the network at the Ethernet service layer, which is called the "ETH layer" in ITU-T terminology.

#### Related Documentation

- *Managing Continuity Measurement Statistics*
- *On-Demand Mode*
- *Proactive Mode*
- *Ethernet Interfaces*

## Ethernet OAM Connectivity Fault Management

The most complete connectivity fault management (CFM) is defined in IEEE 802.1ag. This topic emphasizes the use of CFM in a Metro Ethernet environment.

The major features of CFM are:

- Fault monitoring using the continuity check protocol. This is a neighbor discovery and health check protocol which discovers and maintains adjacencies at the VLAN or link level.
- Path discovery and fault verification using the linktrace protocol. Similar to IP traceroute, this protocol maps the path taken to a destination MAC address through one or more bridged networks between the source and destination.
- Fault isolation using the loopback protocol. Similar to IP ping, this protocol works with the continuity check protocol during troubleshooting.

CFM partitions the service network into various administrative domains. For example, operators, providers, and customers may be part of different administrative domains. Each administrative domain is mapped into one maintenance domain providing enough information to perform its own management, thus avoiding security breaches and making end-to-end monitoring possible. Each maintenance domain is associated with a

maintenance domain level from 0 through 7. Level allocation is based on the network hierarchy, where outermost domains are assigned a higher level than the innermost domains. Customer end points have to highest maintenance domain level. In a CFM maintenance domain, each service instance is called a maintenance association. A maintenance association can be thought as a full mesh of maintenance endpoints (MEPs) having similar characteristics. MEPs are active CFM entities generating and responding to CFM protocol messages. There is also a maintenance intermediate point (MIP), which is a CFM entity similar to the MEP, but more passive (MIPs only respond to CFM messages).

MEPs can be *up MEPs* or *down MEPs*. A link can connect a MEP at level 5 to a MEP at level 7. The interface at level 5 is an up MEP (because the other end of the link is at MEP level 7) and the interface at level 7 is a down MEP (because the other end of the link is at MEP level 5).

In a Metro Ethernet network, CFM is commonly used at two levels:

- By the service provider to check the connectivity among its provider edge (PE) routers
- By the customer to check the connectivity among its customer edge (CE) routers



**NOTE:** The configured customer CFM level must be greater than service provider CFM level.

In many Metro Ethernet networks, CFM is used to monitor connectivity over a VPLS and bridge network.

**Related  
Documentation**

- *Ethernet OAM Feature Guide for MX Series Routers*
- *Ethernet Operations, Administration, and Maintenance*
- *Example: Configuring Ethernet CFM over VPLS*
- *Example: Configuring Ethernet CFM on Bridge Connections*
- *Example: Configuring Ethernet CFM on Physical Interfaces*

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## IEEE 802.1ag OAM Connectivity Fault Management Overview

Ethernet interfaces on M7i and M10i routers with the Enhanced CFEB (CFEB-E) and on M120, M320, MX Series, T Series, and PTX Series routers support the IEEE 802.1ag standard for Operation, Administration, and Management (OAM). The IEEE 802.1ag specification provides for Ethernet connectivity fault management (CFM). The goal of CFM is to monitor an Ethernet network that may comprise one or more service instances. Junos OS supports IEEE 802.1ag connectivity fault management.

In Junos OS Release 9.3 and later, CFM also supports aggregated Ethernet interfaces. On interfaces configured on Modular Port Concentrators (MPCs) and Modular Interface Cards (MICs) on MX Series routers, CFM is not supported on untagged aggregated Ethernet member links. MPCs and MICs do support CFM on untagged and tagged aggregated Ethernet logical interfaces.

CFM does not support Multichassis Link Aggregation (MC-LAG). Do not configure the **mc-ae** statement when you configure CFM.

On T Series routers, CFM is not supported on interfaces configured with CCC encapsulation. If you configure CFM, the system displays the following message: **"MEPs cannot be configured on ccc interface on this platform"**.

Network entities such as operators, providers, and customers may be part of different administrative domains. Each administrative domain is mapped into one maintenance domain. Maintenance domains are configured with different level values to keep them separate. Each domain provides enough information for the entities to perform their own management, perform end-to-end monitoring, and still avoid security breaches.



**NOTE:** As a requirement for Ethernet OAM 802.1ag to work, distributed periodic packet management (PPM) runs on the Routing Engine and Packet Forwarding Engine by default. You can only disable PPM on the Packet Forwarding Engine. To disable PPM on the PFE, include the **ppm no-delegate-processing** statement at the **[edit routing-options ppm]** hierarchy level.

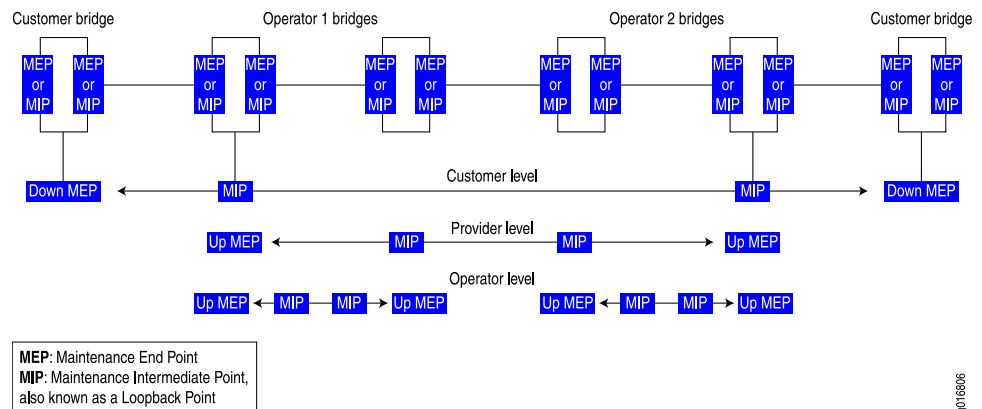
IEEE 802.1ag OAM supports graceful Routing Engine switchover (GRES). IEEE 802.1ag OAM is supported on untagged, single tagged, and stacked VLAN interfaces.

- [Connectivity Fault Management Key Elements on page 183](#)

## Connectivity Fault Management Key Elements

Figure 13 on page 183 shows the relationships among the customer, provider, and operator Ethernet bridges, maintenance domains, maintenance association end points (MEPs), and maintenance intermediate points (MIPs).

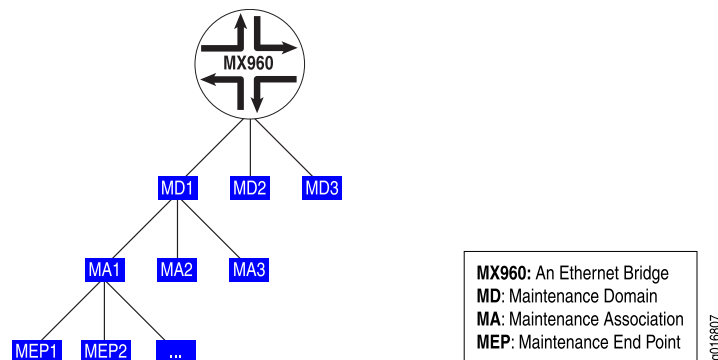
**Figure 13: Relationship Among MEPs, MIPs, and Maintenance Domain Levels**



**NOTE:** Maintenance intermediate points (MIP) are not supported on the ACX Series routers.

A maintenance association is a set of MEPs configured with the same maintenance association identifier and maintenance domain level. [Figure 14 on page 184](#) shows the hierarchical relationships between the Ethernet bridge, maintenance domains, maintenance associations, and MEPs.

**Figure 14: Relationship Among Bridges, Maintenance Domains, Maintenance Associations, and MEPs**



#### Related Documentation

- [connectivity-fault-management](#)
- [Creating the Maintenance Domain](#)
- [Configuring Maintenance Intermediate Points](#)
- [Creating a Maintenance Association](#)
- [Continuity Check Protocol](#)
- [Configuring a Maintenance Endpoint](#)
- [Configuring a Connectivity Fault Management Action Profile](#)
- [Configuring Linktrace Protocol in CFM](#)
- [Configuring Ethernet Local Management Interface on page 167](#)
- [Configuring Port Status TLV and Interface Status TLV](#)
- [Configuring MAC Flush Message Processing in CET Mode](#)
- [Configuring M120 and MX Series Routers for CCC Encapsulated Packets](#)
- [Configuring Rate Limiting of Ethernet OAM Messages](#)
- [Configuring 802.1ag Ethernet OAM for VPLS](#)
- [Ethernet Interfaces](#)

### Example: Configuring IEEE 802.3ah OAM Support for an Interface

Junos OS for ACX Series routers allows the Ethernet interfaces on these routers to support the IEEE 802.3ah standard for the Operation, Administration, and Maintenance (OAM) of Ethernet in access networks. The standard defines OAM link fault management (LFM). You can configure IEEE 802.3ah OAM LFM on point-to-point Ethernet links that are connected either directly or through Ethernet repeaters.



This example describes how to enable and configure OAM on a Gigabit Ethernet interface.

## Requirements

This example uses the following hardware and software components:

- Junos OS Release 12.2 or later for ACX Series routers.
- An ACX1000 or ACX2000 router.

## Overview and Topology

In this example, you configure a 10-Gigabit Ethernet interface on an ACX Series router with 802.3ah OAM support, which includes: link discovery, protocol data units (PDUs), remote loopback, negotiation, and event thresholds.

## Configuring IEEE 802.3ah OAM on an ACX Series Router

### CLI Quick Configuration

To quickly configure IEEE 802.3ah Ethernet OAM, copy the following commands and paste them into the CLI:

```
edit
edit protocols oam ethernet link-fault-management
set interface xe-0/0/0 link-discovery active pdu-interval 800 pdu-threshold 4
remote-loopback negotiation-options allow-remote-loopback
set interface xe-0/0/0 event-thresholds frame-error 30 frame-period 50
frame-period-summary 40 symbol-period 20
```

### Step-by-Step Procedure

To configure IEEE 802.3ah OAM support on an interface:

1. Enable IEEE 802.3ah OAM support on an interface:  

```
[edit protocols oam ethernet link-fault-management]
user@router1# set interface (OAM Link-Fault Management) xe-0/0/0
```
2. Specify that the interface initiates the discovery process by setting the link discovery mode to **active**:  

```
user@router# set interface xe-0/0/0 link-discovery active
```
3. Set the periodic OAM PDU-sending interval (in milliseconds) to 800:  

```
user@router# set interface xe-0/0/0 pdu-interval 800
```
4. Define the number of OAM PDUs to miss before an error is logged as 4:  

```
user@router# set interface xe-0/0/0 pdu-threshold 4
```
5. Configure the remote interface into loopback mode so that all frames except OAM PDUs are looped back without any changes:  

```
user@router# set interface xe-0/0/0 remote-loopback
```
6. Configure remote loopback support for the local interface:  

```
user@router# set interface xe-0/0/0 negotiation-options allow-remote-loopback
```

7. Set the threshold count for sending frame error events to 30:  
user@router# **set interface xe-0/0/0 event-thresholds frame-error 30**
8. Set the threshold count for sending frame period error events to 50:  
user@router# **set interface xe-0/0/0 event-thresholds frame-period 50**
9. Configure the threshold count for sending frame period summary error events to 40:  
user@router# **set interface xe-0/0/0 event-thresholds frame-period-summary 40**
10. Set the threshold count for sending symbol period events to 20:  
user@router# **set interface xe-0/0/0 event-thresholds symbol-period 20**

**Results** Check the results of the configuration:

```
[edit]
user@router# show

[edit]
protocols {
  oam {
    ethernet {
      link-fault-management {
        interface xe-0/0/0 {
          link-discovery active;
          pdu-interval 800;
          pdu-threshold 4;
          remote-loopback;
          negotiation-options {
            allow-remote-loopback;
          }
          event-thresholds {
            frame-error 30;
            frame-period 50;
            frame-period-summary 40;
            symbol-period 20;
          }
        }
      }
    }
  }
}
```

- Related Documentation**
- [\*link-fault-management\*](#)
  - [\*IEEE 802.3ah OAM Link-Fault Management Overview\*](#)
  - [\*Configuring IEEE 802.3ah OAM Link-Fault Management\*](#)
  - [\*Enabling IEEE 802.3ah OAM Support\*](#)
  - [\*Ethernet Interfaces\*](#)

# Routing Protocols

- [IPv6 Support on ACX Series Universal Access Routers on page 187](#)
- [Layer 3 VPNs for IPv4 and IPv6 Overview on page 190](#)
- [Configuring Multiprotocol BGP on page 192](#)

## IPv6 Support on ACX Series Universal Access Routers

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IPv6 builds upon the functionality of IPv4, providing improvements to addressing, configuration and maintenance, and security. The following IPv6 features are supported on ACX Series routers:

- **IPv6 path maximum transmission unit (MTU) discovery**

Path MTU Discovery is used by single-source devices to determine the correct size of fragments. Path MTU Discovery is enabled for IPv6 packets by default.

- **Dynamic routes distribution through IS-IS and OSPF for IPv6**

Routers learn routes through different routing protocols such as OSPF, BGP, or IS-IS. Learned routes are put in the routing table to enable IPv6 traffic forwarding.

- **Dual stacking (IPv4 and IPv6)**

Dual stacking allows a device to run both IPv4 and IPv6 at the same time. End nodes, routers, and switches run both protocols and use IPv6 as the preferred protocol.

- **IPv6 forwarding**

The ACX Series port forwarding engine software supports unicast IPv6 routes and next hops. This includes basic route infrastructure, next-hop support, network infrastructure, and exception packet processing.

- **IPv6 over MPLS (6PE)**

ACX Series Universal Access Routers can interconnect IPv6 islands over an MPLS-enabled IPv4 network. IPv6 information is sent over the MPLS core using MG-BGP with IPv4. The BGP Next Hop field conveys the IPv4 address of the router so that MPLS LSPs can be used without explicit tunnel configuration.

- **Neighbor Discovery**

The Neighbor Discovery protocol facilitates a substantial number of functions related to local network connectivity, datagram routing, and configuration. Both regular hosts

and routers in an IPv6 environment count on the Neighbor Discovery protocol to facilitate the important exchanges of information that are necessary for proper internetwork operations. Neighbor Discovery is a messaging protocol similar to ICMP. The following functions are performed by the protocol:

- Router discovery—How a host locates routers residing on an attached link.
  - Prefix discovery—How a host discovers address prefixes for destinations residing on an attached link. Nodes use prefixes to distinguish between destinations that reside on an attached link and those destinations that it can reach only through a router.
  - Parameter discovery—How a node learns various parameters (link parameters or Internet parameters) that it places in outgoing packets.
  - Address resolution—How a node uses only a destination IPv6 address to determine a link-layer address for destinations on an attached link.
  - Next-hop determination—The algorithm that a node uses for mapping an IPv6 destination address into a neighbor IPv6 address (either the next router hop or the destination itself) to which it plans to send traffic for the destination.
  - Neighbor unreachability detection—How a node determines that it can no longer reach a neighbor.
  - Duplicate address detection—How a node determines whether an address is already in use by another node.
- **Internet Control Message Protocol v6 (ICMPv6)**

ICMP sends error messages and information messages related to IP operations. ICMPv6 defines additional error messages and informational messages specific to IPv6.

There are four different ICMPv6 error messages:

- Destination Unreachable—A packet cannot be delivered due to an inherent problem with how it is being sent. Includes a code that indicates the nature of the problem that caused the packet not to be delivered
- Packet Too Big—Sent when a packet is too large to be delivered.
- Time Exceeded—A packet cannot be delivered because it has exceeded the hop count specified in the basic header hop-by-hop field.
- Parameter Problem—Indicates a problem with a field in the IPv6 header or extension headers that makes it impossible to process the packet.

ICMPv6 information messages are used for sharing the information required to implement various test, diagnostic, and support functions that are critical to the operation of IPv6. There are a total of eight different ICMPv6 informational messages:

- Echo Request—
- Echo Reply—
- Router Advertisement—
- Router Solicitation—
- Neighbor Advertisement—

- Neighbor Solicitation—
- Redirect—
- Router Renumbering—

- **Static routes for IPv6**

Routing information can be configured statically. Whenever a route is configured statically, the routing information base (RIB) is updated with routes specified through the static route. These routes should be configured statically in the “routing-options” hierarchy. The following configuration is used for enabling static routes for IPv6:

```

interfaces {
  fe/0/1/0 {
    unit 0 {
      family inet6 {
        address fec0:0:0:3::1/64;
      }
    }
  }
}
routing-options {
  rib inet6.0 {
    static {
      route fec0:0:0:4::/64 next-hop fec0:0:0:3::ffff;
    }
  }
}

```

```

user@router> show route table inet6.0
inet6.0: 3 destination, 3 routes (3 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both
fec0:0:0:3::/64  *[Direct/0]  00:01:34
    > via fe-0/1/0.0
fec0:0:0:3::1/128  *[Local/0]  00:01:34
    Local
fec0:0:0:4::/64  *[Static/5]  00:01:34
    > to fec0:0:0:3::ffff via fe-0/1/0.0

```

**Related  
Documentation**

- [IPv6 Overview](#)
- [Understanding Dual Stacking](#)
- [IS-IS Overview](#)
- [OSPF Overview](#)
- [ICMP Router Discovery Overview](#)
- [MPLS Overview for ACX Series Universal Access Routers on page 113](#)
- [Configuring the Junos OS for IPv6 Path MTU Discovery](#)
- [IPv6 Neighbor Discovery Overview](#)

- *Monitoring the Status of IPv6 Static Routes in the Routing Table*

## Layer 3 VPNs for IPv4 and IPv6 Overview

---

A Layer 3 virtual private network (VPN) routing instance is a collection of routing tables, interfaces, and routing protocol parameters. The interfaces belong to the routing tables, and the routing protocol parameters control the information in the routing tables. In the case of MPLS VPNs, each VPN has a VPN routing and forwarding (VRF) routing instance.

A VRF routing instance consists of one or more routing tables, a derived forwarding table, the interfaces that use the forwarding table, and the policies and routing protocols that determine what goes into the forwarding table. Because each instance is configured for a particular VPN, each VPN has separate tables, rules, and policies that control its operation. A separate VRF table is created for each VPN that has a connection to a customer edge (CE) router. The VRF table is populated with routes received from directly connected CE sites associated with the VRF routing instance, and with routes received from other provider edge (PE) routers in the same VPN.

The standard or the global instance is called as the default routing instance. By default, all interfaces are associated with the default routing instance and default routing information base (RIB) (**inet0**). Routing options and routing policies supported on the default routing instance are also applicable to other routing instances.

A VRF routing instance is a BGP and MPLS VPN environment in which BGP is used to exchange IP VPN routes and discover the remote site, and in which VPN traffic traverses an MPLS tunnel in an IP and MPLS backbone. You can enable an ACX Series router to function as a PE router by configuring VRF routing instances.

You can configure routing instances on ACX Series routers at the **[edit routing-instances routing-instance-name protocols]** hierarchy level for unicast IPv4, multicast IPv4, unicast IPv6, and multicast IPv6 address families. If you do not explicitly specify the address family in an IPv4 or an IPv6 environment, the router is configured to exchange unicast IPv4 or unicast IPv6 addresses by default. You can also configure the router to exchange unicast IPv4 and unicast IPv6 routes in a specified VRF routing instance. If you specify the multicast IPv4 or multicast IPv6 address family in the configuration, you can use BGP to exchange routing information about how packets reach a multicast source, instead of a unicast destination, for transmission to endpoints.



**NOTE:** Only the forwarding and virtual router routing instances support unicast IPv6 and multicast IPv6 address families. Unicast IPv6 and multicast IPv6 address families are not supported for VRF routing instances.

You can configure the following types of Layer 3 routing instances on ACX Series routers:

- **Forwarding**—Use this routing instance type for filter-based forwarding applications. For this instance type, there is no one-to-one mapping between an interface and a routing instance. All interfaces belong to the default instance **inet.0**. There are multiple

forwarding tables and the selection of a table depends on the filter applied on the interface.

- **Virtual router**—A virtual router routing instance is similar to a VRF instance type, but is used for non-VPN-related applications. There are no VRF import, VRF export, VRF target, or route distinguisher requirements for this instance type. For this instance type, there is a one-to-one mapping between an interface and a routing instance. This routing instance type is used for routing and forwarding virtualization without VPNs (which is achieved by using the VRF-Lite application).
- **VRF**—Use the VRF routing instance type for Layer 3 VPN implementations. This routing instance type has a VPN routing table as well as a corresponding VPN forwarding table. For this instance type, there is a one-to-one mapping between an interface and a routing instance. Each VRF routing instance corresponds with a forwarding table. The routes for each interface are installed in the forwarding table that is associated with the VRF routing instance. This routing instance type is used to implement BGP or MPLS VPNs in service provider networks or in big enterprise topologies.

Consider a sample VRF configuration scenario in which you want to configure two virtual routers, one to transmit voice and data traffic and another to carry management traffic. With such a configuration, the user and management networks are virtually separated, although the physical infrastructure is unified and cohesive. Virtual router routing instances enable you to isolate traffic without using multiple devices to segment your networks. The virtual routers do not create IP, MPLS, or GRE tunnels, and automatic discovery of remote sites that belong to the same network is not available. You must configure interfaces that are part of a virtual network in a streamlined manner to suit your topology requirements.

The following limitations apply to VRF routing instances that you configure on ACX Series routers:

- You cannot establish a communication between two virtual routing instances that are connected by external loopback.
- You cannot add a GRE or an MPLS tunnel to a virtual router.

In the Layer 3 lookup, up to 128 VRF tables are supported. Virtual routers without routing protocols enabled (based on static routes) support 64 VRF tables and virtual routers with all functions enabled within the routing instances support 16 VRF tables. When you enable VRF table labels and you do not explicitly apply a classifier configuration to the routing instance, the default MPLS EXP classifier is applied to the routing instance. You can override the default MPLS EXP classifier and apply a custom classifier to the routing instance. To perform this operation, you can filter the packets based on the IP header, choose the VRF, and based on the selected VRF, create an EXP classifier and associate it with the routing instance.

#### Related Documentation

- *Routing Instances Overview*
- *Configuring Virtual-Router Routing Instances in VPNs*
- *Applying MPLS EXP Classifiers to Routing Instances*
- *Configuring Routing Instances on PE Routers in VPNs*

- [\[edit routing-instances\] Hierarchy Level for ACX Series Routers](#)

## Configuring Multiprotocol BGP

---

Multiprotocol Border Gateway Protocol (MP-BGP) is an extension to BGP that enables BGP to carry routing information for multiple network layers and address families. MP-BGP can carry the unicast routes used for multicast routing separately from the routes used for unicast IP forwarding.

The following topics describe the ways in which you can configure MP-BGP on ACX Series routers for IPv4 and IPv6 address families:

- [Enabling MP-BGP for the IPv4 Address Family on page 192](#)
- [Enabling MP-BGP for the IPv6 Address Family on page 192](#)
- [Enabling MP-BGP for Address Families Other than Unicast IPv4 on page 193](#)
- [Enabling MP-BGP and VPN Signaling for the IPv4 Address Family on page 193](#)
- [Enabling MP-BGP and VPN Signaling for the IPv6 Address Family on page 194](#)

### Enabling MP-BGP for the IPv4 Address Family

To enable MP-BGP to carry Layer 3 virtual private network (VPN) NLRI for the IPv4 address family, include the **family inet-vpn** statement at the **[edit protocols bgp]** or the **[edit routing-instances routing-instance-name protocols bgp]** hierarchy level:

```
family inet-vpn {
  (any | flow | multicast | unicast) {
    accepted-prefix-limit {
      maximum number;
      teardown <percentage> <idle-timeout (forever | minutes)>;
    }
    <loops number>;
    prefix-limit {
      maximum number;
      teardown <percentage> <idle-timeout (forever | minutes)>;
    }
    rib-group group-name;
  }
}
```

### Enabling MP-BGP for the IPv6 Address Family

To enable MP-BGP to carry NLRI for the IPv6 address family, include the **family inet6** statement at the **[edit protocols bgp]** or the **[edit routing-instances routing-instance-name protocols bgp]** hierarchy level:

```
family inet6 {
  (any | labeled-unicast | multicast | unicast) {
    accepted-prefix-limit {
      maximum number;
      teardown <percentage> <idle-timeout (forever | minutes)>;
    }
  }
}
```



```

    <loops number>;
    prefix-limit {
        maximum number;
        teardown <percentage> <idle-timeout (forever | minutes)>;
    }
    rib-group group-name;
}
}

```

## Enabling MP-BGP for Address Families Other than Unicast IPv4

To enable MP-BGP to carry network layer reachability information (NLRI) for address families other than unicast IPv4, include the **family inet** statement at the **[edit protocols bgp]** or the **[edit routing-instances *routing-instance-name* protocols bgp]** hierarchy level:

```

family inet {
    (any | flow | labeled-unicast | multicast | unicast) {
        accepted-prefix-limit {
            maximum number;
            teardown <percentage> <idle-timeout (forever | minutes)>;
        }
        <loops number>;
        prefix-limit {
            maximum number;
            teardown <percentage> <idle-timeout (forever | minutes)>;
        }
        rib-group group-name;
        topology name {
            community {
                target identifier;
            }
        }
    }
}
}

```

## Enabling MP-BGP and VPN Signaling for the IPv4 Address Family

To enable MP-BGP to carry multicast VPN NLRI for the IPv4 address family and to enable VPN signaling, include the **family inet-mvpn** statement at the **[edit protocols bgp]** or the **[edit routing-instances *routing-instance-name* protocols bgp]** hierarchy level:

```

family inet-mvpn {
    signaling {
        accepted-prefix-limit {
            maximum number;
            teardown <percentage> <idle-timeout (forever | minutes)>;
        }
        <loops number>;
        prefix-limit {
            maximum number;
            teardown <percentage> <idle-timeout (forever | minutes)>;
        }
    }
}
}

```

## Enabling MP-BGP and VPN Signaling for the IPv6 Address Family

To enable MP-BGP to carry multicast VPN NLRI for the IPv6 address family and to enable VPN signaling, include the **family inet6-mvpn** statement at the **[edit protocols bgp]** or the **[edit routing-instances *routing-instance-name* protocols bgp]** hierarchy level:

```
family inet6-mvpn {
  signaling {
    accepted-prefix-limit {
      maximum number;
      teardown <percentage> <idle-timeout (forever | minutes)>;
    }
    <loops number>;
    prefix-limit {
      maximum number;
      teardown <percentage> <idle-timeout <forever | minutes>;
    }
  }
}
```

- Related Documentation**
- [Layer 3 VPNs for IPv4 and IPv6 Overview on page 190](#)
  - [Examples: Configuring Multiprotocol BGP](#)

## CHAPTER 12

# Time Division Multiplexing (TDM)

- [Configuring CESoPSN Encapsulation on DS Interfaces on page 195](#)
- [Configuring CE1 Channels Down to DS Interfaces on page 196](#)
- [Configuring SAToP Emulation on Channelized T1 and E1 Interfaces on page 197](#)
- [Configuring Inverse Multiplexing for ATM \(IMA\) on page 204](#)
- [Configuring E1 BERT Properties on page 209](#)
- [Configuring T1 BERT Properties on page 211](#)
- [Configuring E1 Loopback Capability on page 212](#)
- [Configuring T1 Loopback Capability on page 214](#)

### Configuring CESoPSN Encapsulation on DS Interfaces

---

Circuit Emulation Service over Packet-Switched Network (CESoPSN) is an encapsulation layer intended to carry *NxDSO* services over a packet-switched network (PSN).

To configure CESoPSN encapsulation on a DS interface:

1. Create the DS interface.

```
[edit interfaces]
user@host# edit interface ds-fpc/pic/port:partition
```

For example:

```
[edit interfaces]
user@host# edit interface ds-0/0/1:1
```

2. Configure the encapsulation.

```
[edit interfaces ds-fpc/pic/port:partition]
user@host# set encapsulation cesopsn
```

3. Configure the logical interface.

```
[edit interfaces ds-fpc/pic/port:partition]
user@host# set unit logical-unit-number
```

For example:

```
[edit interfaces ds-0/0/1:1]
user@host# set unit 0
```

When you are finished configuring CESoPSN encapsulation on the DS0 interface, enter the **commit** command from configuration mode.

From configuration mode, confirm your configuration by entering the **show** command. for example:

```
[edit interfaces]
user@host# show
ds-1/0/0:1:1 {
  encapsulation cesopsn;
  unit 0;
}
```

**Related  
Documentation**

- *Mobile Backhaul and Circuit Emulation Overview*
- *Configuring CESoPSN Encapsulation on DS Interfaces on Channelized OC3/STM1 (Multi-Rate) Circuit Emulation MIC with SFP*

---

## Configuring CE1 Channels Down to DS Interfaces

You can configure a DS interface on a channelized E1 interface (CE1) and then apply CESoPSN encapsulation for the pseudowire to function. An  $N \times$ DS0 interface can be configured from a channelized CE1 interface, where  $N$  represents the time slots on the CE1 interface. The value of  $N$  is 1 through 31 when a DS0 interface is configured from a CE1 interface.

To configure CE1 channels down to a DS interface, include the **partition** statement at the **[edit interfaces ce1-fpc/pic/port]** hierarchy level, as shown in the following example:

```
[edit interfaces]
user@host# show
ce1-0/0/1 {
  partition 1 timeslots 1-4 interface-type ds;
}
```

After you partition the DS interface, configure the CESoPSN options on it. See *Setting the CESoPSN Options*.

To configure CE1 channels down to a DS interface:

1. Create the CE1 interface.

```
[edit interfaces]
user@host# edit interfaces ce1-fpc/pic/port
```

For example:

```
[edit interfaces]
user@host# edit interface ce1-0/0/1
```

2. Configure the partition, the time slot, and the interface type.

```
[edit interfaces ce1-fpc/pic/port]
user@host# set partition partition-number timeslots timeslots interface-type ds;
```

For example:

```
[edit interfaces ce1-0/0/1]
user@host# set partition 1 timeslots 1-4 interface-type ds;
```



**NOTE:** You can assign multiple time slots on a CE1 interface; in the configuration, separate the time slots by comma without spaces. For example:

```
[edit interfaces ce1-0/0/1]
user@host# set partition 1 timeslots 1-4,9,22-31 interface-type ds;
```

3. Configure the CESoPSN encapsulation for the DS interface.

```
[edit interfaces ds-fpc/pic/port:partition]
user@host# set encapsulation encapsulation-type
```

For example:

```
[edit interfaces ds-0/0/1:1]
user@host# set encapsulation cesopsn
```

4. Configure the logical interface for the DS interface.

```
[edit interfaces ds-fpc/pic/port:partition]
user@host# set unit logical-unit-number;
```

For example:

```
[edit interfaces ds-0/0/1:1]
user@host# set unit 0
```

When you are finished configuring CE1 channels down to a DS interface, enter the **commit** command from configuration mode.

From configuration mode, confirm your configuration by entering the **show** command. For example:

```
[edit interfaces]
user@host# show
ce1-0/0/1 {
  partition 1 timeslots 1-4 interface-type ds;
}
ds-0/0/1:1 {
  encapsulation cesopsn;
  unit 0;
}
```

#### Related Documentation

- *Mobile Backhaul and Circuit Emulation Overview*
- *Configuring CESoPSN Encapsulation on DS Interfaces on Channelized OC3/STM1 (Multi-Rate) Circuit Emulation MIC with SFP*

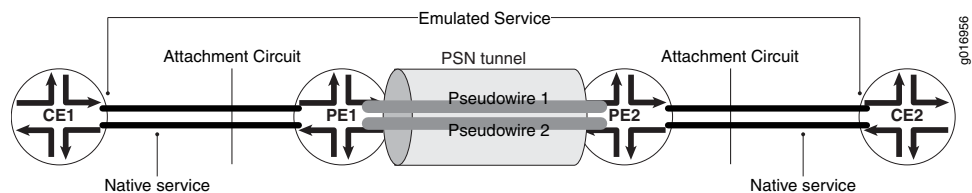
## Configuring SAToP Emulation on Channelized T1 and E1 Interfaces

This configuration is the base configuration of SAToP on an ACX Series router as described in RFC 4553, *Structure-Agnostic Time Division Multiplexing (TDM) over Packet (SAToP)*.

When you configure SAToP on built-in channelized T1 and E1 interfaces, the configuration results in a pseudowire that acts as a transport mechanism for the T1 and E1 circuit signals across a packet-switched network.

The network between the customer edge (CE) routers appears transparent to the CE routers, making it seem that the CE routers are directly connected. With the SAToP configuration on the provider edge (PE) router's T1 and E1 interfaces, the interworking function (IWF) forms a payload (frame) that contains the CE router's T1 and E1 Layer 1 data and control word. This data is transported to the remote PE over the pseudowire. The remote PE removes all the Layer 2 and MPLS headers added in the network cloud and forwards the control word and the Layer 1 data to the remote IWF, which in turn forwards the data to the remote CE.

**Figure 15: Pseudowire Encapsulation with SAToP**



In [Figure 15 on page 198](#) the Provider Edge (PE) router represents the ACX Series router that is being configured in these steps. The result of these steps is the pseudowire from PE1 to PE2. Topics include:

- [Setting the T1/E1 Emulation Mode on page 198](#)
- [Configuring One Full T1 or E1 Interface on Channelized T1 and E1 Interfaces on page 199](#)
- [Setting the SAToP Encapsulation Mode on page 202](#)
- [Configure the Layer 2 Circuit on page 203](#)

## Setting the T1/E1 Emulation Mode

Emulation is a mechanism that duplicates the essential attributes of a service (such as T1 or E1) over a packet-switched network. You set the emulation mode so that the built-in channelized T1 and E1 interfaces on the ACX Series router can be configured to work in either T1 or E1 mode. This configuration is at the PIC level, so all ports operate as either T1 interfaces or E1 interfaces. A mix of T1 and E1 interfaces is not supported. By default all the ports operate as T1 interfaces.

- Configure the emulation mode:

```
[edit chassis fpc fpc-slot pic pic-slot]
user@host# set framing (t1 | e1)
```

For example:

```
[edit chassis fpc 0 pic 0]
user@host# set framing t1
```

After a PIC is brought online and depending on the framing option used (**t1** or **e1**), on the ACX2000 router, 16 CT1 or 16 CE1 interfaces are created, and on the ACX1000 router, 8 CT1 or 8 CE1 interfaces are created.

The following output shows this configuration:

```
user@host# show chassis
fpc 0 {
  pic 0 {
    framing t1;
  }
}
```

The following output from the **show interfaces terse** command shows the 16 CT1 interfaces created with the framing configuration.

```
user@host# run show interfaces terse
```

Interface	Admin	Link	Proto	Local	Remote
ct1-0/0/0	up	down			
ct1-0/0/1	up	down			
ct1-0/0/2	up	down			
ct1-0/0/3	up	down			
ct1-0/0/4	up	down			
ct1-0/0/5	up	down			
ct1-0/0/6	up	down			
ct1-0/0/7	up	down			
ct1-0/0/8	up	down			
ct1-0/0/9	up	down			
ct1-0/0/10	up	down			
ct1-0/0/11	up	down			
ct1-0/0/12	up	down			
ct1-0/0/13	up	down			
ct1-0/0/14	up	down			
ct1-0/0/15	up	down			



**NOTE:** If you set the framing option incorrectly for the PIC type, the commit operation fails.

If you change the mode, the router will reboot the built-in T1 and E1 interfaces.

Bit error rate test (BERT) patterns with all ones received by T1 and E1 interfaces configured for SAToP do not result in an alarm indication signal (AIS) defect. As a result, the T1 and E1 interfaces remain up.

## Configuring One Full T1 or E1 Interface on Channelized T1 and E1 Interfaces

You must configure a child T1 or E1 interface on the built-in channelized T1 or E1 interface created because the channelized interface is not a configurable interface and SAToP encapsulation must be configured (in the next step) for the pseudowire to function. The following configuration creates one full T1 interface on the channelized **ct1** interface. You can follow the same process to create one E1 interface on the channelized **ce1** interface.

- Configure one full T1/E1 interface:

```
[edit interfaces ct1-fpc/pic /port]
user@host# set no-partition interface-type (t1 | e1)
```

For example:

```
[edit interfaces ct1-0/0/0]
```

```
user@host# set no-partition interface-type t1
```

The following output shows this configuration:

```
[edit]
user@host# show interfaces
ct1-0/0/0 {
    no-partition interface-type t1;
}
```

The preceding command creates the **t1-0/0/0** interface on the channelized **ct1-0/0/0** interface. Check the configuration with the **show interfaces *interface-name* extensive** command. Run the command to display output for the channelized interface and the newly created T1 or E1 interface. The following output provides an example of the output for a CT1 interface and the T1 interface created from the preceding example configuration. Notice that **ct1-0/0/0** is running at T1 speed and that the media is T1.

```
user@host> show interfaces ct1-0/0/0 extensive
Physical interface: ct1-0/0/0, Enabled, Physical link is Up
  Interface index: 152, SNMP ifIndex: 780, Generation: 1294
  Link-level type: Controller, Clocking: Internal, Speed: T1, Loopback: None,
  Framing: ESF, Parent: None
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x0
  Link flags     : None
  Hold-times     : Up 0 ms, Down 0 ms
  CoS queues     : 8 supported, 4 maximum usable queues
  Last flapped   : 2012-04-03 06:27:55 PDT (00:13:32 ago)
  Statistics last cleared: 2012-04-03 06:40:34 PDT (00:00:53 ago)
  DS1 alarms    : None
  DS1 defects   : None
  T1 media:
    Seconds      Count  State
    SEF          0       0 OK
    BEE          0       0 OK
    AIS          0       0 OK
    LOF          0       0 OK
    LOS          0       0 OK
    YELLOW       0       0 OK
    CRC Major    0       0 OK
    CRC Minor    0       0 OK
    BPV          0       0
    EXZ          0       0
    LCV          0       0
    PCV          0       0
    CS           0       0
    CRC          0       0
    LES          0
    ES           0
    SES          0
    SEFS         0
    BES          0
    UAS          0
  Line encoding: B8ZS
  Buildout      : 0 to 132 feet
  DS1 BERT configuration:
    BERT time period: 10 seconds, Elapsed: 0 seconds
    Induced Error rate: 0, Algorithm: 2^15 - 1, 0.151, Pseudorandom (9)
```



Packet Forwarding Engine configuration:  
Destination slot: 0 (0x00)

In the following output for the T1 interface, the parent interface is shown as **ct1-0/0/0** and the link level type and encapsulation are **TDM-CCC-SATOP**.

```

user@host> show interfaces t1-0/0/0 extensive
Physical interface: t1-0/0/0, Enabled, Physical link is Up
  Interface index: 160, SNMP ifIndex: 788, Generation: 1302
  Link-level type: TDM-CCC-SATOP, MTU: 1504, Speed: T1, Loopback: None, FCS:
16, Parent: ct1-0/0/0 Interface index 152
  Device flags      : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x0
  Link flags       : None
  Hold-times       : Up 0 ms, Down 0 ms
  CoS queues       : 8 supported, 4 maximum usable queues
  Last flapped     : 2012-04-03 06:28:43 PDT (00:01:16 ago)
  Statistics last cleared: 2012-04-03 06:29:58 PDT (00:00:01 ago)
  Egress queues: 8 supported, 4 in use
  Queue counters:

```

	Queued packets	Transmitted packets	Dropped packets
0 best-effort	0	0	0
1 expedited-fo	0	0	0
2 assured-forw	0	0	0
3 network-cont	0	0	0

```

  Queue number:      Mapped forwarding classes
    0                best-effort
    1                expedited-forwarding
    2                assured-forwarding
    3                network-control
  DS1  alarms       : None
  DS1  defects       : None
  SAToP configuration:
    Payload size: 192
    Idle pattern: 0xFF
    Octet aligned: Disabled
    Jitter buffer: packets: 8, latency: 7 ms, auto adjust: Disabled
    Excessive packet loss rate: sample period: 10000 ms, threshold: 30%
  Packet Forwarding Engine configuration:
    Destination slot: 0
  CoS information:
    Direction : Output
    CoS transmit queue

```

Limit	CoS transmit queue	Bandwidth		Buffer Priority	
		%	bps	%	usec
0 best-effort		95	1459200	95	0 low
none					
3 network-control		5	76800	5	0 low
none					

```

  Logical interface t1-0/0/0.0 (Index 308) (SNMP ifIndex 789) (Generation 11238)

  Flags: Point-To-Point SNMP-Traps Encapsulation: TDM-CCC-SATOP
  CE info
    Packets  Bytes  Count
  CE Tx      0      0
  CE Rx      0      0

```

```
CE Rx Forwarded          0
CE Strayed                0
CE Lost                  0
CE Malformed             0
CE Misinserted           0
CE AIS dropped            0
CE Dropped               0
CE Overrun Events        0
CE Underrun Events       0
Protocol ccc, MTU: 1504, Generation: 13130, Route table: 0
```

## Setting the SAToP Encapsulation Mode

The built-in T1 and E1 interfaces must be configured with SAToP encapsulation at the PE router so that the interworking function (IWF) can segment and encapsulate TDM signals into SAToP packets, and in the reverse direction, to decapsulate the SAToP packets and reconstitute them into TDM signals.

1. On the PE router, configure SAToP encapsulation on the physical interface:

```
[edit interfaces (t1 | e1)-fpc/pic/port]
user@host# set encapsulation satop
```

For example:

```
[edit interfaces t1-0/0/0]
user@host# set encapsulation satop
```

2. On the PE router, configure the logical interface:

```
[edit interfaces ]
user@host# set (t1 | e1)-fpc/pic/port unit logical-unit-number
```

For example:

```
[edit interfaces]
user@host# set t1-0/0/0 unit 0
```

It is not necessary to configure the circuit cross-connect (CCC) family because it is automatically created for the preceding encapsulation. The following output shows this configuration.

```
[edit interfaces]
regress@R7# show t1-0/0/0
encapsulation satop;
unit 0;
```

## Configure the Layer 2 Circuit

When you configure the Layer 2 circuit, you designate the neighbor for the provider edge (PE) router. Each Layer 2 circuit is represented by the logical interface connecting the local PE router to the local customer edge (CE) router. All the Layer 2 circuits that use a particular remote PE router, designated for remote CE routers, are listed under the **neighbor** statement. Each neighbor is identified by its IP address and is usually the end-point destination for the label-switched path (LSP) tunnel that transports the Layer 2 circuit. Configure the Layer 2 circuit:

- [edit protocols l2circuit neighbor *address*]  
user@host# **set interface *interface-name* virtual-circuit-id *identifier***

For example, for a T1 interface:

```
[edit protocols l2circuit neighbor 2.2.2.2]
user@host# set interface t1-0/0/0.0 virtual-circuit-id 1
```

The preceding configuration is for a T1 interface. To configure an E1 interface, use the E1 interface parameters. The following output shows this configuration.

```
[edit protocols l2circuit]
regress@R7# show neighbor 2.2.2.2
interface t1-0/0/0.0 {
    virtual-circuit-id 1;
}
```

### Related Documentation

- *Layer 2 Circuits Feature Guide for Routing Devices*

## Configuring Inverse Multiplexing for ATM (IMA)

---

Inverse multiplexing for ATM (IMA) is a standardized technology used to transport ATM traffic over a bundle of T1 or E1 interfaces, also known as an IMA Group, allowing for an increase in the bandwidth capacity. When you configure IMA on ACX Series routers, you must configure the following:

- The aggregated device count—The device count is the number of IMA group interfaces created on the CT1 or CE1 interfaces. The logical ATM interface that is part of the IMA group has the following naming format: **at-*fpc/pic/port*** with the **port** number taken from the last port on the MIC plus 1. For example, on the ACX2000 router with a 16-port built-in T1/E1 TDM MIC, the IMA group interface numbering starts with **at-0/0/16** and increments by 1 to **at-0/0/17**, and so on. On the ACX1000 router with an 8-port built-in T1/E1 TDM MIC, the IMA group interface numbering starts with **at-0/0/8** and increments by 1 to **at-0/0/9**, and so on.
- The framing mode—Emulation is a mechanism that duplicates the essential attributes of a service, such as T1 or E1, over a packet-switched network. The built-in channelized T1 and E1 interfaces (CT1 and CE1) on the ACX Series routers can be configured to work in either T1 or E1 mode, and these child T1 and E1 interfaces can be configured to carry ATM services over the packet-switched network.
- One full T1 or E1 interface on the channelized CT1 or CE1 interface—The built-in channelized interface is a non-configurable interface that requires a child T1 or E1 or ATM interface on which you configure the parameters.
- The T1 or E1 interface as a member of the IMA group of the respective IMA link—Each child T1 or E1 interface of a channelized CT1 or CE1 interface is the physical interface over which the ATM signals are carried. This T1 or E1 interface must be specified as a member of an IMA group so that the IMA link will work.
- IMA group interface configuration—Each IMA group interface (**at-*fpc/pic/port***) must be configured with all ATM properties for it to work properly: logical link-layer encapsulation type, the circuit cross-connect protocol suite, and the entire ATM device must be dedicated to the ATM cell relay circuit.

Configure IMA on built-in channelized T1 and E1 interfaces:

1. Configure the framing mode:

```
[edit chassis fpc fpc-slot pic pic-slot]
user@host# set framing (t1 | e1)
```

For example, to set E1 framing:

```
[edit chassis fpc 0 pic 0]
user@host# set framing e1
```

This configuration is for E1 framing, which results in the PIC running at the E1 interface speed. To configure T1 framing, use the **t1** option. The following output shows this configuration:

```
[edit]
user@host# show chassis
fpc 0 {
  pic 0 {
    framing e1;
  }
}
```

The following output shows eight CE1 interfaces created on an ACX1000 router:

```
user@host# run show interfaces terse
```

Interface	Admin	Link	Proto	Local	Remote
ce1-0/0/0	up	up			
ce1-0/0/1	up	up			
ce1-0/0/2	up	up			
ce1-0/0/3	up	up			
ce1-0/0/4	up	up			
ce1-0/0/5	up	up			
ce1-0/0/6	up	up			
ce1-0/0/7	up	up			

After a PIC is brought online and depending on the framing option used (**t1** or **e1**), on the ACX2000 router, 16 CT1 or 16 CE1 interfaces are created; on the ACX1000 router, 8 CT1 or 8 CE1 interfaces are created.

2. Configure the aggregated device count:

```
[edit chassis fpc fpc-slot pic pic-slot]
user@host# set aggregated-devices ima device-count number
```

For example:

```
[edit chassis fpc 0 pic 0]
user@host# set aggregated-devices ima device-count 2
```

This configuration creates two IMA group interfaces on the Routing Engine. The following output shows this configuration:

```
[edit]
user@host# show chassis
fpc 0 {
  pic 0 {
    aggregated-devices {
      ima {
        device-count 2;
      }
    }
  }
}
```

```
}
}
```

The following output shows the two IMA group interfaces created on an ACX1000 router with eight built-in channelized interfaces so the IMA group interface naming starts with port 8, **at-0/0/8** and increments by one to **at-0/0/9**:

```
user@host> show interfaces terse
Interface          Admin Link Proto  Local          Remote
ce1-0/0/0          up    up
e1-0/0/0           up    up
ce1-0/0/1          up    up
e1-0/0/1           up    up
ce1-0/0/2          up    up
ce1-0/0/3          up    up
ce1-0/0/4          up    up
ce1-0/0/5          up    up
ce1-0/0/6          up    up
ce1-0/0/7          up    up
at-0/0/8           up    up
at-0/0/9           up    up
```



**NOTE:** When you change the aggregated device count, all interfaces on the MIC are restarted.

3. Configure at least one full T1 or E1 interface on the channelized CE1 or CT1 interface:

```
[edit interfaces (ct1 | ce1)-fpc/pic /port]
```

```
user@host# set no-partition interface-type e1
```

In this example, you configure two full E1 interfaces because you have two IMA groups configured in the previous step:

```
[edit interfaces ce1-0/0/0]
```

```
user@host# set no-partition interface-type e1
```

```
[edit interfaces ce1-0/0/1]
```

```
user@host# set no-partition interface-type e1
```

The following output shows this configuration. Notice that on each **ce1** interface, a corresponding **e1** interface is created with the same **fpc/pic/port** parameters as its parent **ce1** interface:

```
[edit]
user@host# show interfaces
ce1-0/0/0 {
    no-partition interface-type e1;
}
e1-0/0/0 {
}
ce1-0/0/1 {
    no-partition interface-type e1;
}
e1-0/0/1 {
}
```

```
user@host> show interfaces terse
Interface          Admin Link Proto  Local          Remote
```

```

ce1-0/0/0          up    up
e1-0/0/0           up    up
ce1-0/0/1          up    up
e1-0/0/1           up    up
ce1-0/0/2          up    up
ce1-0/0/3          up    up
ce1-0/0/4          up    up
ce1-0/0/5          up    up
ce1-0/0/6          up    up
ce1-0/0/7          up    up
at-0/0/8           up    up
at-0/0/9           up    up

```

4. Specify the T1 or E1 interface as a member of the IMA group of the respective IMA link (**at-0/0/8** or **at-0/0/9**):

```
[edit interfaces (e1 | t1)-fpc/pic /port]
```

```
user@host# set ima-link-options group-id group-id
```

In this example, you configure IMA encapsulation on two E1 interfaces because you have set up two IMA groups in Step 3.

```
[edit interfaces e1-0/0/0]
```

```
user@host# set ima-link-options group-id 8
```

```
[edit interfaces e1-0/0/1]
```

```
user@host# set ima-link-options group-id 9
```

The following output shows this configuration:

```

[edit]
user@host# show interfaces
e1-0/0/0 {
    ima-link-options group-id 8;
    encapsulation ima;
}
e1-0/0/1 {
    ima-link-options group-id 9;
    encapsulation ima;
}

```

5. For each IMA group interface, configure a logical link-layer encapsulation type (**encapsulation atm-ccc-cell-relay**) and the circuit cross-connect protocol suite (**family ccc**), then dedicate the entire ATM device to the ATM cell relay circuit (**allow-any-vci**):

```
[edit interfaces at-fpc/pic /port unit logical-unit-number]
```

```
user@host# encapsulation atm-ccc-cell-relay
```

```
user@host# family ccc
```

```
user@host# allow-any-vci
```

In this example, you configure these statements on the two IMA group interfaces **at-0/0/8** and **at-0/0/9**.

```
[edit]
```

```
user@host# show interfaces
```

```

at-0/0/8 {
    unit 0 {
        encapsulation atm-ccc-cell-relay;
        allow-any-vci;
    }
}

```

```
        family ccc;
    }
}
at-0/0/9 {
    unit 0 {
        encapsulation atm-ccc-cell-relay;
        allow-any-vci;
        family ccc;
    }
}
```

6. Verify that the interfaces are up:

The following output shows the channelized CE1 interface:

```
user@host> show interfaces ce1-0/0/0
Physical interface: ce1-0/0/0, Enabled, Physical link is Up
  Interface index: 128, SNMP ifIndex: 530
  Link-level type: Controller, Clocking: Internal, Speed: E1, Loopback: None,
  Framing: G704,
  Parent: None
  Device flags      : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x0
  Link flags       : None
  CoS queues       : 8 supported, 4 maximum usable queues
  Last flapped     : 2012-04-07 13:42:45 PDT (01:52:59 ago)
  DS1 alarms      : None
  DS1 defects      : None
  Line encoding: HDB3
```

The following output shows the child E1 interfaces:

```
user@host> show interfaces e1-0/0/0
Physical interface: e1-0/0/0, Enabled, Physical link is Up
  Interface index: 152, SNMP ifIndex: 559
  Link-level type: IMA-Link, MTU: 1504, Speed: E1, Loopback: None, FCS: 16,
  Parent: ce1-0/0/0 Interface index 128
  Device flags      : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x0
  Link flags       : None
  CoS queues       : 8 supported, 4 maximum usable queues
  Last flapped     : 2012-04-07 15:34:15 PDT (00:01:49 ago)
  Input rate       : 0 bps (0 pps)
  Output rate      : 0 bps (0 pps)
  IMA Link alarms   : None
  IMA Link defects  : None
  IMA Link state    : Line: OK, NE-Rx: Active, NE-Tx: Active, FE-Rx: Active,
  FE-Tx: Active
  DS1 alarms      : None
  DS1 defects      : None
```

```
user@host> show interfaces e1-0/0/1
Physical interface: e1-0/0/1, Enabled, Physical link is Up
  Interface index: 153, SNMP ifIndex: 561
  Link-level type: IMA-Link, MTU: 1504, Speed: E1, Loopback: None, FCS: 16,
  Parent: ce1-0/0/1 Interface index 130
  Device flags      : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x0
  Link flags       : None
  CoS queues       : 8 supported, 4 maximum usable queues
  Last flapped     : 2012-04-07 16:19:25 PDT (00:04:48 ago)
  Input rate       : 0 bps (0 pps)
```



```

Output rate      : 0 bps (0 pps)
IMA Link alarms  : None
IMA Link defects : None
IMA Link state   : Line: OK, NE-Rx: Active, NE-Tx: Active, FE-Rx: Active,
FE-Tx: Active
DS1  alarms     : None
DS1  defects    : None

```

The following output shows the IMA group interfaces:

```

user@host> show interfaces at-0/0/8
Physical interface: at-0/0/8, Enabled, Physical link is Up
  Interface index: 138, SNMP ifIndex: 568
  Link-level type: ATM-PVC, MTU: 2048, Speed: Unspecified, Loopback: None,
  Payload scrambler: Enabled
  Device flags   : Present Running
  Link flags     : None
  CoS queues     : 8 supported, 4 maximum usable queues
  Current address: 84:18:88:c0:5a:08
  Last flapped   : 2012-04-07 15:34:15 PDT (00:02:10 ago)
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)
  IMA Group alarms : None
  IMA Group defects : None
  IMA Group state  : NE: Operational, FE: Operational

[edit]
user@host> show interfaces at-0/0/9
Physical interface: at-0/0/9, Enabled, Physical link is Up
  Interface index: 139, SNMP ifIndex: 569
  Link-level type: ATM-PVC, MTU: 2048, Speed: Unspecified, Loopback: None,
  Payload scrambler: Enabled
  Device flags   : Present Running
  Link flags     : None
  CoS queues     : 8 supported, 4 maximum usable queues
  Current address: 84:18:88:c0:5a:09
  Last flapped   : 2012-04-04 21:16:08 PDT (15:25:39 ago)
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)
  IMA Group alarms : None
  IMA Group defects : None
  IMA Group state  : NE: Operational, FE: Operational

```

- Related Documentation**
- [Inverse Multiplexing for ATM \(IMA\) Overview on page 29](#)
  - [Configuring SAToP Emulation on Channelized T1 and E1 Interfaces on page 197](#)

## Configuring E1 BERT Properties

This topic discusses BERT properties for the E1 interface specifically. For general information about the Junos OS implementation of the BERT procedure, see *Interface Diagnostics*.

You can configure an E1 interface or a CE1 or E1 partition on a channelized PIC to execute a bit error rate test (BERT) when the interface receives a request to run this test. You specify the duration of the test and the error rate to include in the bit stream by including

the **bert-period** and **bert-error-rate** statements at the **[edit interfaces *interface-name* e1-options]** hierarchy level:

```
[edit interfaces interface-name e1-options]
bert-error-rate rate;
bert-period seconds;
```

By default, the BERT period is 10 seconds. You can configure the BERT period to last from 1 through 239 seconds on some PICs and from 1 through 240 seconds on other PICs. Standard CE1, standard E1, E1 IQ, and E1 IQE interfaces, and PICs partitioned to CE1 and E1 channels, support an extended BERT period range, up to 86,400 seconds (24 hours), and have a default BERT period value of 240 seconds.



**NOTE:** When configuring E1 and CE1 interfaces on 10-port Channelized E1/T1 IQE PICs, you must include the **bert-period** statement at the **[edit interfaces *ce1-fpc/pic/port*]** hierarchy level.



**NOTE:** When configuring CE1 interfaces on the 16-port Channelized E1/T1 Circuit Emulation MIC (MIC-3D-16CHE1-T1-CE), you must include BERT configuration options at the **[edit interfaces *ce1-fpc/pic/port*]** hierarchy level.

**rate** is the bit error rate. This can be an integer from 0 through 7, which corresponds to a bit error rate from  $10^{-0}$  (0, which corresponds to no errors) to  $10^{-7}$  (1 error per 10 million bits). The default is 0.



**NOTE:** The **bit-error-rate** statement in BERT procedure is not supported on the 16-port Channelized E1/T1 Circuit Emulation MIC (MIC-3D-16CHE1-T1-CE).

Individual concatenated E1 interfaces do not support the **bert-algorithm** configuration statement. For individual concatenated E1 interfaces, the **bert-algorithm** statement at the **[edit interfaces *interface-name* e1-options]** hierarchy level is ignored. The algorithm for the E1 BERT procedure is **pseudo-2e15-o151** (pattern is  $2^{15}-1$ , as defined in the CCITT/ITU O.151 standard).

For channelized E1 intelligent queuing (IQ and IQE) interfaces, you can configure the BERT algorithm by including the **bert-algorithm** statement at the **[edit interfaces *ce1-fpc/pic/port* e1-options]** or **[edit interfaces *e1-fpc/pic/port* e1-options]** hierarchy level:

```
[edit interfaces ce1-fpc/pic/port e1-options]
bert-algorithm algorithm;
[edit interfaces e1-fpc/pic/port e1-options]
bert-algorithm algorithm;
```

For a list of supported algorithms, enter a **?** after the **bert-algorithm** statement; for example:

```
[edit interfaces ce1-0/0/0 e1-options]
user@host# set bert-algorithm ?
```

Possible completions:

pseudo-2e11-o152 Pattern is  $2^{11} - 1$  (per O.152 standard)

pseudo-2e15-o151 Pattern is  $2^{15} - 1$  (per O.151 standard)

pseudo-2e20-o151 Pattern is  $2^{20} - 1$  (per O.151 standard)

pseudo-2e20-o153 Pattern is  $2^{20} - 1$  (per O.153 standard)

- Related Documentation**
- [Configuring T1 BERT Properties on page 211](#)
  - [Interface Diagnostics](#)
  - [Interface Diagnostics Operational Mode Commands](#)

## Configuring T1 BERT Properties

This section discusses BERT properties for the T1 interface specifically. For general information about the Junos implementation of the BERT procedure, see *Interface Diagnostics*.

You can configure a T1 interface or partitioned CT1 or T1 channel to execute a bit error rate test (BERT) when the interface receives a request to run this test. You specify the duration of the test and the error rate to include in the bit stream by including the **bert-period** and **bert-error-rate** statements at the **[edit interfaces interface-name t1-options]** hierarchy level:

```
[edit interfaces interface-name t1-options]
bert-algorithm algorithm;
bert-error-rate rate;
bert-period seconds;
```

**seconds** is the duration of the BERT procedure. The test can last from 1 through 239 seconds; the default is 10 seconds. Standard CT1, standard T1, T1 IQ, and T1 IQE interfaces, and PICs partitioned to CT1 and T1 channels, support an extended BERT period range, up to 86,400 seconds (24 hours), and have a default BERT period value of 240 seconds.



**NOTE:** When configuring T1 and CT1 interfaces on 10-port Channelized E1/T1 IQE PICs, the **bert-period** statement must be included at the **[edit interfaces ct1-fpc/pic/port]** hierarchy level.



**NOTE:** When configuring CT1 interfaces on the 16-port Channelized E1/T1 Circuit Emulation MIC (MIC-3D-16CHE1-T1-CE), you must include BERT configuration options at the **[edit interfaces ct1-fpc/pic/port]** hierarchy level.

**rate** is the bit error rate. This can be an integer from 0 through 7, which corresponds to a bit error rate from  $10^{-0}$  (1 error per bit) to  $10^{-7}$  (1 error per 10 million bits).

**algorithm** is the pattern to send in the bit stream. On T1 interfaces, you can also select the pattern to send in the bit stream by including the **bert-algorithm** statement at the **[edit interfaces interface-name interface-options]** hierarchy level:

```
[edit interfaces interface-name interface-options]
bert-algorithm algorithm;
```

For a list of supported algorithms, enter a ? after the **bert-algorithm** statement; for example:

```
[edit interfaces t1-0/0/0 t1-options]
user@host# set bert-algorithm ?
Possible completions:
pseudo-2e11-o152 Pattern is 2^11 - 1 (per O.152 standard)
pseudo-2e15-o151 Pattern is 2^15 - 1 (per O.151 standard)
pseudo-2e20-o151 Pattern is 2^20 - 1 (per O.151 standard)
pseudo-2e20-o153 Pattern is 2^20 - 1 (per O.153 standard)
```



**NOTE:** The **bit-error-rate** statement in BERT procedure is not supported on the 16-port Channelized E1/T1 Circuit Emulation Module (MIC-3D-16CHE1-T1-CE).

For specific hierarchy information, see individual interface types. For information about running the BERT procedure, see the *Junos OS Administration Library for Routing Devices*.

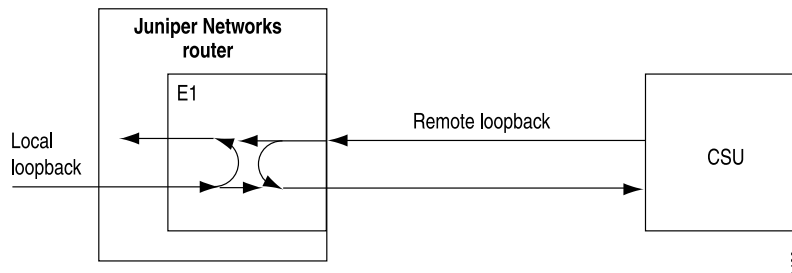
#### Related Documentation

- [Configuring E1 BERT Properties on page 209](#)
- [Interface Diagnostics](#)
- [Interface Diagnostics Operational Mode Commands](#)

## Configuring E1 Loopback Capability

You can configure loopback capability between the local E1 interface and the remote channel service unit (CSU), as shown in [Figure 16 on page 212](#). You can configure the loopback to be local or remote. With local loopback, the E1 interface can transmit packets to the CSU, but receives its own transmission back again and ignores data from the CSU. With remote loopback, packets sent from the CSU are received by the E1 interface, forwarded if there is a valid route, and immediately retransmitted to the CSU.

**Figure 16: Remote and Local E1 Loopback**



To configure loopback capability on an E1 interface, include the **loopback** statement at the `[edit interfaces interface-name e1-options]` hierarchy level:

```
[edit interfaces interface-name e1-options]
loopback (local | remote);
```

Packets can be looped on either the local router or the remote CSU.

To exchange BERT patterns between a local router and a remote router, include the **loopback remote** statement in the interface configuration at the remote end of the link. From the local router, you issue the **test interface** command.

For more information about configuring BERT, see *Interface Diagnostics*. For more information about using operational mode commands to test interfaces, see the *Junos OS Operational Mode Commands*.

To turn off the loopback capability, remove the **loopback** statement from the configuration:

```
[edit]
user@host# delete interfaces e1-fpc/pic/port e1-options loopback
```

You can determine whether there is an internal problem or an external problem by checking the error counters in the output of the **show interface interface-name extensive** command:

```
user@host> show interfaces interface-name extensive
```

## Example: Configuring E1 Loopback Capability

To determine whether a problem is internal or external, loop packets on both the local and the remote router. To do this, include the **no-keepalives** and **encapsulation cisco-hdlc** statements at the **[edit interfaces interface-name]** hierarchy level and the **loopback local** statement at the **[edit interfaces interface-name e1-options]** hierarchy level.

With this configuration, the link stays up, so you can loop ping packets to a remote router. The **loopback local** statement causes the interface to loop within the PIC just before the data reaches the transceiver.

```
[edit interfaces]
e1-1/0/0 {
  no-keepalives;
  encapsulation cisco-hdlc;
  e1-options {
    loopback local;
  }
  unit 0 {
    family inet {
      address 10.100.100.1/24;
    }
  }
}
```



**NOTE:** To configure the CE1 loopback capability on the 16-port Channelized E1/T1 Circuit Emulation MIC (MIC-3D-16CHE1-T1-CE), include the **loopback** statement at the **[edit interfaces ce1-fpc/pic/port]** hierarchy level.

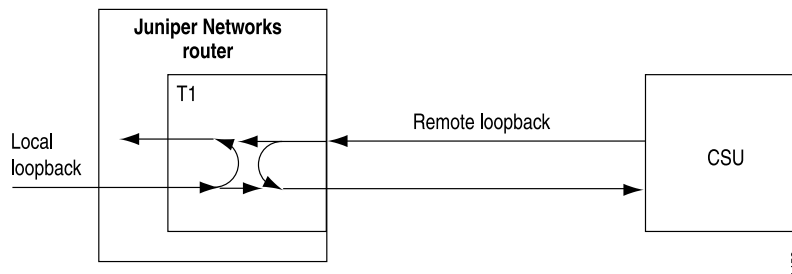
### Related Documentation

- [Configuring T1 Loopback Capability on page 214](#)
- [Performing a Loopback Test on an Interface](#)

## Configuring T1 Loopback Capability

You can configure loopback capability between the local T1 interface and the remote channel service unit (CSU), as shown in [Figure 17 on page 214](#). You can configure the loopback to be local or remote. With local loopback, the T1 interface can transmit packets to the CSU, but receives its own transmission back again and ignores data from the CSU. With remote loopback, packets sent from the CSU are received by the T1 interface, forwarded if there is a valid route, and immediately retransmitted to the CSU.

**Figure 17: Remote and Local T1 Loopback**



To configure loopback capability on a T1 interface, include the **loopback** statement at the **[edit interfaces *interface-name* t1-options]** hierarchy level:

```
[edit interfaces interface-name t1-options]
loopback (local | payload | remote);
```

Packets can be looped on either the local router or the remote CSU. Local and remote loopback loop back both data and clocking information.

To exchange BERT patterns between a local router and a remote router, include the **loopback remote** statement in the interface configuration at the remote end of the link. From the local router, issue the **test interface** command.

For more information about configuring BERT, see *Interface Diagnostics*. For more information about using operational mode commands to test interfaces, see the *Junos OS Operational Mode Commands*.

For channelized T3, T1, and NxDS0 intelligent queuing (IQ) interfaces only, you can include the **loopback payload** statement in the configuration to loop back data only (without clocking information) on the remote router's PIC. In payload loopback, overhead is recalculated. For T3 IQ interfaces, you can include the **loopback payload** statement at the **[edit interfaces *ct3-fpc/pic/port*]** and **[edit interfaces *t3-fpc/pic/port:channel*]** hierarchy levels. For T1 interfaces, you can include the **loopback payload** statement in the configuration at the **[edit interfaces *t1-fpc/pic/port:channel*]** hierarchy level; it is ignored if included at the **[edit interfaces *ct1-fpc/pic/port*]** hierarchy level. For NxDS0 interfaces, payload and remote loopback are the same. If you configure one, the other is ignored. NxDS0 IQ interfaces do not support local loopback.

To determine whether a problem is internal or external, you can loop packets on both the local and the remote router. To do this, include the **no-keepalives** and **encapsulation cisco-hdlc** statements at the **[edit interfaces *interface-name*]** hierarchy level and the

**loopback local** statement at the **[edit interfaces *interface-name* t1-options]** hierarchy level, as shown in the following example:

```
[edit interfaces]
t1-1/0/0 {
  no-keepalives;
  encapsulation cisco-hdlc;
  t1-options {
    loopback local;
  }
  unit 0 {
    family inet {
      address 10.100.100.1/24;
    }
  }
}
```



**NOTE:** To configure the CT1 loopback capability on the 16-port Channelized E1/T1 Circuit Emulation Module (CEM), use the **loopback** statement at the **[edit interfaces *ct1-fpc/pic/port*]** hierarchy level.

With this configuration, the link stays up, so you can loop ping packets to a remote router. The **loopback local** statement causes the interface to loop within the PIC just before the data reaches the transceiver.

To turn off the loopback capability, remove the **loopback** statement from the configuration:

```
[edit]
user@host# delete interfaces t1-fpc/pic/port t1-options loopback
```

You can determine whether there is an internal problem or an external problem by checking the error counters in the output of the **show interface *interface-name* extensive** command, for example:

```
user@host> show interfaces t1-fpc/pic/port extensive
```

#### Related Documentation

- [Configuring E1 Loopback Capability on page 212](#)
- [Performing a Loopback Test on an Interface](#)





## CHAPTER 13

# Timing and Synchronization

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- [Example: Disabling a PoE Interface on ACX2000 Routers on page 249](#)

## Automatic Clock Selection Overview

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Automatic clock selection is the selection of the best quality clock source by the clock source selection algorithm based on the Ethernet Synchronization Message Channel (ESMC) Synchronization Status Message (SSM) quality level, the configured quality level, and the priority.

- [Clock Source Selection Algorithm on page 217](#)
- [Clock Selection and Quality Level on page 218](#)
- [Selection Mode for the Incoming ESMC Quality on page 218](#)

## Clock Source Selection Algorithm

The clock source selection algorithm is triggered by the following events:

- Changes in the received ESMC SSM quality level (QL)

- Configuration changes. For example, the addition or deletion of a clock source, a change to the QL mode, and so on.
- Signal failure detected on the currently selected source.

When the router is configured with automatic clock selection, the system chooses up to two best upstream clock sources. The system then uses the clock recovered from one of the sources to lock the chassis clock. If an upstream clock with acceptable good quality is not available or if the system is configured in free-run mode, the system uses the internal oscillator.

## Clock Selection and Quality Level

Automatic clock selection supports two modes: QL enabled and QL disabled.

- QL disabled— In this mode, the best clock is selected based on the configured ESMC SSM QL. If the QL of the configured clocks are equal, the clock selection is based on the configured priority. If both the configured QL and priority are equal, one of the sources is randomly selected. Absence of the **quality-mode-enable** statement at the **[edit chassis synchronization]** hierarchy level means that QL is disabled.



**NOTE:** The default setting is QL disable.

- QL enabled—In this mode, the best clock is selected based on the incoming ESMC SSM QL as long as the incoming QL is at least as good as the source's configured QL. If the QLs are equal, the clock selection is based on the configured priority. If both the received QL and the priority are equal, one of the sources is selected randomly.

## Selection Mode for the Incoming ESMC Quality

Depending on the configuration, the clock source selection algorithm uses the configured or received ESMC SSM quality level for clock selection. In both configured and received selection modes, the interface qualifies for clock source selection only when the received ESMC SSM quality level on the interface is equal to or greater than the configured ESMC SSM quality level for the interface.

### Related Documentation

- [External Clock Synchronization Overview for ACX Series Routers on page 219](#)
- [Configuring External Clock Synchronization for ACX Series Routers on page 221](#)
- *synchronization*

## Clock Sources for the ACX Series Universal Access Routers

Clocking is an important feature on the ACX Series routers. The ACX Series routers can be directly connected to different types of base stations (for example, base transceiver station (BTS) in 2G, NodeB in 3G, and eNodeB in 4G networks) and different types of routers that hand off time-division multiplexing (TDM, ATM, and Ethernet traffic to the base station controller. ACX Series routers must extract the network clock from these sources and pass on synchronization information to the base stations to help the routers synchronize with the base station controller.

The ACX Series router timing hardware includes the following: two external clock inputs (BITS and GPS), T1 and E1 ports (FPC 0, PIC 0), Gigabit Ethernet ports (RJ45), Gigabit Ethernet ports (SFP) and 10-Gigabit Ethernet ports.

ACX Series router hardware and software support various clocking options:

- The ACX series has an OCXO (Stratum 3E) type of oscillator.
- External clocking includes a choice of GPS-based clock recovery (10 MHz) or BITS-T1 or E1 line synchronization (1.544 MHz and 2.048 MHz).
- Synchronous Ethernet is supported based on the ITU G.8261, G.8262, and G.8264 specifications with line timing for **ge** and **xe** ports.

Synchronous Ethernet is a key requirement for circuit (emulation) services and mobile radio access technologies. Synchronous Ethernet supports sourcing and transfer of frequency for synchronization purposes for both wireless and wireline services and is primarily used for mobile backhaul and converged transport.

- The Precision Time Protocol (PTP) 1588v2—compliant ordinary slave clock estimates the time offset from the PTP master clock and tries to align its own time and frequency with that of the master. PTP supports sourcing, transfer of frequency, and phase synchronization. Also, PTP can be used for mobile backhaul when phase synchronization is required, such as in Long Term Evolution-Time Division Duplex (LTE-TDD) infrastructures.

### Related Documentation

- [Global Positioning System \(GPS\) and the ACX Series Routers on page 227](#)
- [Understanding Interfaces on ACX Series Universal Access Routers on page 100](#)
- [Synchronous Ethernet Overview on the ACX Series Universal Access Routers on page 35](#)
- [IEEE 1588v2 Precision Timing Protocol \(PTP\) on ACX Series Universal Access Routers on page 28](#)

## External Clock Synchronization Overview for ACX Series Routers

The ACX Series Universal Access routers support external clock synchronization and automatic clock selection for Synchronous Ethernet, T1 or E1 line timing sources, and external inputs. Configuring external clock synchronization and automatic clock selection requires making clock selection, quality level (QL), and priority considerations. The clock

source selection algorithm is used to pick the two best upstream clock sources from among all the various sources, based on system configuration and execution criteria such as QL, priority, and hardware restrictions.

## Automatic Clock Selection

With automatic clock selection, the system chooses up to two best upstream clock sources. The system then uses the clock recovered from one of the sources to lock the chassis clock. If an upstream clock with acceptable good quality is not available or if the system is configured in free-run mode, the system uses the internal oscillator. The following automatic clock selection features are supported for Synchronous Ethernet, T1 or E1 line timing sources, and external inputs:



**NOTE:** Automatic clock selection does not apply to the IEEE 1588v2 recovered clock.

Automatic clock selection is supported on the ACX Series routers. Automatic clock selection of the best quality clock source is based on the Ethernet Synchronization Message Channel (ESMC) Synchronization Status Message (SSM) quality level, the configured quality level, and the priority. To configure automatic clock selection, include the **auto-select** option at the **[edit chassis synchronization]** hierarchy level. You can also configure the chassis to lock to the free-running local oscillator, which is the Stratum 3E oscillator, by including the **free-run** option at the **[edit chassis synchronization]** hierarchy level. The **auto-select** option enables the clock source selection algorithm to run. The clock source selection algorithm is triggered by the following events:

- Signal failure detected on the currently selected source
- Changes in the received Ethernet Synchronization Message Channel (ESMC) Synchronization Status Message (SSM) quality level (QL)
- Configuration changes. For example, the addition or deletion of a clock source, a change to the QL mode, and so on.

Automatic clock selection supports two modes on the ACX Series router: QL enabled and QL disabled. To configure QL mode, include the **quality-mode-enable** statement at the **[edit chassis synchronization]** hierarchy level.

- QL disabled—The default setting is disable, which means that when the **quality-mode-enable** statement is not configured, QL is disabled. In this mode, the best clock is selected based on the configured ESMC SSM QL. If the QL of the best clocks are equal, the clock selection is based on the configured priority. If both the configured QL and priority are equal, one of the sources is randomly selected.
- QL enabled—In this mode, the best clock is selected based on the incoming ESMC SSM QL as long as the incoming QL is at least as good as the source's configured QL. If the QLs are equal, the clock selection is based on the configured priority. If both the received QL and the priority are equal, one of the sources is selected randomly.

## Clock Source Selection Algorithm

The clock source selection algorithm uses the following logic and restrictions:

- QL must be configured for non-external clocks, whether or not QL is enabled.
- For **network-option option-1**, QL must be configured for external clocks (**gps** or **bits**) whether or not QL is enabled.
- In the case of **network-option option-2**, the default QL for the external clocks is QL\_STU, whether or not QL is enabled.
- Configuring priority is optional. When not specified, **gps** has a higher default priority than **bits**, and **bits** has a higher default priority than Gigabit Ethernet, 10-Gigabit Ethernet, and T1 or E1 clock, which have the lowest default priority.
- When QL is enabled, the received QL must be equal to or better than the configured QL for that particular source or else that source will not be considered for clock selection. This is so that a downstream client is guaranteed clock quality of a certain level (that “certain level” being the configured QL).

During clock selection:

- The active source with the highest QL is selected.
- If QL is the same for two or more sources, then the source with the highest priority is selected.
- If two or more sources have the same QL and priority, then the currently active source, if any, among these sources is selected.
- If two or more sources have the same QL and priority, and none of these is currently active, then any one of these may be selected.
- If selection-mode is *configured quality*, then the configured (or default) QL of the selected clock source is used for transmitting ESMC. If selection-mode is *received quality*, then the received QL of the selected clock source is used for ESMC transmit.
- In order to receive or transmit ESMC messages out of an interface, at least one logical interface should be configured on that interface. If the interface is currently not configured with a logical interface, you may do so using the **set interfaces interface-name unit 0** statement at the **edit** hierarchy level.

### Related Documentation

- [Configuring External Clock Synchronization for ACX Series Routers on page 221](#)
- [Understanding Interfaces on ACX Series Universal Access Routers on page 100](#)

## Configuring External Clock Synchronization for ACX Series Routers

The ACX Series Universal Access Routers support external clock synchronization for Synchronous Ethernet, T1 or E1 line timing sources, and external inputs. Configuring external clock synchronization requires making clock selection, quality level (QL), and priority considerations. The clock source selection algorithm is used to pick the two best

upstream clock sources from among all the various sources, based on system configuration and execution criteria such as QL, priority, and hardware restrictions.

To configure external synchronization on the router, include the **synchronization** statement at the **[edit chassis]** hierarchy level.

### Setting the Ethernet equipment clock (EEC) network type

The network type options set the frequency of the configured clock. When **bits** is configured with **option-1** on the ACX2000 router, the Synchronous Ethernet equipment is optimized for 2048 Kbps, the speed of an E1 interface. When **bits** is configured with **option-2** on the ACX2000 router, the Synchronous Ethernet equipment is optimized for 1544 Kbps, the speed of a T1 interface. To set the clock type, use the following command:

```
set chassis synchronization network-option (option-1 | option-2)
```

For **option-1**, QL must be configured for external clocks (**gps** or **bits**) whether or not QL is enabled. For **option-2**, the default QL for external clocks is QL\_STU whether or not QL is enabled.

The following output shows an example of the configuration of the **network type** with **option-1**:

```
[edit]
user@host# show chassis
synchronization {
    network-option option-1;
}
```

### Setting the clock mode

Clock mode sets the selection of the clock source from a free-running local oscillator or from an external qualified clock. The default clock mode is **auto-select**, which uses the best clock source. To set the clock mode, use the following command:

```
set chassis synchronization clock-mode (free-run | auto-select)
```

The following output shows an example of the configuration of the **free-run** option:

```
[edit]
user@host# show chassis
synchronization {
    clock-mode free-run;
}
```



.....

**NOTE:** Automatic clock selection does not apply to the IEEE 1588v2 recovered clock.

.....

### Setting the quality mode

Specify the expected quality of the incoming clock on this source. The default is disable. To set the synchronization quality mode, use the following command:

```
set chassis synchronization quality-mode-enable
```

The following output shows the configuration of the **quality-mode-enable** statement:

```
[edit]
user@host# show chassis
synchronization {
    quality-mode-enable;
}
```

### Setting the selection mode

The selection mode specifies whether the clock source selection algorithm should use the configured or received ESMC SSM quality level for clock selection. In both selection modes (**configured-quality** and **received-quality**), the interface qualifies for clock source selection only when the received ESMC SSM quality level on the interface is equal to or greater than the configured ESMC SSM quality level for the interface. To configure the ESMC SSM quality-based clock source selection mode, use the following command:

```
set chassis synchronization selection-mode (configured-quality | received-quality)
```

The following output shows the configuration of the **selection-mode** statement with the **configured-quality** option and the mandatory **quality-mode-enable** statement:

```
[edit]
user@host# show chassis
synchronization {
    selection-mode configured-quality;
    quality-mode-enable;
}
```



**NOTE:** For the **selection-mode** statement configuration to take effect, you must set the **quality-mode-enable** statement at the **[edit chassis synchronization]** hierarchy level.

### Setting the time interval before a new clock source is selected

For routers operating with Synchronous Ethernet, set the time interval to wait before the router selects a new clock source. After a change in the configuration, the time to wait is between 15 and 60 seconds. After a reboot (restart), the time to wait is from 60 to 180 seconds. After clock recovery (switchover), the time to wait is from 30 to 60 seconds. The default switchover time is 30 seconds and cold boot time is 120 seconds. To set the time interval before a new clock source is selected, use the following command:

```
set chassis synchronization hold-interval (configuration-change | restart |
switchover) seconds
```

The following output shows the configuration of the **hold-interval** statement with the **configuration-change** option:

```
[edit]
user@host# show chassis
synchronization {
    hold-interval {
        configuration-change 20;
    }
}
```

### Setting the synchronization switching mode

The configured switching mode determines the clock source used. In revertive mode, the system switches from a lower to a higher quality clock source whenever the higher clock source becomes available. In non-revertive mode, the system continues to use the current clock source as long as it is valid. The default mode is revertive. To set the synchronization switchover mode, use the following command:

```
set chassis synchronization switchover-mode (revertive | non-revertive)
```

The following output shows the configuration of the **switchover-mode** statement with the **non-revertive** option:

```
[edit]
user@host# show chassis
synchronization {
    switchover-mode non-revertive;
}
```

### Setting the clock source

The configured clock source is the candidate for selection by the clock selection algorithm. The clock source can be the router's BITS T1 or E1 interface, GPS, or an interface with an upstream clock source. To set the clock source, use the following command:

```
set chassis synchronization source (bits | gps | interfaces interface-name)
```

The following output shows the configuration of the **source** statement with the **bits** option and the mandatory **network-option** statement. When **bits** is configured with **option-1** on the ACX2000 router, the Synchronous Ethernet equipment is optimized for 2048 Kbps, the speed of an E1 interface.

```
[edit]
user@host# show chassis
synchronization {
    network-option option-1;
    source {
        bits;
    }
}
```



**NOTE:** For the **source** statement configuration to take effect, you must set the **network-option (option-1 | option-2)** statement at the **[edit chassis synchronization]** hierarchy level.

The **bits** option is not supported on the ACX1000 router.

---

### Setting ESMC transmit interface

The ESMC transmit interface is the interface on which ESMC transmit messages are permitted. To enable ESMC packet transmit, use the following command:

```
set chassis synchronization esmc-transmit interfaces interface-name
```

The following output shows the configuration of the **esmc-transmit** statement:



```
[edit]
user@host# show chassis
synchronization {
    esmc-transmit {
        interfaces ge-0/1/0;
    }
}
```

You can also enable ESMC on all interfaces with the **interfaces all** statement at the preceding hierarchy level.

### Setting the synchronization source quality level

Specify the expected quality of the incoming clock on this source. Specific quality-level options are valid depending on the configured **network-option**; **option-1** or **option-2**. Both option-1 and option-2 SSM quality levels are supported. To set the synchronization source quality level, use the following command:

```
set chassis synchronization source (bits | gps | interfaces interface-name)
quality-level (prc | prs | sec | smc | ssu-a | ssu-b | st2 | st3 | st3e | st4 |
stu | tnc)
```

The following output shows the configuration of the **quality-level** statement configured with the **prc** option:

```
[edit]
user@host# show chassis
synchronization {
    source {
        bits {
            quality-level prc;
        }
    }
}
```

### Setting the synchronization source priority

Specify a priority level between 1 and 5. When not specified, **gps** has a higher priority than **bits**, and **bits** has a higher default priority than other Gigabit Ethernet or 10 Gigabit Ethernet clock sources, which have the lowest priority. To set the synchronization source priority, use the following command:

```
set chassis synchronization source (bits | gps | interfaces interface-name)
priority number
```

The following output shows the configuration of the **priority** statement:

```
[edit]
user@host# show chassis
synchronization {
    source {
        bits {
            priority 2;
        }
    }
}
```

### Setting the synchronization source wait to restore time

A wait-to-restore time can be configured for each port. When a port's signal transitions out of the signal fail state, it must be fault free for the wait-to-restore time before it is again considered by the selection process. The range is from **0** through **12** minutes. The default time is 5 minutes.

To set the synchronization source wait-to-restore time, use the following command:

```
set chassis synchronization source interfaces interface-name wait-to-restore
minutes
```

The following output shows the configuration of the **wait-to-restore** statement:

```
[edit]
user@host# show chassis
synchronization {
  network-option option-1;
  source {
    interfaces ge-0/1/0 {
      wait-to-restore 2;
    }
  }
}
```

### Setting the synchronization source lockout

A lockout may be configured for any source. When a lockout is configured for a source, that source will not be considered by the selection process. To set the synchronization source lockout, use the following command:

```
set chassis synchronization source (bits | gps | interfaces interface-name)
request lockout
```

The following output shows the configuration of the **request lockout** statement:

```
[edit]
user@host# show chassis
synchronization {
  network-option option-1;
  source {
    bits {
      request lockout;
    }
  }
}
```

### Setting the forced switch

Force a switch to the source provided that the source is enabled and not locked out. Only one configured source may be force-switched. To set the forced switch, use the following command:

```
set chassis synchronization source (bits | gps | interfaces interface-name)
request force-switch
```

The following output shows the configuration of the **request force-switch** statement:

```
[edit]
user@host# show chassis
synchronization {
```

```

network-option option-1;
source {
    bits {
        request force-switch;
    }
}

```

**Related  
Documentation**

- [External Clock Synchronization Overview for ACX Series Routers on page 219](#)
- *synchronization*
- *Interface and Router Clock Sources Overview*

## Global Positioning System (GPS) and the ACX Series Routers

Global Positioning System (GPS) is a navigation aid system that uses signals from satellites to calculate the actual position of a GPS-capable receiver. These signals are not only used for determining the position of the receiver on Earth but also as a very accurate time base. There are GPS receivers with 10-MHz clock frequency output synchronized to a GPS satellite. The ACX Series router has a SubMiniature version B (SMB) connector that can take 10-MHz sine-wave input from a GPS receiver. To configure this 10-MHz clock from a GPS receiver as a candidate clock source for chassis synchronization, include the **gps** statement and options at the **[edit chassis synchronization source]** hierarchy level.

**Related  
Documentation**

- [External Clock Synchronization Overview for ACX Series Routers on page 219](#)
- [Configuring External Clock Synchronization for ACX Series Routers on page 221](#)
- *source*

## Configuring Precision Time Protocol Clocking

In a distributed network, you can configure Precision Time Protocol (PTP) master and slave clocks to help synchronize the timing across the network. The synchronization is achieved through packets that are transmitted and received in a session between the master clock and the slave clock or clock client.

To configure Precision Time Protocol (PTP) options:

1. In configuration mode, go to the **[edit protocols ptp]** hierarchy level.

```

[edit]
user@host# edit protocols ptp

```

2. Specify the clock as a boundary or ordinary clock. The **boundary** option signifies that the clock can be both a master clock and a slave clock. The **ordinary** option signifies that the clock is a slave clock.

```

[edit protocols ptp]
user@host# set clock-mode (boundary | ordinary)

```

3. (Optional) Configure the PTP domain with values from 0 through 127. The default value is 0.

```
[edit protocols ptp]
user@host# set domain domain-value
```

4. (Optional) Specify the DiffServ code point (DSCP) value (0 through 63) for all PTP IPv4 packets originated by the router. The default value is 56.

```
[edit protocols ptp]
user@host# set ipv4-dscp number
```

5. Specify the master clock parameters.

```
[edit protocols ptp]
user@host# set master
```

For details about configuring the master clock parameters, see [“Configuring a PTP Master Boundary Clock” on page 229](#).

6. (Optional) Configure the priority value of the clock (0 through 255). This value is used in selecting the best master clock. The *priority1-value* is advertised in the master clock's announce message to clock clients. The default value is 128.

```
[edit protocols ptp]
user@host# set priority1 priority1-value
```

7. (Optional) Configure the tie-breaker in selecting the best master clock (0 through 255). The *priority2* value differentiates and prioritizes the master clock to avoid confusion when the *priority1-value* is the same for different master clocks in a network. The default value is 128.

```
[edit protocols ptp]
user@host# set priority2 priority2-value
```

8. Specify the PTP slave clock parameters.

```
[edit protocols ptp]
user@host# set slave
```

For information about configuring the slave clock options, see [“Configuring a PTP Slave Clock” on page 231](#).

9. (Optional) Enable unicast negotiation. Unicast negotiation is a method by which the announce, synchronization, and delay response packet rates are negotiated between the master clock and the clock client before a PTP session is established.

```
[edit protocols ptp]
user@host# set unicast-negotiation
```



**NOTE:** Unicast negotiation, when enabled, does not allow you to commit packet rate–related configurations.

---

**Related  
Documentation**

- [IEEE 1588v2 PTP Boundary Clock Overview on page 25](#)
- [Configuring a PTP Master Boundary Clock on page 229](#)

- [Configuring a PTP Slave Clock on page 231](#)
- [Example: Configuring a PTP Boundary Clock With Unicast Negotiation on page 237](#)
- [Example: Configuring a PTP Boundary Clock on page 234](#)
- [\[edit protocols ptp\] Hierarchy Level](#)

## Configuring a PTP Master Boundary Clock

On an ACX Series router, a Precision Time Protocol (PTP) master boundary clock sends PTP messages to the clients (ordinary and boundary) so that they can establish their relative time offset from this master's clock or clock reference. You cannot configure an ordinary master clock on an ACX Series Router. The master boundary clock synchronizes time through a boundary slave port. To configure a master boundary clock, you must include the **boundary** statement at the [\[edit protocols ptp clock-mode\]](#) hierarchy level and at least one master with the **master** statement and at least one slave with the **slave** statement at the [\[edit protocols ptp\]](#) hierarchy level.

To configure a PTP master boundary clock, complete the following tasks:

- [Configuring the PTP Master Boundary Clock Parameters on page 229](#)
- [Configuring a PTP Master Boundary Clock Interface on page 230](#)

### Configuring the PTP Master Boundary Clock Parameters

To configure the parameters of a PTP master boundary clock:

1. Configure the clock mode.

```
[edit protocols ptp]
user@host# set clock-mode boundary
```

2. Configure the master clock.

```
[edit protocols ptp]
user@host# edit master
```

3. (Optional) Specify the log mean interval between announce messages—from 0 through 4. By default, one announce message is sent every two seconds. This configuration is used for manual clock clients. The master boundary clock sends announce messages to manual clock clients as specified in the announce-interval value.

```
[edit protocols ptp master]
user@host# set announce-interval announce-interval-value
```

4. Configure the interface on which to respond to downstream PTP clients and slaves.

```
[edit protocols ptp master]
user@host# edit interface interface-name
```

For details about configuring the parameters for the master boundary clock interface, see [“Configuring a PTP Master Boundary Clock Interface” on page 230](#)

5. (Optional) Specify the maximum log mean interval between announce messages—from 0 through 4. The default value is 4.

```
[edit protocols ptp master]
user@host# set max-announce-interval max-announce-interval-value
```

6. (Optional) Specify the maximum log mean interval between delay-response messages—from -7 through 4. The default value is 4.

```
[edit protocols ptp master]
user@host# set max-delay-response-interval max-delay-response-interval-value
```

7. (Optional) Specify the maximum log mean interval between synchronization messages—from -7 through 4. The default value is 4.

```
[edit protocols ptp master]
user@host# set max-sync-interval max-sync-interval-value
```

8. (Optional) Specify the minimum log mean interval between announce messages—from -0 through 4. The default value is 0.

```
[edit protocols ptp master]
user@host# set min-announce-interval min-announce-interval
```

9. (Optional) Specify the minimum log mean interval between delay-response messages—from -7 through 4. The default value is -7.

```
[edit protocols ptp master]
user@host# set min-delay-response-interval min-delay-response-interval
```

10. (Optional) Specify the minimum log mean interval between synchronization messages—from -7 through 4. The default value is -7.

```
[edit protocols ptp master]
user@host# set min-sync-interval min-sync-interval-value
```

11. (Optional) Specify the log mean interval between synchronization messages—from -7 through 4. The default value is -6. This configuration is used for manual clock clients. The master boundary clock sends synchronization messages to manual clock clients as specified in the *sync-interval-value* statement.

```
[edit protocols ptp master]
user@host# set sync-interval sync-interval-value
```

After you have configured the PTP master boundary clock parameters, enter the **commit** command from configuration mode. To complete the configuration of the master boundary clock, complete [“Configuring a PTP Master Boundary Clock Interface” on page 230](#).

## Configuring a PTP Master Boundary Clock Interface

After you have configured the master boundary clock parameters, complete the configuration of the master boundary clock by configuring an interface to act in the role of the master clock.

To configure a PTP master boundary clock interface:

1. Configure the interface on which to respond to downstream PTP slaves or clients.

```
[edit protocols ptp master]
user@host# edit interface interface-name
```



**NOTE:** For the configuration to work, the interface you specify must be configured at the [edit interfaces *interface-name*] hierarchy level.

2. On this interface, configure downstream PTP clients.

```
[edit protocols ptp master interface interface-name]
user@host# edit unicast-mode
```

3. Configure the IP address of the remote PTP host, or configure a subnet mask so that any host belonging to that subnet can join the master clock. You can configure up to 512 clients for each master boundary clock.

```
[edit protocols ptp master interface interface-name unicast-mode]
user@host# edit clock-client ip-address
```



**NOTE:** You can configure the maximum number of clients (512) in the following combination:

- Automatic clients 256.
- Manual and secure clients 256—Any combination of manual and secure clients is allowed as long as the combined total amounts to 256.

4. Configure the IP address of the interface acting as the local PTP master.

```
[edit protocols ptp master interface interface-name unicast-mode clock-client
ip-address]
user@host# set local-ip-address local-ip-address
```

5. (Optional) When the **unicast-negotiation** statement is configured at the [edit protocols **ptp**] hierarchy level, configure a clock client to immediately receive announce and synchronization messages from the master boundary clock without unicast negotiation.

```
[edit protocols ptp master interface interface-name unicast-mode clock-client ip-address
local-ip-address local-ip-address]
user@host# set manual
```

6. Specify the encapsulation type for PTP packet transport—IPv4. This statement is mandatory.

```
[edit protocols ptp master interface interface-name unicast-mode]
user@host# set transport ipv4
```

After you have configured the PTP master clock interface, enter the **commit** command from configuration mode.

## Configuring a PTP Slave Clock

The slave port that you configure can be a Precision Time Protocol (PTP) boundary or ordinary clock, depending on the configuration of the **clock-mode** statement at the [edit protocols **ptp**] hierarchy level. An ordinary or boundary slave clock performs frequency

and phase recovery based on received and requested timestamps from a master clock—a grandmaster or a boundary clock master.

To configure a PTP slave clock, complete the following tasks:

- [Configuring the PTP Slave Clock Parameters on page 232](#)
- [Configuring the PTP Slave Clock Interface on page 233](#)

## Configuring the PTP Slave Clock Parameters

To configure a PTP slave clock.

1. Configure the clock mode:

```
[edit protocols ptp]
user@host# set clock-mode (boundary | ordinary)
```

2. Configure the slave clock.

```
[edit protocols ptp]
user@host# edit slave
```

3. (Optional) Specify the rate of announce messages that a PTP slave requests from the master during a unicast-negotiation session—from 0 through 4. The default value is 1.

```
[edit protocols ptp slave]
user@host# set announce-interval announce-interval-value
```



**NOTE:** The configuration of the `announce-interval` statement is effective only when the `unicast-negotiation` statement is also configured at the `[edit protocols ptp]` hierarchy level.

4. (Optional) Specify the number of announce messages that a slave—configured on an ACX Series router—must miss before an announce timeout is declared—from 2 through 10. The default value is 3.

```
[edit protocols ptp slave]
user@host# set announce-timeout announce-timeout-value
```

5. (Optional) Override the default PTP clock class to Ethernet Synchronization Message Channel (ESMC) mapping and specify the quality level for the PTP timing source.

```
[edit protocols ptp slave]
user@host# set clock-class-to-quality-level-mapping quality-level (prc | prs | sec |
smc | ssu-a | ssu-b | st2 | st3 | st3e | st4 | stu | tnc)
```

6. (Optional) Enable retrieval of ESMC information from the PTP clock class.

```
[edit protocols ptp slave]
user@host# set convert-clock-class-to-quality-level
```

7. (Optional) Specify the logarithmic mean interval in seconds between the delay request messages sent by the slave to the master—from -6 through 3. The default value is 0.

```
[edit protocols ptp slave]
```



```
user@host# set delay-request delay-request-value
```

8. (Optional) Specify the grant duration value. When unicast negotiation is enabled, the local PTP slave requests announce, synchronization, and delay-response messages from the master. In each request, the slave asks for the packets to be sent at a specified rate and the slave provides a duration for which the rate is valid. The grant-duration value is specified in seconds. The default grant duration is 300 seconds.

```
[edit protocols ptp slave]
user@host# set grant-duration interval
```

9. Configure the interface for the slave.

```
[edit protocols ptp slave]
user@host# edit interface interface-name
```

For details about configuring the slave interface, see [“Configuring the PTP Slave Clock Interface” on page 233](#).

10. (Optional) Configure the log mean interval between synchronization messages—from –6 through –3. The default value is –6 or 64 synchronous interval messages sent per second

```
[edit protocols ptp slave]
user@host# set sync-interval sync-interval-value
```

After you have configured the PTP slave clock parameters, enter the **commit** command from configuration mode. To complete the configuration of the slave clock, complete [“Configuring the PTP Slave Clock Interface” on page 233](#).

## Configuring the PTP Slave Clock Interface

The slave clock interface responds to the upstream PTP master clock.

To configure the PTP slave clock interface:

1. Configure the interface for the slave clock.

```
[edit protocols ptp slave]
user@host# edit interface interface-name
```

2. Configure the upstream unicast PTP master clock source parameters.

```
[edit protocols ptp slave interface interface-name]
user@host# edit unicast-mode
```

3. Configure the IP address of the master, which acts as a source of time for this slave.

```
[edit protocols ptp slave interface interface-name unicast-mode]
user@host# edit clock-source ip-address
```



**NOTE:** To configure additional master clock sources for the slave, include the **clock-source** statement up to four times. However, synchronization is to only one master clock.

4. Specify the IP address of the interface acting as the local PTP slave port.

```
[edit protocols ptp slave interface interface-name unicast-mode clock-source ip-address]
```

```
user@host# set local-ip-address local-ip-address
```



**NOTE:** For the configuration to work, the interface you specify must be configured with this IP address at the [edit interfaces *interface-name*] hierarchy level.

5. Configure the encapsulation type for PTP packet transport. This statement is mandatory.

```
[edit protocols ptp slave interface interface-name unicast-mode]
user@host# set transport ipv4
```

After you have configured the PTP slave clock interface, enter the **commit** command from configuration mode.

---

## G.703 2.048MHz Signal Type for BITS Interfaces Overview

The ITU-T Recommendation G.703, *Physical/electrical characteristics of hierarchical digital interfaces*, is a standard method for encoding clock and data signals into a single signal. This signal is then used to synchronize various data communications devices, such as switches, routers and multiplexers at a data rate of 2.048 MHz. Both directions of the G.703 signal must use the same signal type. To configure signal type parameters for a building-integrated timing supply (BITS) interface, include the following statements at the [edit chassis synchronization ] hierarchy level:

```
interfaces bits {
  signal-type (2048khz | e1 | t1);
  e1-options {
    framing (g704 | g704-no-crc4);
  }
  t1-options {
    framing (esf | sf);
  }
}
```

- Related Documentation**
- [synchronization \(ACX Series\)](#)
  - [show chassis synchronization on page 597](#)

---

## Example: Configuring a PTP Boundary Clock

This example shows how to configure a Precision Timing Protocol (PTP) boundary clock. A boundary clock must include the configuration of at least one master and at least one slave. The boundary master receives time from a remote master through the slave, and in turn passes that time on to clock clients, which are in a slave relationship to the

boundary master. In this example, you configure a master, slave, clock source, and clock client.

- [Requirements on page 235](#)
- [Overview on page 235](#)
- [Configuration on page 235](#)

## Requirements

This example uses the following hardware and software components:

- An ACX Series router
- Junos OS Release 12.3 or later

## Overview

In this example, the slave clock or clock client immediately receives announce and synchronization packets after completion of the configuration.

## Configuration

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

```
set protocols ptp clock-mode boundary
set protocols ptp slave interface ge-1/3/9.0 unicast-mode transport ipv4
set protocols ptp slave interface ge-1/3/9.0 unicast-mode clock-source 192.1.1.2
  local-ip-address 192.1.1.1
set protocols ptp master interface ge-1/0/0.0 unicast-mode transport ipv4
set protocols ptp master interface ge-1/0/0.0 unicast-mode clock-client 20.20.20.2/32
  local-ip-address 20.20.20.1
```

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

To configure a boundary clock without unicast negotiation:

1. Configure the clock mode.  

```
[edit protocols ptp]
user@host# set clock-mode boundary
```
2. Configure the slave interface.  

```
[edit protocols ptp]
user@host# edit slave interface ge-1/3/9.0
```
3. Configure the upstream unicast PTP master clock source parameters.  

```
[edit protocols ptp slave interface ge-1/3/9.0]
user@host# edit unicast-mode
```

4. Configure the encapsulation type for PTP packet transport.  

```
[edit protocols ptp slave interface ge-1/3/9.0 unicast-mode ]
user@host# set transport ipv4
```
5. Configure the IP address of the master interface.  

```
[edit protocols ptp]
user@host# edit master interface ge-1/0/0.0
```
6. Specify the IP address and subnet of the remote PTP host, and the IP address of the local PTP master interface.  

```
[edit protocols ptp master interface ge-1/0/0.0 ]
user@host# edit unicast-mode
user@host# set protocols ptp master interface ge-1/0/0.0 unicast-mode clock-client
20.20.20.2/32 local-ip-address 20.20.20.1
```



**NOTE:** For the configuration to work, the master interface you specify must be configured with this IP address at the `[edit interfaces interface-name]` hierarchy level.

7. Configure the encapsulation type for PTP packet transport.  

```
[edit protocols ptp master interface ge-1/0/0.0 unicast-mode]
user@host# set transport ipv4
```

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

```
[edit protocols ptp]
user@host# show
clock-mode boundary;
slave {
  interface ge-1/3/9.0 {
    unicast-mode {
      transport ipv4;
      clock-source 192.1.1.2 local-ip-address 192.1.1.1;
    }
  }
}
master {
  interface ge-1/0/0.0 {
    unicast-mode {
      transport ipv4;
      clock-client 20.20.20.2/32 local-ip-address 20.20.20.1;
    }
  }
}
```

After you have configured the device, enter the **commit** command from configuration mode.

- Related Documentation**
- [Precision Time Protocol Overview](#)
  - [IEEE 1588v2 PTP Boundary Clock Overview on page 25](#)
  - [Configuring Precision Time Protocol Clocking on page 227](#)
  - [Configuring a PTP Master Boundary Clock on page 229](#)
  - [Configuring a PTP Slave Clock on page 231](#)
  - [Example: Configuring a PTP Boundary Clock With Unicast Negotiation on page 237](#)
  - [\[edit protocols ptp\] Hierarchy Level](#)

## Example: Configuring a PTP Boundary Clock With Unicast Negotiation

This example shows how to configure a boundary clock with unicast negotiation turned on and a mixture of manual, secure and automatic clock clients, which have a slave relationship to the master boundary clock. The unicast negotiation applies to clock sources, which are configured on the slave or clock client. Clock clients, configured on the master, are not affected by unicast negotiation.

Note that in this example, unicast-negotiation is applicable only to clock-sources. For clock clients the statement **unicast-negotiation** at the **[edit protocols ptp]** hierarchy level is not effective.

- [Requirements on page 237](#)
- [Overview on page 237](#)
- [Configuration on page 238](#)

## Requirements

This example uses the following hardware and software components:

- An ACX Series router
- Junos OS Release 12.3 or later

## Overview

A PTP slave clock or clock client can join a master clock with and without unicast negotiation. With unicast negotiation, the announce, synchronization, and delay response packet rates are negotiated between the master and the slave or client before a PTP session is established. Without unicast negotiation and after it is configured, the slave or client immediately receives announce and synchronization packets.

A clock client is the remote PTP host, which receives time from the PTP master. The following clock clients are configured in this example:

- Secure client—A secure client is configured with an exact IP address, after which, it joins a master clock through unicast negotiation. In this example, the clock client **clock-client 117.117.117.117/32 local-ip-address 109.109.109.53** is a secure client, which

means that only this specific host from the subnet can join the master clock through a unicast negotiation .

- Automatic client—An automatic client is configured with an IP address, which includes a subnet mask, indicating that any PTP host belonging to that subnet, can join the master clock through a unicast negotiation. In this example, the clock client **clock-client 109.109.109.0/24 local-ip-address 109.109.109.53** is an automatic client. Additionally, this automatic client is configured on the same master clock interface—**109.109.109.53**—as the secure client.
- Manual client—A manual client does *not* use unicast negotiation to join the master clock. The **manual** statement overrides the **unicast-negotiation** statement configured at the **[edit protocols ptp]** hierarchy level. As soon as you configure a manual client, it starts receiving announce and synchronization packets. In this example, the clock client **clock-client 7.7.7.7 local-ip-address 7.7.7.53 manual** is the manual client and is configured on a second master clock interface.

## Configuration

A boundary clock must include the configuration of at least one master and at least one slave. The boundary master receives time from a remote master through the slave, and in turn passes that time on to clock clients, which are in a slave relationship to the boundary master. In this example, you configure a boundary slave, two Precision Time Protocol (PTP) boundary masters with three different kinds of clock clients—automatic, manual, and secure. Two of the clock clients are configured on the same boundary master.

### CLI Quick Configuration

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

```
set protocols ptp clock-mode boundary
set protocols ptp unicast-negotiation
set protocols ptp slave interface ge-0/1/0.0 unicast-mode transport ipv4
set protocols ptp slave interface ge-0/1/0.0 unicast-mode clock-source 10.10.10.50
  local-ip-address 10.10.10.53
set protocols ptp master interface ge-0/1/3.0 unicast-mode transport ipv4
set protocols ptp master interface ge-0/1/3.0 unicast-mode clock-client 117.117.117.117/32
  local-ip-address 109.109.109.53
set protocols ptp master interface ge-0/1/3.0 unicast-mode clock-client 109.109.109.0/24
  local-ip-address 109.109.109.53
set protocols ptp master interface ge-0/1/5.0 unicast-mode transport ipv4
set protocols ptp master interface ge-0/1/5.0 unicast-mode clock-client 7.7.7.7/32
  local-ip-address 7.7.7.53 manual
```

### Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the *CLI User Guide*.

To configure a boundary clock with unicast negotiation:

1. Configure the clock mode.  
**[edit protocols ptp]**

- ```

user@host# set clock-mode boundary

```
2. Enable unicast negotiation.
 

```

[edit protocols ptp]
user@host# set unicast-negotiation

```
  3. Configure the local slave interface from which the boundary master receives time and passes it on to the configured clock clients.
 

```

[edit protocols ptp]
user@host# edit slave interface ge-0/1/0.0

```
  4. Configure the upstream unicast PTP master clock source parameters.
 

```

[edit protocols ptp slave interface ge-0/1/0.0]
user@host# edit unicast-mode

```
  5. Configure the encapsulation type for PTP packet transport.
 

```

[edit protocols ptp slave interface ge-0/1/0.0 unicast-mode ]
user@host# set transport ipv4

```
  6. Configure the PTP master parameters by specifying the IP address of the PTP master clock and the IP address of the local interface.
 

```

[edit protocols ptp slave interface ge-0/1/0.0 unicast-mode ]
user@host# set clock-source 10.10.10.50 local-ip-address 10.10.10.53

```
  7. Configure the first master interface in this example.
 

```

[edit protocols ptp]
user@host# edit master interface ge-0/1/3.0

```
  8. On the first master interface, configure the downstream PTP clock clients.
 

```

[edit protocols ptp master interface ge-0/1/3.0 ]
user@host# edit unicast-mode

```
  9. On the first master interface, configure the encapsulation type for PTP packet transport.
 

```

[edit protocols ptp master interface ge-0/1/3.0 unicast-mode]
user@host# set transport ipv4

```
  10. On the first master interface, configure the PTP master parameters by specifying the exact IP address of the remote PTP host and the IP address of the local PTP master interface.
 

```

[edit protocols ptp master interface ge-0/1/3.0 unicast-mode]
user@host# set clock-client 117.117.117.117 local-ip-address 109.109.109.53

```
  11. On the first master interface, configure a second PTP master by specifying the IP address and subnet of the second remote PTP host and the IP address of the local PTP master interface.
 

```

[edit protocols ptp master interface ge-0/1/3.0 unicast-mode]
user@host# set clock-client 109.109.109.0/24 local-ip-address 109.109.109.53

```
  12. Configure the second master interface with the following parameters: the encapsulation type, the downstream PTP host, the IP address of the local PTP

master interface, and the **manual** statement so that this client does not use unicast negotiation.

```
[edit protocols ptp master]
user@host# set interface ge-0/1/5.0 unicast-mode transport ipv4
user@host# set interface ge-0/1/5.0 unicast-mode clock-client 7.7.7.7
local-ip-address 7.7.7.53 manual
```

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

```
[edit protocols ptp]
user@host# show
clock-mode boundary;
unicast-negotiation;
slave {
  interface ge-0/1/0.0 {
    unicast-mode {
      transport ipv4;
      clock-source 10.10.10.50 local-ip-address 10.10.10.53;
    }
  }
}
master {
  interface ge-0/1/3.0 {
    unicast-mode {
      transport ipv4;
      clock-client 117.117.117.117/32 local-ip-address 109.109.109.53;
      clock-client 109.109.109.0/24 local-ip-address 109.109.109.53;
    }
  }
  interface ge-0/1/5.0 {
    unicast-mode {
      transport ipv4;
      clock-client 7.7.7.7/32 local-ip-address 7.7.7.53 {
        manual;
      }
    }
  }
}
```

After you have configured the device, enter the **commit** command from configuration mode.

**Related Documentation**

- [Precision Time Protocol Overview](#)
- [IEEE 1588v2 PTP Boundary Clock Overview on page 25](#)
- [Configuring Precision Time Protocol Clocking on page 227](#)
- [Configuring a PTP Master Boundary Clock on page 229](#)
- [Configuring a PTP Slave Clock on page 231](#)
- [Example: Configuring a PTP Boundary Clock on page 234](#)
- [\[edit protocols ptp\] Hierarchy Level](#)



## Example: Configuring an Ordinary Slave Clock With Unicast-Negotiation

This example shows the base configuration of a Precision Time Protocol (PTP) ordinary slave clock *with* unicast-negotiation on an ACX Series router.

- [Requirements on page 241](#)
- [Overview on page 241](#)
- [Configuration on page 241](#)

### Requirements

This example uses the following hardware and software components:

- One ACX Series router
- Junos OS Release 12.2 or later

### Overview

In this configuration, the ordinary slave clock uses unicast-negotiation and compensates for some network asymmetry.



**NOTE:** The values in this example are for illustration purposes only. You can set the values for each parameter according to your requirements.

### Configuration

To configure an ordinary slave clock with unicast-negotiation, perform these tasks:

- [Configuring an ordinary slave clock with unicast-negotiation on page 241](#)
- [Results on page 242](#)

#### CLI Quick Configuration

```
set ptp clock-mode ordinary
set ptp domain 110
set ptp unicast-negotiation
set ptp slave delay-request -6
set ptp slave announce-timeout 2
set ptp slave announce-interval 3
set ptp slave sync-interval -5
set ptp slave grant-duration 7200
set ptp slave interface ge-0/1/0.0 unicast-mode transport ipv4
set ptp slave interface ge-0/1/0.0 unicast-mode clock-source 10.10.10.50
local-ip-address 10.10.10.75 asymmetry -4500
```

#### Configuring an ordinary slave clock with unicast-negotiation

#### Step-by-Step Procedure

1. Configure the clock mode, domain, and unicast-negotiation:
 

```
[edit protocols ptp]
user@host# set clock-mode ordinary domain 110 unicast-negotiation
```

2. Configure the announce timeout and the announce interval:  

```
[edit protocols ptp]
user@host# set slave announce-timeout 2 announce-interval 3
```
3. Configure the synchronization interval and the grant duration:  

```
[edit protocols ptp]
user@host# set slave sync-interval -5 grant-duration 7200
```
4. Configure the slave interface:  

```
[edit protocols ptp]
user@host# edit slave interface ge-0/1/0.0
```
5. Configure the unicast transport mode:  

```
[edit protocols ptp slave interface ge-0/1/0.0]
user@host# set unicast-mode transport ipv4
```
6. Configure the clock source:  

```
[edit protocols ptp slave interface ge-0/1/0.0]
user@host# edit unicast-mode clock-source 10.10.10.50 local-ip-address 10.10.10.75
```
7. Configure the asymmetric path:  

```
[edit protocols ptp slave interface ge-0/1/0.0 unicast-mode clock-source 10.10.10.50
local-ip-address 10.10.10.75]
user@host# set asymmetry -4500
```
8. Verify the configuration:  

```
[edit protocols ptp slave interface ge-0/1/0.0 unicast-mode clock-source 10.10.10.50
local-ip-address 10.10.10.75]
user@host# top
[edit]
user@host# edit protocols
[edit protocols]
user@host# show
```

See the output for the **show** command in the Results section.

---

## Results

The following output shows the configuration of unicast-negotiation and compensation for some network asymmetry. The **unicast-negotiation** statement includes the parameters for the delay request, announce interval, synchronization interval, and grant duration values. Interface **ge-0/1/0.0** is configured to compensate for an asymmetric path to the PTP master by subtracting 4.5 microseconds from the slave-to-master direction delay calculations.

```
[edit protocols]
user@host# show
ptp {
  clock-mode ordinary;
  domain 110;
  unicast-negotiation;
  slave {
    delay-request -6;
    announce-timeout 2;
```

```

    announce-interval 3;
    sync-interval -5;
    grant-duration 7200;
    interface ge-0/1/0.0 {
        unicast-mode {
            transport ipv4;
            clock-source 10.10.10.50 local-ip-address 10.10.10.75 {
                asymmetry -4500;
            }
        }
    }
}

```

#### Related Documentation

- [IEEE 1588v2 Precision Timing Protocol \(PTP\) on ACX Series Universal Access Routers on page 28](#)
- *slave*
- *unicast-mode*

### Example: Configuring an Ordinary Slave Clock Without Unicast-Negotiation

This example shows the base configuration of a Precision Time Protocol (PTP) ordinary slave clock *without* unicast-negotiation on an ACX Series router.

- [Requirements on page 243](#)
- [Overview on page 243](#)
- [Configuration on page 244](#)

#### Requirements

This example uses the following hardware and software components:

- One ACX Series router
- Junos OS Release 12.2 or later

#### Overview

In this configuration, unicast-negotiation is *not* configured, so the PTP slave has no control over the rate of the negotiation. The PTP master (a Brilliant Grand Master or an MX Series router) must be configured with the parameters of the PTP slave, such as announce, synchronization, and delay-response packets to control the rate of the negotiation.



**NOTE:** The values in this example are for illustration purposes only. You can set the values for each parameter according to your requirements.

## Configuration

To configure an ordinary slave clock without unicast-negotiation, perform these tasks:

- [Configuring an ordinary slave clock without unicast-negotiation on page 244](#)
- [Results on page 245](#)

|                                    |                                                                                                                                                                                                                                                                    |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CLI Quick<br/>Configuration</b> | <pre>set protocols ptp clock-mode ordinary set protocols ptp ipv4-dscp 46 set protocols ptp slave interface ge-0/2/0.0 unicast-mode transport ipv4 set protocols ptp slave interface ge-0/2/0.0 unicast-mode clock-source 12.1.1.4 local-ip-address 12.1.1.5</pre> |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

---

### Configuring an ordinary slave clock without unicast-negotiation

---

- |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Step-by-Step<br/>Procedure</b> | <ol style="list-style-type: none"><li>1. Configure the clock mode:<br/><pre>[edit protocols ptp] user@host# set clock-mode ordinary</pre></li><li>2. Configure the Differentiated Services code point (DSCP) value for all PTP IPv4 packets originated by the router:<br/><pre>[edit protocols ptp] user@host# set ipv4-dscp 46</pre></li><li>3. Configure the slave interface:<br/><pre>[edit protocols ptp] user@host# edit slave interface ge-0/2/0.0</pre></li><li>4. Configure the unicast transport mode:<br/><pre>[edit protocols ptp slave interface ge-0/2/0.0] user@host# set unicast-mode transport ipv4</pre></li><li>5. Configure the clock source:<br/><pre>[edit protocols ptp slave interface ge-0/2/0.0] user@host# unicast-mode clock-source 12.1.1.4 local-ip-address 12.1.1.5</pre></li><li>6. Verify the configuration:<br/><pre>[edit protocols ptp slave interface ge-0/2/0.0] user@host# top [edit] user@host# edit protocols [edit protocols] user@host# show</pre></li></ol> |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

See the output for the **show** command in the Results section.

## Results

In this example, the PTP slave on the local interface **ge-0/2/0** is assigned a local IP address of **12.1.1.5**. Unicast-negotiation is not configured so the PTP master must be explicitly configured with the details of the PTP slave (**12.1.1.5**).

```
[edit protocols]
user@host# show
ptp {
    clock-mode ordinary;
    ipv4-dscp 46;
    slave {
        interface ge-0/2/0.0 {
            unicast-mode {
                transport ipv4;
                clock-source 12.1.1.4 local-ip-address 12.1.1.5;
            }
        }
    }
}
```

### Related Documentation

- [IEEE 1588v2 Precision Timing Protocol \(PTP\) on ACX Series Universal Access Routers on page 28](#)
- *slave*
- *unicast-mode*

## Example: Configuring PoE on ACX2000 Routers

Power over Ethernet (PoE) ports supply electric power over the same ports that are used to connect network devices. These ports allow you to plug in devices that need both network connectivity and electric power, such as voice over IP (VoIP) phones, wireless access points, and IP cameras.

This example shows how to configure PoE to deliver power up to 65 W on ACX2000 interfaces:

- [Requirements on page 245](#)
- [Overview on page 246](#)
- [Configuration on page 246](#)
- [Verification on page 248](#)

## Requirements

This example uses the following software and hardware components:

- Junos OS Release 12.2 or later for ACX Series routers
- An ACX2000 router that supports PoE

Before you configure PoE, be sure you have:

- Performed the initial router configuration. See “ACX Series Autoinstallation Overview” on page 45, “Verifying Autoinstallation on ACX Series Universal Access Routers” on page 49, and “Boot Sequence (ACX Series Routers)” on page 265 for details.

## Overview

This example consists of a router that has eight ports. Only two ports—ge-0/1/3 and ge-0/1/7—support PoE, which means they provide both network connectivity and electric power for powered devices such as VoIP telephones, wireless access points, and IP security cameras that require power up to 65 W. The remaining six ports provide only network connectivity. You use the standard ports to connect devices that have their own power sources, such as desktop and laptop computers, printers, and servers.

Table 26 on page 246 details the topology used in this configuration example.

**Table 26: Components of the PoE Configuration**

| Property                                                                                                  | Settings                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hardware                                                                                                  | ACX2000 router with 8 Gigabit Ethernet ports: Two PoE interfaces (ge-0/1/3 and ge-0/1/7) and 6 non-PoE interfaces (ge-0/1/0, ge-0/1/1, ge-0/1/2, ge-0/1/4, ge-0/1/5, ge-0/1/6). |
| VLAN name                                                                                                 | default                                                                                                                                                                         |
| Connection to a wireless access point (requires PoE)                                                      | ge-0/1/7                                                                                                                                                                        |
| Power port priority                                                                                       | high                                                                                                                                                                            |
| Maximum power available to PoE port                                                                       | 65 W                                                                                                                                                                            |
| PoE management mode                                                                                       | high-power                                                                                                                                                                      |
| Direct connections to desktop PCs, file servers, integrated printer/fax/copier machines (no PoE required) | ge-0/1/0 through ge-0/1/2                                                                                                                                                       |
| Unused ports (for future expansion)                                                                       | ge-0/1/4 through ge-0/1/6                                                                                                                                                       |

## Configuration

To configure PoE on an ACX2000 router:

### CLI Quick Configuration

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

```
set poe management high-power guard-band 19
set poe interface ge-0/1/3 priority high maximum-power 65 telemetries
```

**Step-by-Step Procedure** The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the *CLI User Guide*.

To configure PoE:

1. Set the PoE management mode to **high-power**.

```
[edit]
user@host# set poe management high-power
```



**NOTE:**

- Set the PoE management mode to **high-power** only when the power requirement is more than 32 W and up to 65 W. If the power requirement is less than or equal to 32 W, then you do not need to set the PoE management mode to **high-power**.
- The default management mode is **static**. In this mode, the power sourcing equipment can deliver power up to 32 W.

2. Reserve power wattage in case of a spike in PoE consumption.

```
[edit]
user@host# set poe guard-band 19
```

3. Enable PoE.

```
[edit]
user@host# edit poe interface ge-0/1/3
```

4. Set the power port priority.

```
[edit poe interface ge-0/1/3]
user@host# set priority high
```

5. Set the maximum PoE power for a port.

```
[edit poe interface ge-0/1/3]
user@host# set maximum-power 65
```



**NOTE:** Set the maximum PoE power for a port only when the power requirement is more than 32 W and up to 65 W. If the power requirement is less than or equal to 32 W, then you do not need to configure the maximum PoE power.

6. Enable the logging of PoE power consumption.

```
[edit poe interface ge-0/1/3]
user@host# set telemetries
```

## Results

---

In configuration mode, confirm your configuration by entering the **show poe interface ge-0/1/3** command. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show poe interface ge-0/1/3
priority high;
maximum-power 65;
telemetries;
```

If you are done configuring the device, enter **commit** in configuration mode.

## Verification

To confirm that the configuration is working properly, perform these tasks:

- [Verifying the Status of PoE Interfaces on page 248](#)
- [Verifying the Telemetry Data \(History\) for the Specified Interface on page 248](#)
- [Verifying PoE Global Parameters on page 249](#)

### Verifying the Status of PoE Interfaces

---

**Purpose** Verify that the PoE interfaces are enabled and set to the desired priority settings.

**Action** In operational mode, enter the **show poe interface ge-0/1/3** command.

```
user@host> show poe interface ge-0/1/3
PoE interface status:
PoE interface           : ge-0/1/3
Administrative status   : Enabled
Operational status      : Powered-up
Power limit on the interface : 65 W
Priority                 : High
Power consumed          : 6.6 W
Class of power device    : 0
```

**Meaning** The **show poe interface ge-0/1/3** command lists PoE interfaces configured on the ACX2000 router, with their status, priority, power consumption, and class.

### Verifying the Telemetry Data (History) for the Specified Interface

---

**Purpose** Verify the PoE interface's power consumption over a specified period.

**Action** In operational mode, enter the **show poe telemetries interface** command.

For all records:

```
user@host> show poe telemetries interface ge-0/1/3 all
Interface  SI No    Timestamp                Power    Voltage
          1     Mon May 14 00:45:05 2012 14.2 W   53.9 V
          2     Mon May 14 00:44:04 2012 14.2 W   53.9 V
          3     Mon May 14 00:43:03 2012 14.2 W   53.9 V
```



For a specific number of records:

```
user@host> show poe telemetries interface ge-0/1/3 2
```

| Interface | Sl | No | Timestamp                | Power  | Voltage |
|-----------|----|----|--------------------------|--------|---------|
|           | 1  |    | Mon May 14 00:45:05 2012 | 14.2 W | 53.9 V  |
|           | 2  |    | Mon May 14 00:44:04 2012 | 14.2 W | 53.9 V  |

**Meaning** The telemetry status displays the power consumption history for the specified interface, provided telemetry has been configured for that interface.

### Verifying PoE Global Parameters

**Purpose** Verify global parameters such as guard band, power limit, and power consumption.

**Action** In operational mode, enter the **show poe controller** command.

```
user@host> show poe controller
```

| Controller<br>index | Maximum<br>power | Power<br>consumption | Guard<br>band | Management | Status | Lldp<br>Priority |
|---------------------|------------------|----------------------|---------------|------------|--------|------------------|
| 0                   | 130.0 W          | 14.2 W               | 0 W           | high-power | UP     |                  |

**Meaning** The **show poe controller** command lists the global parameters configured on the router.

**Related Documentation**

- [Understanding PoE on ACX Series Universal Access Routers on page 42](#)

## Example: Disabling a PoE Interface on ACX2000 Routers

This example shows how to disable PoE on all interfaces or on a specific interface.

- [Requirements on page 249](#)
- [Overview on page 249](#)
- [Configuration on page 250](#)
- [Verification on page 250](#)

### Requirements

Before you begin:

- Configure PoE on all interfaces. See [“Example: Configuring PoE on ACX2000 Routers” on page 245](#).

### Overview

In this example, you disable PoE on all interfaces and on a specific interface, which in this case is ge-0/1/3.

## Configuration

- Step-by-Step Procedure**
- Disable PoE on all interfaces.  
[edit]  
user@host# **set poe interface all disable**
  - Disable PoE on a specific interface.  
[edit]  
user@host# **set poe interface ge-0/1/3 disable**

## Verification

To verify the configuration is working properly, enter the **show poe interface** command.

user@host> **show poe interface**

| Interface | Admin status | Oper status | Max power | Priority | Power consumption | Class |
|-----------|--------------|-------------|-----------|----------|-------------------|-------|
| ge-0/1/3  | Disabled     | Disabled    | 32.0W     | Low      | 0.0W              | 0     |
| ge-0/1/7  | Disabled     | Disabled    | 32.0W     | Low      | 0.0W              | 0     |

user@host> **show poe interface ge-0/1/3**

PoE interface status:  
PoE interface : ge-0/1/3  
Administrative status : Disabled  
Operational status : Disabled  
Power limit on the interface : 32.0 W  
Priority : Low  
Power consumed : 0.0 W  
Class of power device : 0

- Related Documentation**
- [Understanding PoE on ACX Series Universal Access Routers on page 42](#)

# Upgrade and Installation

- [ACX Series Autoinstallation Overview on page 251](#)
- [Dual-Root Partitioning ACX Series Universal Access Routers Overview on page 253](#)
- [Understanding How the Primary Junos OS Image with Dual-Root Partitioning Recovers on the ACX Series Router on page 255](#)
- [Junos OS Release 12.2 or Later Upgrades with Dual-Root Partitioning on ACX Series Routers on page 256](#)
- [Installing Junos OS Using a USB Storage Device on ACX Series Routers on page 257](#)
- [Installing Junos OS Upgrades from a Remote Server on ACX Series Routers on page 258](#)
- [Example: Installing Junos OS and Configuring a Dual-Root Partition on ACX Series Routers Using the CLI on page 258](#)
- [Hardware Architecture Overview on page 261](#)
- [Hardware Overview \(ACX Series, M Series, MX Series, T Series, and TX Matrix Routers\) on page 262](#)
- [Boot Sequence \(ACX Series Routers\) on page 265](#)
- [Routing Engines and Storage Media Names \(ACX Series, M Series, MX Series, PTX Series, T Series, TX Matrix, TX Matrix Plus, and JCS 1200 Routers\) on page 265](#)
- [Upgrading Software Packages on page 267](#)
- [Load and Commit the Configuration File on page 269](#)
- [Checking the Current Configuration and Candidate Software Compatibility on page 270](#)
- [Understanding System Snapshot on an ACX Series Router on page 270](#)
- [Example: Taking a Snapshot of the Software and Configuration on page 272](#)

## ACX Series Autoinstallation Overview

---

Autoinstallation provides automatic configuration for a new router that you connect to the network and turn on, or for a router configured for autoinstallation. The autoinstallation process begins anytime a router is powered on and cannot locate a valid configuration file in the CompactFlash (CF) card. Typically, a configuration file is unavailable when a router is powered on for the first time, or if the configuration file is deleted from the CF card. The autoinstallation feature enables you to deploy multiple routers from a central location in the network.

For the autoinstallation process to work, you must store one or more host-specific or default configuration files on a configuration server in the network and have a service available—typically Dynamic Host Configuration Protocol (DHCP)—to assign an IP address to the router.

Autoinstallation takes place automatically when you connect an Ethernet on a new Juniper Networks router to the network and power on the router. To simplify the process, you can explicitly enable autoinstallation on a router and specify a configuration server, an autoinstallation interface, and a protocol for IP address acquisition.

This topic describes:

- [Supported Autoinstallation Interfaces and Protocols on page 252](#)
- [Typical Autoinstallation Process on a New Router on page 252](#)

## Supported Autoinstallation Interfaces and Protocols

Before autoinstallation on a router can take place, the router must acquire an IP address or a USB key. The protocol or protocols you choose for IP address acquisition determine the router interface to connect to the network for autoinstallation. The router detects the connected interface and requests an IP address with a protocol appropriate for the interface. Autoinstallation is supported over an Ethernet LAN interface. For IP address acquisition, the ACX Series router uses DHCP, BOOTP, or Reverse Address Resolution Protocol (RARP) on an Ethernet LAN interface.

If the server with the autoinstallation configuration file is not on the same LAN segment as the new router, or if a specific router is required by the network, you must configure an intermediate router directly attached to the new router, through which the new router can send HTTP, FTP, Trivial File Transfer Protocol (TFTP), BOOTP, and Domain Name System (DNS) requests. In this case, you specify the IP address of the intermediate router as the location to receive HTTP, FTP, or TFTP requests for autoinstallation.

## Typical Autoinstallation Process on a New Router

When a router is powered on for the first time, it performs the following autoinstallation tasks:

1. The new router sends out DHCP, BOOTP, or RARP requests on each connected interface simultaneously to obtain an IP address.

If a DHCP server responds, it provides the router with some or all of the following information:

- An IP address and subnet mask for the autoinstallation interface.
- The location of the TFTP (typically), Hypertext Transfer Protocol (HTTP), or FTP server on which the configuration file is stored.
- The name of the configuration file to be requested from the HTTP, FTP, or TFTP server.
- The IP address or hostname of the HTTP, FTP, or TFTP server.

If the DHCP server provides only the hostname, a DNS server must be available on the network to resolve the name to an IP address.

- The IP address of an intermediate router if the configuration server is on a different LAN segment from the new router.
2. After the new router acquires an IP address, the autoinstallation process on the router attempts to download a configuration file in the following ways:
    - a. If the configuration file is specified as a URL, the router fetches the configuration file from the URL by using HTTP, FTP, or TFTP depending on the protocol specified in the URL.
    - b. If the DHCP server specifies the host-specific configuration file (boot file) **hostname.conf**, the router uses that filename in the TFTP server request. (In the filename, **hostname** is the hostname of the new router.) The autoinstallation process on the new router makes three unicast TFTP requests for **hostname.conf**. If these attempts fail, the router broadcasts three requests to any available TFTP server for the file.
    - c. If the new router cannot locate **hostname.conf**, the autoinstallation process unicasts or broadcasts TFTP requests for a default router configuration file called **network.conf**, which contains hostname-to-IP address mapping information, to attempt to find its hostname.
    - d. If **network.conf** contains no hostname entry for the new router, the autoinstallation process sends out a DNS request and attempts to resolve the new router's IP address to a hostname.
    - e. If the new router can determine its hostname, it sends a TFTP request for the **hostname.conf** file.
    - f. If the new router is unable to map its IP address to a hostname, it sends TFTP requests for the default configuration file **router.conf**.
  3. After the new router locates a configuration file on a TFTP server, autoinstallation downloads the file, installs the file on the router, and commits the configuration.

#### Related Documentation

- [Before You Begin Autoinstallation on an ACX Series Universal Access Router on page 47](#)
- [Autoinstallation Configuration of ACX Series Universal Access Routers on page 48](#)
- [Verifying Autoinstallation on ACX Series Universal Access Routers on page 49](#)
- [USB Autoinstallation on ACX Series Routers on page 50](#)
- [autoinstallation](#)
- [show system autoinstallation status on page 944](#)

## Dual-Root Partitioning ACX Series Universal Access Routers Overview

Dual-root partitioning allows the ACX Series router to remain functional even if there is file system corruption and to facilitate easy recovery of the file system. Dual-root

partitioning means that the primary and backup Junos OS images are kept in two independently bootable root partitions. If the primary root partition becomes corrupted, the system can still boot from the backup Junos OS image located in the other root partition and remain fully functional.



**NOTE:** All ACX Series routers run with dual-root partitioning.

This section contains the following topics:

- [Boot Media and Boot Partition on the ACX Series Routers on page 254](#)
- [Important Features of the Dual-Root Partitioning Scheme on page 254](#)

## Boot Media and Boot Partition on the ACX Series Routers

With dual-root partitioning, the ACX Series router first tries to boot the Junos OS from the primary root partition and then from the backup root partition on the internal NAND flash. If both primary and backup root partitions of the internal NAND flash fail to boot, you must insert a USB storage media with a copy of the Junos OS from which to boot.

The following is the storage media available on the ACX Series router:

- USB media emergency boot device



**NOTE:** The USB media device is not dual-root partitioned.

- Dual, internal NAND flash device (first daOs1, then daOs2)

## Important Features of the Dual-Root Partitioning Scheme

The dual-root partitioning scheme has the following important features:

- The primary and backup copies of Junos OS images reside in separate partitions. The partition containing the backup copy is mounted only when required. With the single-root partitioning scheme, there is one root partition that contains both the primary and the backup Junos OS images.
- The **request system software add** command for a Junos OS package erases the contents of the other root partition. The contents of the other root partition will not be valid unless software installation is completed successfully.
- Add-on packages, such as **jais** or **jfirmware**, can be reinstalled as required after a new Junos OS image is installed.
- The **request system software rollback** command does not delete the current Junos OS image. It is possible to switch back to the image by issuing the **rollback** command again.

### Related Documentation

- [Understanding How the Primary Junos OS Image with Dual-Root Partitioning Recovers on the ACX Series Router on page 255](#)
- [Installing Junos OS Using a USB Storage Device on ACX Series Routers on page 257](#)

- [Installing Junos OS Upgrades from a Remote Server on ACX Series Routers on page 258](#)
- [Example: Installing Junos OS and Configuring a Dual-Root Partition on ACX Series Routers Using the CLI on page 258](#)

## Understanding How the Primary Junos OS Image with Dual-Root Partitioning Recovers on the ACX Series Router

If the ACX Series Universal Access router is unable to boot from the primary Junos OS image and boots up from the backup Junos OS image in the backup root partition, a message appears on the console at the time of login indicating that the device has booted from the backup Junos OS image.

```
login: user

Password:

*****

**   **

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

**   **

**  It is possible that the active copy of JUNOS failed to boot up **

**  properly, and so this device has booted from the backup copy.  **

**   **

**  Please re-install JUNOS to recover the active copy in case    **

**  it has been corrupted.   **

**   **

*****
```

Because the system is left with only one functional root partition, you should immediately restore the primary Junos OS image using one of the following methods:

- Install a new image using the CLI. When you install the new image, the new image is installed on only one partition—the alternate partition, meaning the router is now running two images. When you reboot, the router boots from the newly installed image, which becomes the primary image. So now there are two different images running on the router. Run the installation process again to update the other partition.
- Use a snapshot of the backup root partition by entering the **request system snapshot slice alternate** command. After the primary root partition is recovered using this method, the device will successfully boot from the primary root partition on the next reboot.

After the procedure, the primary root partition will contain the same version of Junos OS as the backup root partition.



**NOTE:** You can use the CLI command `request system snapshot slice alternate` to back up the currently running root file system (primary or secondary) to the other root partition on the system.

You can use this command to:

- Save an image of the primary root partition in the backup root partition when the system boots from the primary root partition.
- Save an image of the backup root partition in the primary root partition when the system boots from the backup root partition.



**WARNING:** The process of restoring the alternate root by using the CLI command `request system snapshot slice alternate` takes several minutes to complete. If you terminate the operation before completion, the alternate root might not have all required contents to function properly.

#### Related Documentation

- [Dual-Root Partitioning ACX Series Universal Access Routers Overview on page 253](#)
- [Installing Junos OS Using a USB Storage Device on ACX Series Routers on page 257](#)
- [Installing Junos OS Upgrades from a Remote Server on ACX Series Routers on page 258](#)
- [Example: Installing Junos OS and Configuring a Dual-Root Partition on ACX Series Routers Using the CLI on page 258](#)

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## Junos OS Release 12.2 or Later Upgrades with Dual-Root Partitioning on ACX Series Routers

---



**NOTE:** If you are upgrading to Junos OS Release 12.2 without transitioning to dual-root partitioning, use the conventional CLI installation method.

To format the media with dual-root partitioning while upgrading to Junos OS Release 12.2 or later, use either of the following installation methods:



**NOTE:** All ACX Series routers run with dual-root partitioning.

- Installation using a USB storage device. We recommend this method if console access to the system is available and the system can be physically accessed to plug in a USB storage device. See *Installing Junos OS Using a USB Storage Device on ACX Series Routers*.



- Installation from the CLI. We recommend this method only if console access is not available. This installation can be performed remotely. See *Installing Junos OS Upgrades from a Remote Server on ACX Series Routers*.

**Related  
Documentation**

- [Dual-Root Partitioning ACX Series Universal Access Routers Overview on page 253](#)
- [Understanding How the Primary Junos OS Image with Dual-Root Partitioning Recovers on the ACX Series Router on page 255](#)
- [Installing Junos OS Using a USB Storage Device on ACX Series Routers on page 257](#)
- [Installing Junos OS Upgrades from a Remote Server on ACX Series Routers on page 258](#)
- [Example: Installing Junos OS and Configuring a Dual-Root Partition on ACX Series Routers Using the CLI on page 258](#)

## Installing Junos OS Using a USB Storage Device on ACX Series Routers

To install the Junos OS image on ACX Series routers using a USB storage device, you must have access to the USB port physically and you must also have console access. Perform the following steps to install the Junos OS image:

1. Insert the USB storage device that has a valid installation image into the USB port.
2. Reboot the router by either pressing the power button on the chassis or switching off and turning on the power button behind the Routing Engine, or by entering the **request system reboot** command from the CLI. The system LED starts blinking in green.

On the console, a message is displayed stating that your flash memory device (NAND Flash device) will be formatted and you will lose all the data. You are prompted to confirm the formatting of the flash memory device.

3. Press **y** to confirm and proceed with the formatting process. The flash memory device is formatted and the image is installed on both the partitions.

After the installation is completed, a message is displayed on the console prompting you to eject the USB storage device and to press **Enter** to reboot the device.

4. After you remove the USB port and press **Enter**, the reboot begins. After the router is rebooted, the new Junos OS version is loaded and functional. The LED glows steadily in green.



**NOTE:** If an installation error occurs, the LEDs turn red. You must have console access to the router to troubleshoot an installation error.

**Related  
Documentation**

- [Dual-Root Partitioning ACX Series Universal Access Routers Overview on page 253](#)
- [Understanding How the Primary Junos OS Image with Dual-Root Partitioning Recovers on the ACX Series Router on page 255](#)
- [Junos OS Release 12.2 or Later Upgrades with Dual-Root Partitioning on ACX Series Routers on page 256](#)

- [Installing Junos OS Upgrades from a Remote Server on ACX Series Routers on page 258](#)
- [Example: Installing Junos OS and Configuring a Dual-Root Partition on ACX Series Routers Using the CLI on page 258](#)

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## Installing Junos OS Upgrades from a Remote Server on ACX Series Routers

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You can use the CLI to install Junos OS packages that are downloaded with FTP or HTTP from the specified location on internal media, such as the NAND Flash device.

Before you begin:

- Verify the available space on the NAND Flash device.
- Download the Junos OS package.

To install Junos OS upgrades from a remote server, enter the following command from operational mode:

```
user@host>request system software add junos-juniper-12.2R1.9-domestic.tgz no-copy  
no-validate reboot
```

The new Junos OS image is installed on the router and the device is rebooted.

### Related Documentation

- [Dual-Root Partitioning ACX Series Universal Access Routers Overview on page 253](#)
- [Understanding How the Primary Junos OS Image with Dual-Root Partitioning Recovers on the ACX Series Router on page 255](#)
- [Junos OS Release 12.2 or Later Upgrades with Dual-Root Partitioning on ACX Series Routers on page 256](#)
- [Installing Junos OS Using a USB Storage Device on ACX Series Routers on page 257](#)
- [Example: Installing Junos OS and Configuring a Dual-Root Partition on ACX Series Routers Using the CLI on page 258](#)

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## Example: Installing Junos OS and Configuring a Dual-Root Partition on ACX Series Routers Using the CLI

---

This example shows how to install Junos OS Release 12.2 or later and configure a dual-root partition on ACX Series routers with the CLI.

- [Requirements on page 258](#)
- [Overview on page 259](#)
- [Configuration on page 259](#)
- [Verification on page 261](#)

### Requirements

This example requires an ACX Series router. Before you begin, back up any important data.

## Overview

This example formats the NAND Flash device and installs the new Junos OS image on the media with dual-root partitioning. Install the Junos OS Release 12.2 or later image from the CLI by using the **request system software add** command. Partitions are automatically created on ACX Series routers and no option needs to be manually entered for creating partitions. This command copies the image to the device, and then reboots the device for installation. The device boots with the Release 12.2 or later image installed with the dual-root partitioning scheme. The formatting and installation process is scheduled to run on the next reboot. Therefore, we recommend that this option be used together with the **reboot** option.



**NOTE:** The process might take 15 to 20 minutes. The system is not accessible over the network during this time.



**WARNING:** Using the **request system software add** command erases the existing contents of the media. Only the current configuration is preserved. You should back up any important data before starting the process.



**NOTE:** Dual, internal NAND Flash device (first daOs1, then daOs2) and USB storage device are the storage media available on the ACX Series router. The USB storage device is not dual-root partitioned.

In this example, add the software package `junos-juniper-12.2R1.9-domestic.tgz` with the following options:

- **no-copy** option to install the software package. However, do not save the copies of the package files. You should include this option if you do not have enough space on the internal media to perform an upgrade that keeps a copy of the package on the device.
- **no-validate** option to bypass the compatibility check with the current configuration before installation starts.
- **reboot** option to reboot the device after installation is completed.

## Configuration

### CLI Quick Configuration

To install Junos OS Release 12.2 or later and configure dual-root partitioning on ACX Series routers, copy the following command, paste it in a text file, remove any line break, and then copy and paste the command into the CLI.

From operational mode, enter:

```
user@host>request system software add junos-juniper-12.2R1.9-domestic.tgz no-copy
no-validate reboot
```

**Step-by-Step Procedure**

To install Junos OS Release 12.2 or later and configure a dual-root partition:

1. Upgrade the ACX Series router to Junos OS Release 12.2 or later using the CLI. See [“Upgrading Software Packages” on page 267](#).
2. Install Junos OS Release 12.2 or later and configure the dual-root partition.

```
user@host>request system software add junos-juniper-12.2R1.9-domestic.tgz
no-copy no-validate reboot
Copying package junos-juniper-12.2R1.9-domestic.tgz to var/tmp/install
Rebooting ...
```

**Results**

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

Sample output on a system with dual-root partitioning that displays information about the root partition that is mounted (only one root partition is mounted at a point in time):

```
user@host> show system storage
```

| Filesystem                                           | Size | Used | Avail | Capacity | Mounted on          |
|------------------------------------------------------|------|------|-------|----------|---------------------|
| /dev/da0s1a                                          | 872M | 150M | 713M  | 17%      | /                   |
| devfs                                                | 1.0K | 1.0K | 0B    | 100%     | /dev                |
| /dev/md0                                             | 41M  | 41M  | 0B    | 100%     | /packages/mnt/jbase |
| /dev/md1                                             | 183M | 183M | 0B    | 100%     |                     |
| /packages/mnt/jkernel-ppc-12.2I20121026_1217_sranjan |      |      |       |          |                     |
| /dev/md2                                             | 30M  | 30M  | 0B    | 100%     |                     |
| /packages/mnt/jpfe-ACX-12.2I20121026_1217_sranjan    |      |      |       |          |                     |
| /dev/md3                                             | 9.1M | 9.1M | 0B    | 100%     |                     |
| /packages/mnt/jdocs-12.2I20121026_1217_sranjan       |      |      |       |          |                     |
| /dev/md4                                             | 55M  | 55M  | 0B    | 100%     |                     |
| /packages/mnt/jroute-ppc-12.2I20121026_1217_sranjan  |      |      |       |          |                     |
| /dev/md5                                             | 12M  | 12M  | 0B    | 100%     |                     |
| /packages/mnt/jcrypto-ppc-12.2I20121026_1217_sranjan |      |      |       |          |                     |
| /dev/md6                                             | 1.0G | 8.0K | 951M  | 0%       | /tmp                |
| /dev/md7                                             | 1.0G | 448K | 950M  | 0%       | /mfs                |
| /dev/da0s1e                                          | 92M  | 18K  | 91M   | 0%       | /config             |
| procfs                                               | 4.0K | 4.0K | 0B    | 100%     | /proc               |
| /dev/da0s3f                                          | 3.9G | 3.6G | 30M   | 99%      | /var                |
| /dev/da0s3d                                          | 447M | 2.8M | 409M  | 1%       | /var/log            |

If you are done configuring the device, enter **commit** in configuration mode.

You can issue the **fdisk** command from the Junos prompt to display information about the entire partition format on the NAND Flash device. All ACX Series routers run with dual-root partitioning. The following example displays the partition details on an ACX Series router with dual-root partitions:

```
user@host% fdisk
```

```
***** Working on device /dev/da0 *****
parameters extracted from in-core disklabel are:
cylinders=487 heads=255 sectors/track=63 (16065 blks/cyl)

parameters to be used for BIOS calculations are:
cylinders=487 heads=255 sectors/track=63 (16065 blks/cyl)
```

```
Media sector size is 512
```

```

Warning: BIOS sector numbering starts with sector 1
Information from DOS bootblock is:
The data for partition 1 is:
sysid 165 (0xa5),(FreeBSD/NetBSD/386BSD)
  start 567, size 1011528 (493 Meg), flag 80 (active)
  beg: cyl 0/ head 9/ sector 1;
  end: cyl 62/ head 254/ sector 63
The data for partition 2 is:
sysid 165 (0xa5),(FreeBSD/NetBSD/386BSD)
  start 1012662, size 1011528 (493 Meg), flag 0
  beg: cyl 63/ head 9/ sector 1;
  end: cyl 125/ head 254/ sector 63
The data for partition 3 is:
sysid 165 (0xa5),(FreeBSD/NetBSD/386BSD)
  start 2024757, size 3581928 (1748 Meg), flag 0
  beg: cyl 126/ head 9/ sector 1;
  end: cyl 348/ head 254/ sector 63
The data for partition 4 is:
sysid 165 (0xa5),(FreeBSD/NetBSD/386BSD)
  start 5607252, size 2200338 (1074 Meg), flag 0
  beg: cyl 349/ head 9/ sector 1;
  end: cyl 485/ head 254/ sector 63

```

In the preceding example, partition 1 and 2 contain two partitions each internally, a root partition and a configuration partition.

## Verification

Confirm that the configuration is working properly.

- [Verifying the Partitioning Scheme Details on page 261](#)

### Verifying the Partitioning Scheme Details

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>               | Verify that the partitioning scheme details on the ACX Series router were configured.                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Action</b>                | In operational mode, enter the <b>show system storage</b> command. For details about the output of this command and the descriptions of the output fields, see <i>show system storage</i> .                                                                                                                                                                                                                                                           |
| <b>Related Documentation</b> | <ul style="list-style-type: none"> <li>• <a href="#">Junos OS Release 12.2 or Later Upgrades with Dual-Root Partitioning on ACX Series Routers on page 256</a></li> <li>• <a href="#">Installing Junos OS Using a USB Storage Device on ACX Series Routers on page 257</a></li> <li>• <a href="#">Installing Junos OS Upgrades from a Remote Server on ACX Series Routers on page 258</a></li> <li>• <i>Installation and Upgrade Guide</i></li> </ul> |

## Hardware Architecture Overview

Juniper Network routing platforms are made up of two basic routing components:

- **Routing Engine**—The Routing Engine controls the routing updates and system management.

- Packet Forwarding Engine (PFE)—The Packet Forwarding Engine performs Layer 2 and Layer 3 packet switching, route lookups, and packet forwarding.

From a system administration perspective, you install the software onto the Routing Engine and during the installation, the appropriate software is forwarded to other components as necessary. Most Routing Engines include a CompactFlash card that stores Junos OS. On M Series Multiservice Edge Routers, MX240, MX480, and MX960 3D Universal Edge Routers, T Series Core Routers, and TX Matrix routers, the system also includes a hard disk or solid-state drive (SSD) that acts as a backup boot drive. PTX Series Packet Transport Routers and the TX Matrix Plus router include a solid state drive as a backup boot drive.



**NOTE:** The MX80 router is a single-board router with a built-in Routing Engine and single Packet Forwarding Engine. On an MX80 router, Junos OS is stored on dual, internal NAND flash devices. These devices provide the same functionality as a CompactFlash card and hard disk or solid-state drive (SSD).



**NOTE:** The ACX Series router is a single board router with a built-in Routing Engine and one Packet Forwarding Engine. The ACX router supports dual-root partitioning, which means that the primary and backup Junos OS images are kept in two independently bootable root partitions. If the primary partition becomes corrupted, the system remains fully functional by booting from the backup Junos OS image located in the other root partition.

On routing platforms with dual Routing Engines, each Routing Engine is independent with regard to upgrading the software. To install new software on both Routing Engines, you need to install the new software on each Routing Engine. On platforms with dual Routing Engines configured for high availability, you can use the unified in-service software upgrade procedure to upgrade the software. For more information about this procedure, see the [Junos OS High Availability Configuration Guide](#).

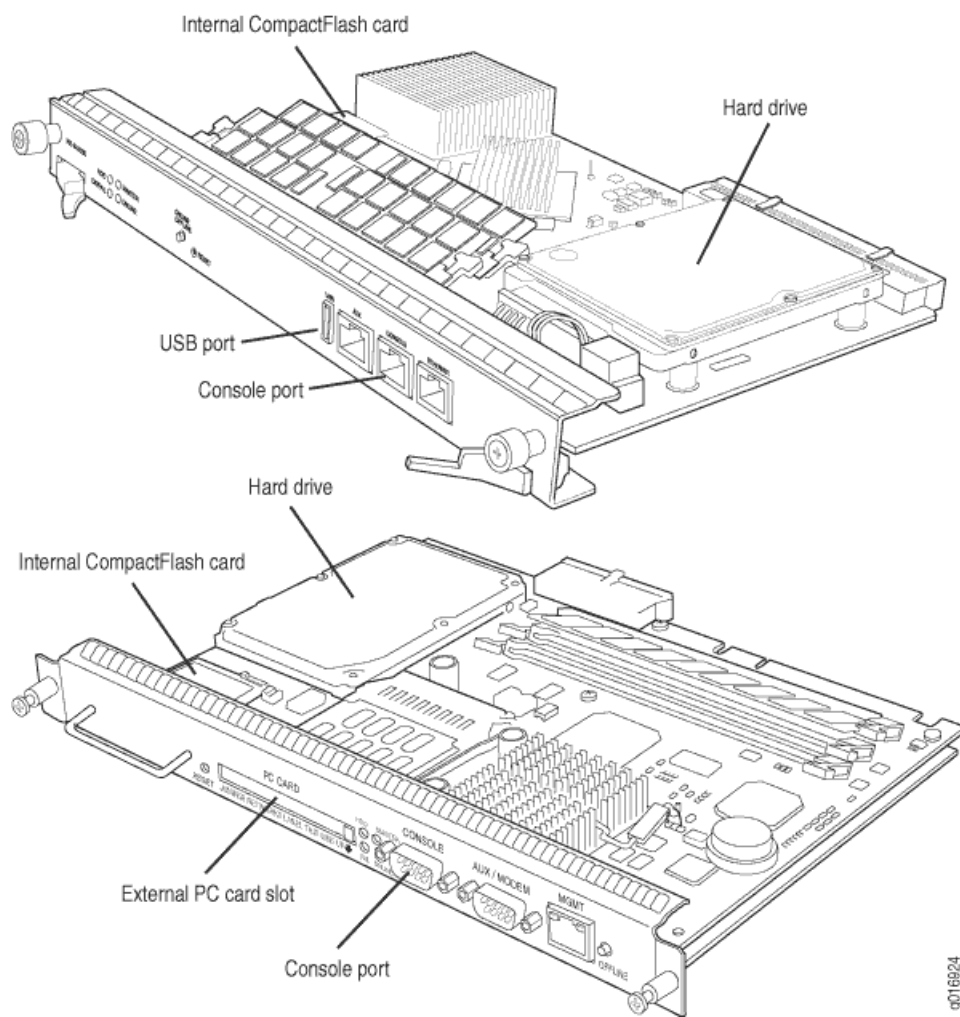
**Related  
Documentation**

- [Dual-Root Partitioning ACX Series Universal Access Routers Overview on page 253](#)

## [Hardware Overview \(ACX Series, M Series, MX Series, T Series, and TX Matrix Routers\)](#)

[Figure 18 on page 263](#) shows examples of Routing Engines.

Figure 18: Routing Engines



The ACX Series, M Series, MX Series, PTX Series, T Series, TX Matrix, and TX Matrix Plus routers include the following:

- [System Memory on page 263](#)
- [Storage Media on page 264](#)

## System Memory

Starting with Junos OS Release 9.0, all routing platforms require a minimum of 512 MB of system memory on each Routing Engine. All M7i and M10i routers delivered before December 7, 2007, had 256 MB of memory. These routers require a system memory upgrade before you install Junos OS Release 9.0 or a later release. To determine the amount of memory currently installed on your system, use the **show chassis routing-engine** command in the command-line interface (CLI).

For more information about upgrading your M7i or M10i router, see the Customer Support Center JTAC Technical Bulletin PSN-2007-10-001:

<https://www.juniper.net/alerts/viewalert.jsp?txtAlertNumber=PSN-2007-10-001&actionBtn=Search>.

ACX2000 routers are shipped with 2 GB of memory and ACX1000 routers with 1 GB of memory.

## Storage Media

Except for the ACX Series, MX80 routers, and MX104 routers, the M Series, MX Series, PTX Series, T Series, TX Matrix, and TX Matrix Plus routers use the following media storage devices:

- CompactFlash card—The CompactFlash card is typically the primary storage device for most routers.



**NOTE:** M7i and M10i routers using RE-400 are not delivered from the factory with the CompactFlash card installed. In this case, the hard disk is the primary and only boot device. The M7i and M10i routers with RE-400 can be upgraded to include the CompactFlash card.

- Hard disk or solid-state drive—For most routers,, a hard disk or solid-state drive is the secondary boot device. When the CompactFlash card is not installed on the router, the hard disk or the solid-state drive becomes the primary boot device. The hard disk or solid-state drive is also used to store system log files and diagnostic dump files.
- Emergency boot device—Depending on the router, the emergency boot device can be a PC card, a USB storage device, or an LS-120 floppy disk.

On MX80 routers, the internal NAND flash devices (first *da0*, then *da1*) act as the primary and secondary boot devices.

On ACX Series routers, the internal NAND flash devices (first *da0s1*, then *da0s2*) act as the primary and secondary boot devices.

Emergency boot devices can be used to revive a routing platform that has a damaged Junos OS. When an emergency boot device is attached to the router, the router attempts to boot from that device before it boots from the CompactFlash card, solid-state drive (SSD), or hard disk.

On an ACX Series router, the emergency boot device is a USB storage device.

On MX104 routers, the internal NAND flash device (**da0**) mounted on the internal eUSB card acts as the primary boot and storage device. on MX104 routers, the emergency boot device is a USB storage device that is plugged into one of the USB ports in the front plate.

When booting from an emergency boot device, the router requests a boot acknowledgment on the console interface. If you enter yes, the emergency boot device repartitions the primary boot device and reloads Junos OS onto the primary boot device. After the loading is complete, the routing platform requests that you remove the



emergency boot device and reboot the system. After the reboot is complete, you must perform an initial configuration of the router before it can be used on your network.

## Boot Sequence (ACX Series Routers)

The router attempts to boot from the storage media in the following order:

1. USB storage media device.
2. Dual, internal NAND flash device (first da0s1, then da0s2).

### Related Documentation

- [Dual-Root Partitioning ACX Series Universal Access Routers Overview on page 253](#)
- [Understanding How the Primary Junos OS Image with Dual-Root Partitioning Recovers on the ACX Series Router on page 255](#)

## Routing Engines and Storage Media Names (ACX Series, M Series, MX Series, PTX Series, T Series, TX Matrix, TX Matrix Plus, and JCS 1200 Routers)

Table 27 on page 265 specifies the storage media names by Routing Engine. The storage media device names are displayed when the router boots.

**Table 27: Routing Engines and Storage Media Names (ACX Series, M Series, MX Series, T Series, TX Matrix, TX Matrix Plus, and JCS 1200 Routers)**

| Routing Engine             | CompactFlash Card | Hard Disk | Solid State Drive             | Removable Media<br>Emergency Boot Device |
|----------------------------|-------------------|-----------|-------------------------------|------------------------------------------|
| RE-400-768 (RE5)           | ad0               | ad1       | No                            | ad3                                      |
| RE-600-2048 (RE3)          | ad0               | ad1       | No                            | ad3                                      |
| RE-850-1536 (RE-850)       | ad0               | ad1       | No                            | ad3                                      |
| RE-A-1000-2048 (RE-A-1000) | ad0               | ad2       | No                            | da0                                      |
| RE-A-1800x2 (RE-A-1800)    | ad0               | No        | Yes<br>SSD1: ad1<br>SSD2: ad2 | da0                                      |
| RE-S-1300-2048 (RE-S-1300) | ad0               | ad2       | No                            | da0                                      |

**Table 27: Routing Engines and Storage Media Names (ACX Series, M Series, MX Series, T Series, TX Matrix, TX Matrix Plus, and JCS 1200 Routers) (continued)**

| Routing Engine                            | CompactFlash Card | Hard Disk | Solid State Drive                     | Removable Media Emergency Boot Device |
|-------------------------------------------|-------------------|-----------|---------------------------------------|---------------------------------------|
| RE-S-1800x2<br>RE-S-1800x4<br>(RE-S-1800) | ad0               | No        | Yes<br><br>SSD1: ad1<br><br>SSD2: ad2 | da0                                   |
| RE-B-1800X1-4G-S                          | ad0               | No        | Yes<br><br>SSD1: ad1                  | da0                                   |
| RE-1600-2048 (RE4)                        | ad0               | ad1       | No                                    | ad3 and ad4                           |
| RE-A-2000-4096<br>(RE-A-2000)             | ad0               | ad2       | No                                    | da0                                   |
| RE-S-2000-4096<br>(RE-S-2000)             | ad0               | ad2       | No                                    | da0                                   |
| RE-MX-104                                 | No                | da0       | No                                    | da1 and da2                           |
| RE-DUO-C2600-16G<br>(RE-DUO-2600)         | ad0               | No        | ad1                                   | da0                                   |
| RE-DUO-C1800-8G-<br>(RE-DUO-1800)         | ad0               | No        | ad1                                   | da0                                   |
| RE-DUO-C1800-16G                          | ad0               | No        | ad1                                   | da0                                   |
| RE-JCS1200-1x2330                         | da0               | da1       | No                                    | da2                                   |



**NOTE:** On MX80 routers, the Routing Engine is a built-in device and has no model number. The dual internal NAND flash devices are *da0* and *da1*. The USB storage device is *da2*.



**NOTE:** On ACX Series routers, the Routing Engine is a built-in device, which does not have a model number. The dual internal NAND flash devices are *da0s1* and *da0s2*. The USB storage device is *da0s2a*. Use the `show chassis hardware models` command to obtain the field-replaceable unit (FRU) model number—for example, ACX2000BASE-DC for the ACX2000 router.

To view the storage media currently available on your system, use the CLI **show system storage** command. For more information about this command, see the *CLI User Guide*.

**Related Documentation**

- *Supported Routing Engines by Chassis*
- *Routing Engine Specifications*
- *RE-S-1300 Routing Engine Description*
- *RE-S-2000 Routing Engine Description*
- *RE-S-1800 Routing Engine Description for MX Series*
- *JCS1200 Routing Engine Description*

## Upgrading Software Packages



**NOTE:** When you install individual software packages, the following notes apply:

- When upgrading from Junos OS Release 8.2 or earlier to Junos OS Release 8.5, use the **system software add <image> no-validate** command option.
- Only use the **jinstall** Junos OS image when upgrading or downgrading to or from Junos OS Release 8.5. Do not use the **jbundle** image.
- Before upgrading to Junos OS Release 8.5, ensure that the routing platform's CompactFlash card is 256 MB or larger to avoid disk size restrictions. (M7i routers without a CompactFlash card are excluded.)

To upgrade an individual Junos OS package, follow these steps:

1. Download the software packages you need from the Juniper Networks Support Web site at <http://www.juniper.net/support/>. For information about downloading software packages, see *Downloading Software*.



**NOTE:** We recommend that you upgrade all individual software packages using an out-of-band connection from the console or management Ethernet interface, because in-band connections can be lost during the upgrade process.

2. Back up the currently running and active file system so that you can recover to a known, stable environment in case something goes wrong with the upgrade:

```
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 or solid-state drive (SSD).



**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.

3. If you are copying multiple software packages to the router, copy them to the `/var/tmp` directory on the hard disk or solid-state drive (SSD):

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

4. Add the new software package:

- To add an individual software package:

```
user@host> request system software add /var/tmp/ installation-package validate
```

*installation-package* is the full URL to the file.

If you are upgrading more than one package at the same time, add `jbase` first. If you are using this procedure to upgrade all packages at once, add them in the following order:

```
user@host> request system software add /var/tmp/jbase-release-signed.tgz
user@host> request system software add /var/tmp/jkernel-release-signed.tgz
user@host> request system software add /var/tmp/jpfe-release-signed.tgz
user@host> request system software add /var/tmp/jdocs-release- signed.tgz
user@host> request system software add /var/tmp/jweb-release- signed.tgz
user@host> request system software add /var/tmp/jroute-release-signed.tgz
user@host> request system software add /var/tmp/jcrypto-release-signed.tgz
```

- For M Series, MX Series, and T Series routers and Branch SRX Series firewall filters running Junos OS Release 12.2 and above, you can add more than one software package at the same time. To add multiple software packages:

```
user@host> request system software add set /var/tmp/
installation-package/var/tmp/ installation-package validate
```

*installation-package* can be any of the following:

- A list of installation packages, each separated by a blank space. For example,

```
user@host> request system software add set /var/tmp/
jinstall-10.2R1.8-domestic-signed.tgz /var/tmp/ jtools*.tgz validate
```

- The full URL to the directory or tar file containing the list of installation packages.

Use the `request system software add set` command to retain any SDK configuration by installing the SDK add-on packages along with the core Junos OS installation package.



**WARNING:** Do not include the `re0 | re1` option when you install a package using the `request system software add` command, if the Routing Engine on

which the package is located and the Routing Engine on which you want to install the package are the same. In such cases, the package gets deleted after a successful upgrade.

The system might display the following message:

```
pkg_delete: couldn't entirely delete package
```

This message indicates that someone manually deleted or changed an item that was in a package. You do not need to take any action; the package is still properly deleted.

For more information about the **request system software add** command, see the [Junos OS System Basics and Services Command Reference](#).

5. Reboot the router to start the new software:

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

6. After you have upgraded or downgraded the software and are satisfied that the new software is successfully running, issue the **request system snapshot** command to back up the new software:

```
user@host> request system snapshot
```



**NOTE:** On an ACX router, you must issue the **request system snapshot slice alternate** command.

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 or solid-state drive (SSD).



**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.

## Load and Commit the Configuration File

Once the saved configuration file is copied to the router, you load and commit the file:

1. Start the CLI configuration mode.

```
user@routename> configure
Entering configuration mode
```

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

2. Load the file into the current configuration. You should override the existing file.

```
user@host#
```

```
load override /var/tmp/filename
load complete
```

3. Commit the file.

```
user@host# commit
commit complete
```

4. Exit the CLI configuration mode.

```
user@host# exit
user@host>
```

5. Back up Junos OS.

After you have installed the software on the router, committed the configuration, and are satisfied that the new configuration is successfully running, 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 drive will be out of sync with the configuration on the primary boot drive.

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 or solid-state drive (SSD).

---

## Checking the Current Configuration and Candidate Software Compatibility

When you upgrade or downgrade Junos OS, we recommend that you include the **validate** option with the **request system software add** command to check that the candidate software is compatible with the current configuration. By default, when you add a package with a different release number, the validation check is done automatically. For more information about the **request system software add** command, see the [Junos OS System Basics and Services Command Reference](#).



**NOTE:** On an ACX Series router, you must ensure that the primary and backup partitions are synchronized after an upgrade by issuing the **request system snapshot** command.

### Related Documentation

- [request system software add](#)
- [request system snapshot](#)

---

## Understanding System Snapshot on an ACX Series Router

The system snapshot feature enables you to create copies of the software running on an ACX Series router. You can use the system snapshot feature to take a "snapshot" of the files currently used to run the router—the complete contents of the root (/) and

`/config` directories, which include the running Juniper Networks Juniper operating system (Junos OS) and the active configuration—and copy all of these files to another media, such as a universal serial bus (USB) storage device, the active slice of a dual-root partitioned router, or the alternate slice of a dual-root partitioned router.



**NOTE:** Junos OS automatically uses the backup software if the currently running software goes bad. For example, if the `da0s1` slice goes bad, Junos OS automatically comes up using the `da0s2` slice, and takes a snapshot of the `da0s2` slice and copies it to the `da0s1` slice if the auto snapshot functionality is configured, which is disabled by default. However, you can also do this manually using the system snapshot feature.

Typically, you can take a snapshot prior to the upgrade of an image on the dual internal NAND flash device (`da0s1` or `da0s2`), or to remedy a bad image, thereby preventing the bad image from rendering the system useless. A snapshot to another media ensures that the device can boot from the other media in case the system does not boot up from the current image.

You can take a snapshot of the currently running software and configuration on a router in the following situations:

- The router's active slice (for example, `da0s1`) is updated with a new Junos OS image (using the `jinstall` package). In such a case, you must update the other slice (`da0s2`) with the new image.



**NOTE:** The active slice can be `da0s1` or `da0s2`.

- The router's active slice (for example, `da0s1`) is corrupted and the router is rebooted from the backup slice (that is, from `da0s2`). Therefore, you must restore a new image on the active slice—that is, on `da0s1`.
- Both slices of the router's dual internal NAND flash device are corrupted and the router continues trying to reboot. In this situation, you can insert a USB storage device, boot the router from that device, and restore the NAND flash device slices—`da0s1` and `da0s2`.



**NOTE:** Before you attempt to take a snapshot from the USB storage device, ensure that the USB storage device contains an image of Junos OS from which the router can boot up.

#### Related Documentation

- [Example: Taking a Snapshot of the Software and Configuration on page 272](#)
- [request system snapshot \(ACX Series\) on page 290](#)

## Example: Taking a Snapshot of the Software and Configuration

---

This example includes six scenarios in which you can take a snapshot of the currently running software and configuration on an ACX Series router, prior to the upgrade of an image or to remedy a bad image, thereby preventing the bad image from rendering the system useless.

- [Requirements on page 272](#)
- [Overview on page 272](#)
- [Taking a Snapshot on page 272](#)

### Requirements

This example uses the following hardware and software components:

- One ACX Series router
- Junos OS Release 12.2 or later

### Overview

In this example, the **request system snapshot** command is used to take a copy of the currently running software and configuration on another media—for example, a universal serial bus (USB) storage device, the active slice (**da0s1** or **da0s2**) of a dual-root partitioned router, or the alternate slice (**da0s1** or **da0s2**) of a dual-root partitioned router. A snapshot to another media ensures that the device can boot from the other media in case the system does not boot up from the current image.



**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.

### Taking a Snapshot

Scenario: To take a snapshot from a NAND flash device slice to a USB storage device:

1. Boot up the router from the NAND flash device and make sure that a formatted USB storage device is plugged in to the router's USB port. The USB storage device must be formatted for the root (/) and **/config** directories.
2. Issue the **request system snapshot** command.

```
user@host> request system snapshot
Verifying compatibility of destination media partitions...
Running newfs (254MB) on usb media / partition (da1s1a)...
Running newfs (47MB) on usb media /config partition (da1s1e)...
Copying '/dev/da0s2a' to '/dev/da1s1a' .. (this may take a few minutes)
```



Copying '/dev/da0s2e' to '/dev/da1s1e' .. (this may take a few minutes)  
 The following filesystems were archived: / /config

The root (/) and /**config** directories from the currently mounted NAND flash slice are copied to the USB storage device.

Scenario: To take a snapshot from a NAND flash device slice to a USB storage device with formatting:

1. Boot up the router from the NAND flash device and make sure that a USB storage device is plugged in to the router's USB port.



**NOTE:** Formatting a USB storage device deletes all the data on the USB storage device.

2. Issue the **request system snapshot partition** command.

```
user@host> request system snapshot partition
clearing current label...
Partitioning usb media (da1) ...
Partitions on snapshot:
```

| Partition | Mountpoint | Size  | Snapshot argument |
|-----------|------------|-------|-------------------|
| a         | /          | 312MB | root-size         |
| e         | /config    | 47MB  | config-size       |
| f         | /var       | 620MB | var-size          |

```
Running newfs (312MB) on usb media / partition (da1s1a)...
Running newfs (47MB) on usb media /config partition (da1s1e)...
Running newfs (620MB) on usb media /var partition (da1s1f)...
Copying '/dev/da0s2a' to '/dev/da1s1a' .. (this may take a few minutes)
Copying '/dev/da0s2e' to '/dev/da1s1e' .. (this may take a few minutes)
The following filesystems were archived: / /config
```

After the USB storage device is formatted, the root (/) and /**config** directories from the currently mounted NAND flash slice are copied to the USB storage device.

Scenario: To take a snapshot from the active slice of the NAND flash device to the alternate slice:

1. Boot up the router from the NAND flash device.
2. Issue the **request system snapshot slice alternate** command.

```
user@host> request system snapshot slice alternate
Verifying compatibility of destination media partitions...
Running newfs (439MB) on internal media / partition (da0s1a)...
Running newfs (46MB) on internal media /config partition (da0s1e)...
Copying '/dev/da0s2a' to '/dev/da0s1a' .. (this may take a few minutes)
Copying '/dev/da0s2e' to '/dev/da0s1e' .. (this may take a few minutes)
The following filesystems were archived: / /config
```

The root (/) and /**config** directories from the currently mounted NAND flash slice are copied to the other slice.

Scenario: To take a snapshot from an active slice of the NAND flash device to the alternate slice after partitioning:

1. Boot up the router from the NAND flash device.
2. Issue the **request system snapshot partition slice alternate** command.

```
user@host> request system snapshot partition slice alternate
Verifying compatibility of destination media partitions...
Running newfs (439MB) on internal media / partition (da0s1a)...
Running newfs (46MB) on internal media /config partition (da0s1e)...
Copying '/dev/da0s2a' to '/dev/da0s1a' .. (this may take a few minutes)
Copying '/dev/da0s2e' to '/dev/da0s1e' .. (this may take a few minutes)
The following filesystems were archived: / /config
```

The BSD label (disk partitioning information) for the active flash slice is installed and then the root (/) and /config directories from the currently mounted NAND flash slice are copied to the other slice.

Scenario: To take a snapshot from a USB storage device to the active slice of the NAND flash device:

1. Boot up the router from a USB storage device containing the required Junos OS image.
2. Issue the **request system snapshot** command.

```
user@host> request system snapshot
Verifying compatibility of destination media partitions...
Running newfs (439MB) on internal media / partition (da0s1a)...
Running newfs (46MB) on internal media /config partition (da0s1e)...
Copying '/dev/da1s1a' to '/dev/da0s1a' .. (this may take a few minutes)
Copying '/dev/da1s1e' to '/dev/da0s1e' .. (this may take a few minutes)
The following filesystems were archived: / /config
```

The root (/) and /config directories from the USB storage device are copied to the active NAND flash slice.

Scenario: To take a snapshot from a USB storage device to the active slice of the NAND flash device after partitioning:

1. Boot up the router from a USB storage device containing the required Junos OS image.
2. Issue the **request system snapshot partition** command.

```
user@host> request system snapshot partition
Verifying compatibility of destination media partitions...
Running newfs (439MB) on internal media / partition (da0s1a)...
Running newfs (46MB) on internal media /config partition (da0s1e)...
Copying '/dev/da1s1a' to '/dev/da0s1a' .. (this may take a few minutes)
Copying '/dev/da1s1e' to '/dev/da0s1e' .. (this may take a few minutes)
The following filesystems were archived: / /config
```

The BSD label (disk partitioning information) for the active flash slice is installed and then the root (/) and /config directories from the USB storage device are copied to the active NAND flash slice.

**Related  
Documentation**

- [Understanding System Snapshot on an ACX Series Router on page 270](#)
- [request system snapshot \(ACX Series\) on page 290](#)

# Junos Configuration Statements

- [Key Configuration Statements Supported on ACX Series Routers on page 275](#)

## Key Configuration Statements Supported on ACX Series Routers

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This topic includes key statements supported on ACX Series routers. The list does not include every statement supported on the ACX Series routers. If a statement does not appear in this list, you can take the following actions:

- Find the statements using the Search Engine.
- See [“Protocols and Applications Supported by the ACX Routers” on page 5](#) for a complete list of features and release dates.

The following list includes key statements supported on ACX Series routers:

- *access-profile*
- *active*
- *aggregate*
- *aggregated-devices*
- *allow-any-vci*
- *announce-interval (Slave Clock)*
- *announce-interval (Master Clock)*
- *as-path*
- *asymmetry*
- *atm-options*
- *atm-policer (Firewall)*
- *atm-service*
- *auto-export*
- *autoinstallation*
- *autonomous-system*
- *backup-neighbor*

- *bits*
- *brief*
- *cdvt*
- *cesopsn-options*
- *chained-composite-next-hop*
- *classifiers*
- *classifiers (Physical Interface)*
- *clock-class-to-quality-level-mapping*
- *clocking*
- *clock-client*
- *clock-mode*
- *clock-mode (Chassis Synchronization)*
- *clock-source*
- *color*
- *community*
- *confederation*
- *convert-clock-class-to-quality-level*
- *delay-buffer-rate*
- *destination-networks*
- *disable (Interface)*
- *disable (Routing Options)*
- *discard*
- *dscp (Class of Service Classifier)*
- *dscp (Classifier on Physical Interface)*
- *dscp (Rewrite Rules on Physical Interface)*
- *dynamic-tunnels*
- *e1-options*
- *e1-options (BITS Interfaces Signal Type)*
- *ethernet-switch-profile*
- *encapsulation (Logical Interface)*
- *encapsulation (Physical Interface)*
- *esmc-transmit*
- *export*

- *flow*
- *flow-map*
- *forwarding-cache*
- *forwarding-class*
- *forwarding-table*
- *framing*
- *framing (E1 Options for BITS Interfaces)*
- *framing (T1 Options for BITS Interfaces)*
- *full*
- *generate*
- *gether-options*
- *global-arp-prefix-limit*
- *global-supplementary-blackout-timer*
- *gps*
- *graceful-restart*
- *grant-duration*
- *gre*
- *group*
- *hold-interval*
- *host-fast-reroute*
- *ieee-802.1 (Classifier on Physical Interface)*
- *ieee-802.1 (Rewrite Rules on Physical Interface)*
- *ima-group-options*
- *ima-link-options*
- *inet-precedence*
- *inet-precedence (Classifier on Physical Interface)*
- *inet-precedence (Rewrite Rules on Physical Interface)*
- *ingress*
- *interface*
- *interface (Master Clock)*
- *interface (PTP Slave)*
- *interface-routes*
- *interface-type*

- *interfaces*
- *interfaces bits*
- *interfaces (Chassis Synchronization Source)*
- *ipv4-dscp*
- *l3vpn*
- *label-switched-path-template*
- *link-protection*
- *local-ip-address*
- *logical-interface-policer*
- *management*
- *manual*
- *martians*
- *master*
- *max-announce-interval*
- *max-burst-size*
- *max-delay-response-interval*
- *max-sync-interval*
- *maximum-paths*
- *maximum-prefixes*
- *med-igp-update-interval*
- *media-type*
- *metric*
- *min-announce-interval*
- *min-delay-response-interval*
- *min-sync-interval*
- *mtu*
- *multicast*
- *native-vlan-id*
- *network-option*
- *no-bfd-triggered-local-repair*
- *no-partition*
- *options (Routing Options)*
- *partition*

- *passive*
- *peak-rate*
- *policing-action*
- *policy*
- *ppm*
- *preference*
- *primary*
- *promiscuous-mode*
- *priority*
- *psn-vci*
- *psn-vpi*
- *quality-level (Chassis Synchronization Source Interface)*
- *quality-level (Clock Class Mapping PTP Slave)*
- *quality-mode-enable*
- *request*
- *rewrite-rules (Physical Interfaces)*
- *rib*
- *rib-group (Routing Options)*
- *route-distinguisher-id*
- *route-record*
- *router-id*
- *routing-options*
- *selection-mode*
- *satop-options*
- *signal-type*
- *slave*
- *source*
- *source-address (Routing Options)*
- *source-routing*
- *standby*
- *static (Protocols Layer 2 Circuit)*
- *static (Origin Validation for BGP)*
- *sustained-rate*

- *switchover-mode*
- *sync-interval (Slave)*
- *sync-interval (Master)*
- *synchronization*
- *system-defaults*
- *tag*
- *t1-options*
- *t1-options (BITS Interfaces Signal Type)*
- *timeslots*
- *traceoptions (Routing Options)*
- *traffic-control-profiles*
- *transport*
- *unicast*
- *unicast-mode (Master Clock)*
- *unicast-mode (PTP Slave Interface)*
- *validation*
- *vci*
- *vpi (Logical Interface and Interworking)*
- *vpi (ATM CCC Cell-Relay Promiscuous Mode)*
- *vpi (Define Virtual Path)*
- *vrf-propagate-ttl*
- *wait-to-restore*

**Related  
Documentation**

- [Key Configuration Statement Hierarchies Supported on ACX Series Routers on page 281](#)



# Configuration Statement Hierarchies

- [Key Configuration Statement Hierarchies Supported on ACX Series Routers](#) on page 281

## Key Configuration Statement Hierarchies Supported on ACX Series Routers

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This topic includes key statement hierarchies supported on ACX Series routers. The list does not include every statement hierarchy supported on the ACX Series routers. If a statement hierarchy does not appear in this list, you can take the following actions:

- Find the statement hierarchy using the Search Engine.
- See [“Protocols and Applications Supported by the ACX Routers”](#) on page 5 for a complete list of features and release dates.

The following list includes key statement hierarchies supported on ACX Series routers:

- *[edit protocols bfd] Hierarchy Level*
- *[edit protocols bgp] Hierarchy Level*
- *[edit protocols esis] Hierarchy Level*
- *[edit forwarding-options family] Hierarchy Level*
- *[edit protocols isis] Hierarchy Level*
- *[edit protocols l2circuit] Hierarchy Level*
- *[edit protocols ldp] Hierarchy Level*
- *[edit protocols mpls] Hierarchy Level*
- *[edit protocols msdp] Hierarchy Level*
- *[edit protocols oam] Hierarchy Level*
- *[edit protocols ospf] Hierarchy Level*
- *[edit protocols ospf3] Hierarchy Level*
- *[edit poe]*
- *[edit protocols ppp] Hierarchy Level*
- *[edit protocols ppp-service] Hierarchy Level*
- *[edit protocols ptp] Hierarchy Level*

- *[edit protocols rip] Hierarchy Level*
- *[edit protocols ripng] Hierarchy Level*
- *[edit protocols rsvp] Hierarchy Level*
- *[edit routing-instances] Hierarchy Level*
- *[edit routing-options] Hierarchy Level*
- *[edit switch-options] Hierarchy Level*
- *[edit system] Hierarchy Level*
- *Statement Hierarchy for Configuring FBF for IPv4 Traffic on ACX Series Routers*

**Related  
Documentation**

- [Key Configuration Statements Supported on ACX Series Routers on page 275](#)

## PART 3

# Administration

- [Monitoring Commands for the ACX Universal Access Router on page 285](#)




## CHAPTER 17

# Monitoring Commands for the ACX Universal Access Router

## restart chassis-control

---

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | restart chassis-control<br><fcc <i>number</i>   sfc <i>number</i> ><br><gracefully   immediately   soft>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Syntax (MX Series Routers)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | restart chassis-control<br><gracefully   immediately   soft>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Syntax (PTX Series)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | restart chassis-control<br><gracefully   immediately   soft>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Release Information                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Command introduced before JUNOS Release 7.4.<br>Command introduced in Junos OS Release 12.3 for MX2020 3D Universal Edge Routers.<br>Command introduced in Junos OS Release 12.3 for MX2010 3D Universal Edge Routers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Restart the chassis management process.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <div> <b>NOTE:</b> When GRES is configured and the <code>restart chassis-control</code> command is executed on a TX Matrix Plus router with 3D SIBs, we cannot ascertain which Routing Engine becomes a master. This is due to the chassisd restart. The chassis process or chassisd is responsible for maintaining and retaining mastership and when it is restarted, the new chassisd is processed based on the router load. This results in one of the Routing Engines being made master.</div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Options                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <p><b>fcc <i>number</i></b>—(Routing matrix only) (Optional) Restart the software process for a specific T640 routing node that is connected to a TX Matrix platform. Replace <b><i>number</i></b> with a value from 0 through 3.</p> <p><b>sfc <i>number</i></b>—(TX Matrix Plus routers only) (Optional) Restart the software process on the TX Matrix Plus router (or switch-fabric chassis). Replace <b><i>number</i></b> with 0.</p> <p><b>gracefully</b>—(Optional) Restart the software process.</p> <p><b>immediately</b>—(Optional) Immediately restart the software process.</p> <p><b>soft</b>—(Optional) Reread and reactivate the configuration without completely restarting the software processes. For example, Border Gateway Protocol (BGP) peers stay up and the routing table stays constant. Omitting this option results in a graceful restart of the software process.</p> |
| Required Privilege Level                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | reset                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Related Documentation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li><code>restart</code></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| List of Sample Output                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <a href="#">restart chassis-control gracefully on page 287</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

[restart chassis-control soft on page 287](#)

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

## Sample Output

[restart chassis-control gracefully](#)

```
user@host> restart chassis-control gracefully
Chassis control process started, pid 1631
```

[restart chassis-control soft](#)

```
user@host> restart chassis-control soft
Chassis control process started, pid 1653
```

## request chassis feb

---

|                                    |                                                                                                                                                                                                                                                                           |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                      | <code>request chassis feb (offline   online   restart) slot <i>slot-number</i></code>                                                                                                                                                                                     |
| <b>Syntax (ACX Series Routers)</b> | <code>request chassis feb restart slot <i>slot-number</i></code>                                                                                                                                                                                                          |
| <b>Release Information</b>         | Command introduced in Junos OS Release 8.0.<br>Command introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.                                                                                                                                   |
| <b>Description</b>                 | (M120 router only) Control the operation of the specified Forwarding Engine Board (FEB).<br><br>(ACX Series routers) Restart the specified FEB.                                                                                                                           |
| <b>Options</b>                     | <b>offline</b> —Take the specified FEB offline.<br><br><b>online</b> —Bring the specified FEB online.<br><br><b>restart</b> —Restart the specified FEB.<br><br><b>slot <i>slot-number</i></b> —FEB slot number. Replace <i>slot-number</i> with a value from 0 through 5. |
| <b>Required Privilege Level</b>    | maintenance                                                                                                                                                                                                                                                               |
| <b>Related Documentation</b>       | <ul style="list-style-type: none"><li>• <a href="#">show chassis feb on page 394</a></li><li>• <i>show chassis fabric feb</i></li><li>• <i>show chassis fpc-feb-connectivity</i></li><li>• <i>feb</i></li><li>• <i>Switching Control Board Redundancy</i></li></ul>       |
| <b>List of Sample Output</b>       | <a href="#">request chassis feb offline slot 0 on page 288</a><br><a href="#">request chassis feb online slot 0 on page 288</a><br><a href="#">request chassis feb restart slot 0 on page 289</a>                                                                         |
| <b>Output Fields</b>               | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                     |

### request chassis feb (M120 Router)

#### request chassis feb offline slot 0

```
user@host> request chassis feb offline slot 0
Offline initiated, use "show chassis feb" to verify
```

#### request chassis feb online slot 0

```
user@host> request chassis feb online slot 0
Online initiated, use "show chassis feb" to verify
```



### request chassis feb restart slot 0

```
user@host> request chassis feb restart slot 0
Restart initiated, use "show chassis feb" to verify
```

### request chassis feb (ACX Series Routers)

```
user@host> request chassis feb restart slot 0
FEB will be restarted NOW.
```

## request system snapshot (ACX Series)

---

**Syntax**    request system snapshot  
              <partition>  
              <partition slice alternate>  
              <slice alternate>

**Release Information**    Command introduced in Junos OS Release 12.2 for ACX Series Routers.

**Description**    On the router, take a snapshot of the files currently used to run the router—the complete contents of the root (/) and /config directories, which include the running Junos OS and the active configuration.



.....  
**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**    **none**—Back up the currently running software and configuration by copying the root (/) and /config directories—the snapshot—to the media that the router did not boot from. If the router booted from internal media, the snapshot is copied to an external universal serial bus (USB) storage media. If the router booted from external USB media, the snapshot is copied to the active slice of the internal media—**da0s1** or **da0s2**. (If the snapshot destination is external media but a USB flash drive is not connected, an error message is displayed.)

**partition**—(Optional) Repartition the flash drive or the USB media before a snapshot occurs. If the partition table on the flash drive is corrupted, the **request system snapshot partition** command fails and reports errors.

**slice alternate**—(Optional) Take a snapshot of the active slice and copy it to the alternate slice on the boot media.

**Required Privilege Level**    maintenance

**Related Documentation**

- [Understanding System Snapshot on an ACX Series Router on page 270](#)
- [Example: Taking a Snapshot of the Software and Configuration on page 272](#)

**List of Sample Output**    [request system snapshot on page 291](#)  
                                  [request system snapshot partition \(USB Storage Device\) on page 291](#)  
                                  [request system snapshot partition \(Active Slice of the NAND Flash Device\) on page 291](#)  
                                  [request system snapshot partition slice alternate on page 291](#)  
                                  [request system snapshot slice alternate on page 291](#)

## Sample Output

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

### request system snapshot

```
user@host> request system snapshot
Verifying compatibility of destination media partitions...
Running newfs (254MB) on usb media / partition (da1s1a)...
Running newfs (47MB) on usb media /config partition (da1s1e)...
Copying '/dev/da0s2a' to '/dev/da1s1a' .. (this may take a few minutes)
Copying '/dev/da0s2e' to '/dev/da1s1e' .. (this may take a few minutes)
The following filesystems were archived: / /config
```

### request system snapshot partition (USB Storage Device)

```
user@host> request system snapshot partition
Clearing current label...
Partitioning usb media (da1) ...
Partitions on snapshot:

    Partition Mountpoint Size Snapshot argument
    a         /           312MB root-size
    e         /config     47MB config-size
    f         /var        620MB var-size
Running newfs (312MB) on usb media / partition (da1s1a)...
Running newfs (47MB) on usb media /config partition (da1s1e)...
Running newfs (620MB) on usb media /var partition (da1s1f)...
Copying '/dev/da0s2a' to '/dev/da1s1a' .. (this may take a few minutes)
Copying '/dev/da0s2e' to '/dev/da1s1e' .. (this may take a few minutes)
The following filesystems were archived: / /config
```

### request system snapshot partition (Active Slice of the NAND Flash Device)

```
user@host> request system snapshot partition
Verifying compatibility of destination media partitions...
Running newfs (439MB) on internal media / partition (da0s1a)...
Running newfs (46MB) on internal media /config partition (da0s1e)...
Copying '/dev/da1s1a' to '/dev/da0s1a' .. (this may take a few minutes)
Copying '/dev/da1s1e' to '/dev/da0s1e' .. (this may take a few minutes)
The following filesystems were archived: / /config
```

### request system snapshot partition slice alternate

```
user@host> request system snapshot partition slice alternate
Verifying compatibility of destination media partitions...
Running newfs (439MB) on internal media / partition (da0s1a)...
Running newfs (46MB) on internal media /config partition (da0s1e)...
Copying '/dev/da0s2a' to '/dev/da0s1a' .. (this may take a few minutes)
Copying '/dev/da0s2e' to '/dev/da0s1e' .. (this may take a few minutes)
The following filesystems were archived: / /config
```

### request system snapshot slice alternate

```
user@host> request system snapshot slice alternate
Verifying compatibility of destination media partitions...
Running newfs (439MB) on internal media / partition (da0s1a)...
Running newfs (46MB) on internal media /config partition (da0s1e)...
Copying '/dev/da0s2a' to '/dev/da0s1a' .. (this may take a few minutes)
```

```
Copying '/dev/da0s2e' to '/dev/da0s1e' .. (this may take a few minutes)
The following filesystems were archived: / /config
```

## show bgp neighbor

|                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                   | <pre>show bgp neighbor &lt;exact-instance <i>instance-name</i>&gt; &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;neighbor-address&gt; &lt;orf (detail   <i>neighbor-address</i>)</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Syntax (EX Series Switch and QFX Series)</b> | <pre>show bgp neighbor &lt;instance <i>instance-name</i>&gt; &lt;exact-instance <i>instance-name</i>&gt; &lt;neighbor-address&gt; &lt;orf (<i>neighbor-address</i>   detail)</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>                      | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p> <p><b>orf</b> option introduced in Junos OS Release 9.2.</p> <p><b>exact-instance</b> option introduced in Junos OS Release 11.4.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>                              | Display information about BGP peers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Options</b>                                  | <p><b>none</b>—Display information about all BGP peers.</p> <p><b>exact-instance <i>instance-name</i></b>—(Optional) Display information for the specified instance only.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display information about BGP peers for all routing instances whose name begins with this string (for example, <b>cust1</b>, <b>cust11</b>, and <b>cust111</b> are all displayed when you run the <b>show bgp neighbor instance cust1</b> command).</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>neighbor-address</b>—(Optional) Display information for only the BGP peer at the specified IP address.</p> <p><b>orf (detail   <i>neighbor-address</i>)</b>—(Optional) Display outbound route-filtering information for all BGP peers or only for the BGP peer at the specified IP address. The default is to display brief output. Use the <b>detail</b> option to display detailed output.</p> |
| <b>Additional Information</b>                   | For information about the <b>local-address</b> , <b>nlri</b> , <b>hold-time</b> , and <b>preference</b> statements, see the <i>Junos OS Routing Protocols Library for Routing Devices</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Required Privilege Level</b>                 | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>                    | <ul style="list-style-type: none"> <li><i>clear bgp neighbor</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

**List of Sample Output** [show bgp neighbor on page 300](#)  
[show bgp neighbor \(CLNS\) on page 301](#)  
[show bgp neighbor \(Layer 2 VPN\) on page 301](#)  
[show bgp neighbor \(Layer 3 VPN\) on page 303](#)  
[show bgp neighbor neighbor-address on page 304](#)  
[show bgp neighbor neighbor-address on page 305](#)  
[show bgp neighbor orf neighbor-address detail on page 306](#)

**Output Fields** Table 28 on page 294 describes the output fields for the **show bgp neighbor** command. Output fields are listed in the approximate order in which they appear.

**Table 28: show bgp neighbor Output Fields**

| Field Name   | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Peer</b>  | Address of the BGP neighbor. The address is followed by the neighbor port number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>AS</b>    | AS number of the peer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Local</b> | Address of the local routing device. The address is followed by the peer port number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Type</b>  | Type of peer: <b>Internal</b> or <b>External</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>State</b> | <p>Current state of the BGP session:</p> <ul style="list-style-type: none"> <li>• <b>Active</b>—BGP is initiating a transport protocol connection in an attempt to connect to a peer. If the connection is successful, BGP sends an Open message.</li> <li>• <b>Connect</b>—BGP is waiting for the transport protocol connection to be completed.</li> <li>• <b>Established</b>—The BGP session has been established, and the peers are exchanging update messages.</li> <li>• <b>Idle</b>—This is the first stage of a connection. BGP is waiting for a Start event.</li> <li>• <b>OpenConfirm</b>—BGP has acknowledged receipt of an open message from the peer and is waiting to receive a keepalive or notification message.</li> <li>• <b>OpenSent</b>—BGP has sent an open message and is waiting to receive an open message from the peer.</li> </ul>                                                                                                                  |
| <b>Flags</b> | <p>Internal BGP flags:</p> <ul style="list-style-type: none"> <li>• <b>Aggregate Label</b>—BGP has aggregated a set of incoming labels (labels received from the peer) into a single forwarding label.</li> <li>• <b>CleanUp</b>—The peer session is being shut down.</li> <li>• <b>Delete</b>—This peer has been deleted.</li> <li>• <b>Idled</b>—This peer has been permanently idled.</li> <li>• <b>ImportEval</b>—At the last commit operation, this peer was identified as needing to reevaluate all received routes.</li> <li>• <b>Initializing</b>—The peer session is initializing.</li> <li>• <b>SendRtn</b>—Messages are being sent to the peer.</li> <li>• <b>Sync</b>—This peer is synchronized with the rest of the peer group.</li> <li>• <b>TryConnect</b>—Another attempt is being made to connect to the peer.</li> <li>• <b>Unconfigured</b>—This peer is not configured.</li> <li>• <b>WriteFailed</b>—An attempt to write to this peer failed.</li> </ul> |

Table 28: show bgp neighbor Output Fields (*continued*)

| Field Name        | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Last state</b> | <p>Previous state of the BGP session:</p> <ul style="list-style-type: none"> <li>• <b>Active</b>—BGP is initiating a transport protocol connection in an attempt to connect to a peer. If the connection is successful, BGP sends an Open message.</li> <li>• <b>Connect</b>—BGP is waiting for the transport protocol connection to be completed.</li> <li>• <b>Established</b>—The BGP session has been established, and the peers are exchanging update messages.</li> <li>• <b>Idle</b>—This is the first stage of a connection. BGP is waiting for a Start event.</li> <li>• <b>OpenConfirm</b>—BGP has acknowledged receipt of an open message from the peer and is waiting to receive a keepalive or notification message.</li> <li>• <b>OpenSent</b>—BGP has sent an open message and is waiting to receive an open message from the peer.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Last event</b> | <p>Last activity that occurred in the BGP session:</p> <ul style="list-style-type: none"> <li>• <b>Closed</b>—The BGP session closed.</li> <li>• <b>ConnectRetry</b>—The transport protocol connection failed, and BGP is trying again to connect.</li> <li>• <b>HoldTime</b>—The session ended because the hold timer expired.</li> <li>• <b>KeepAlive</b>—The local routing device sent a BGP keepalive message to the peer.</li> <li>• <b>Open</b>—The local routing device sent a BGP open message to the peer.</li> <li>• <b>OpenFail</b>—The local routing device did not receive an acknowledgment of a BGP open message from the peer.</li> <li>• <b>RecvKeepAlive</b>—The local routing device received a BGP keepalive message from the peer.</li> <li>• <b>RecvNotify</b>—The local routing device received a BGP notification message from the peer.</li> <li>• <b>RecvOpen</b>—The local routing device received a BGP open message from the peer.</li> <li>• <b>RecvUpdate</b>—The local routing device received a BGP update message from the peer.</li> <li>• <b>Start</b>—The peering session started.</li> <li>• <b>Stop</b>—The peering session stopped.</li> <li>• <b>TransportError</b>—A TCP error occurred.</li> </ul> |
| <b>Last error</b> | <p>Last error that occurred in the BGP session:</p> <ul style="list-style-type: none"> <li>• <b>Cease</b>—An error occurred, such as a version mismatch, that caused the session to close.</li> <li>• <b>Finite State Machine Error</b>—In setting up the session, BGP received a message that it did not understand.</li> <li>• <b>Hold Time Expired</b>—The session's hold time expired.</li> <li>• <b>Message Header Error</b>—The header of a BGP message was malformed.</li> <li>• <b>Open Message Error</b>—A BGP open message contained an error.</li> <li>• <b>None</b>—No errors occurred in the BGP session.</li> <li>• <b>Update Message Error</b>—A BGP update message contained an error.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Export</b>     | Name of the export policy that is configured on the peer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Import</b>     | Name of the import policy that is configured on the peer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

Table 28: show bgp neighbor Output Fields (*continued*)

| Field Name                               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Options</b>                           | Configured BGP options: <ul style="list-style-type: none"> <li>• <b>AddressFamily</b>—Configured address family: <b>inet</b> or <b>inet-vpn</b>.</li> <li>• <b>AuthKeyChain</b>—Authentication key change is enabled.</li> <li>• <b>DropPathAttributes</b>—Certain path attributes are configured to be dropped from neighbor updates during inbound processing.</li> <li>• <b>GracefulRestart</b>—Graceful restart is configured.</li> <li>• <b>HoldTime</b>—Hold time configured with the <b>hold-time</b> statement. The hold time is three times the interval at which keepalive messages are sent.</li> <li>• <b>IgnorePathAttributes</b>—Certain path attributes are configured to be ignored in neighbor updates during inbound processing.</li> <li>• <b>Local Address</b>—Address configured with the <b>local-address</b> statement.</li> <li>• <b>Multihop</b>—Allow BGP connections to external peers that are not on a directly connected network.</li> <li>• <b>NLRI</b>—Configured MBGP state for the BGP group: <b>multicast</b>, <b>unicast</b>, or both if you have configured <b>nlri any</b>.</li> <li>• <b>Peer AS</b>—Configured peer autonomous system (AS).</li> <li>• <b>Preference</b>—Preference value configured with the <b>preference</b> statement.</li> <li>• <b>Refresh</b>—Configured to refresh automatically when the policy changes.</li> <li>• <b>Rib-group</b>—Configured routing table group.</li> </ul> |
| <b>Path-attributes dropped</b>           | Path attribute codes that are dropped from neighbor updates.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Path-attributes ignored</b>           | Path attribute codes that are ignored during neighbor updates.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Authentication key change</b>         | (appears only if the <b>authentication-keychain</b> statement has been configured) Name of the authentication keychain enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Authentication algorithm</b>          | (appears only if the <b>authentication-algorithm</b> statement has been configured) Type of authentication algorithm enabled: <b>hmac</b> or <b>md5</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Address families configured</b>       | Names of configured address families for the VPN.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Local Address</b>                     | Address of the local routing device.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Remove-private options</b>            | Options associated with the <b>remove-private</b> statement.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Holdtime</b>                          | Hold time configured with the <b>hold-time</b> statement. The hold time is three times the interval at which keepalive messages are sent.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Flags for NLRI inet-label-unicast</b> | Flags related to labeled-unicast: <ul style="list-style-type: none"> <li>• <b>TrafficStatistics</b>—Collection of statistics for labeled-unicast traffic is enabled.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |



Table 28: show bgp neighbor Output Fields (*continued*)

| Field Name                                 | Field Description                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Traffic statistics</b>                  | Information about labeled-unicast traffic statistics: <ul style="list-style-type: none"> <li>• <b>Options</b>—Options configured for collecting statistics about labeled-unicast traffic.</li> <li>• <b>File</b>—Name and location of statistics log files.</li> <li>• <b>size</b>—Size of all the log files, in bytes.</li> <li>• <b>files</b>—Number of log files.</li> </ul> |
| <b>Traffic Statistics Interval</b>         | Time between sample periods for labeled-unicast traffic statistics, in seconds.                                                                                                                                                                                                                                                                                                 |
| <b>Preference</b>                          | Preference value configured with the <b>preference</b> statement.                                                                                                                                                                                                                                                                                                               |
| <b>Outbound Timer</b>                      | Time for which the route is available in Junos OS routing table before it is exported to BGP. This field is displayed in the output only if the <b>out-delay</b> parameter is configured to a non-zero value.                                                                                                                                                                   |
| <b>Number of flaps</b>                     | Number of times the BGP session has gone down and then come back up.                                                                                                                                                                                                                                                                                                            |
| <b>Peer ID</b>                             | Router identifier of the peer.                                                                                                                                                                                                                                                                                                                                                  |
| <b>Group index</b>                         | Index number for the BGP peer group. The index number differentiates between groups when a single BGP group is split because of different configuration options at the group and peer levels.                                                                                                                                                                                   |
| <b>Peer index</b>                          | Index that is unique within the BGP group to which the peer belongs.                                                                                                                                                                                                                                                                                                            |
| <b>Local ID</b>                            | Router identifier of the local routing device.                                                                                                                                                                                                                                                                                                                                  |
| <b>Local Interface</b>                     | Name of the interface on the local routing device.                                                                                                                                                                                                                                                                                                                              |
| <b>Active holdtime</b>                     | Hold time that the local routing device negotiated with the peer.                                                                                                                                                                                                                                                                                                               |
| <b>Keepalive Interval</b>                  | Keepalive interval, in seconds.                                                                                                                                                                                                                                                                                                                                                 |
| <b>BFD</b>                                 | Status of BFD failure detection.                                                                                                                                                                                                                                                                                                                                                |
| <b>Local Address</b>                       | Name of directly connected interface over which direct EBGP peering is established.                                                                                                                                                                                                                                                                                             |
| <b>NLRI for restart configured on peer</b> | Names of address families configured for restart.                                                                                                                                                                                                                                                                                                                               |
| <b>NLRI advertised by peer</b>             | Address families supported by the peer: <b>unicast</b> or <b>multicast</b> .                                                                                                                                                                                                                                                                                                    |
| <b>NLRI for this session</b>               | Address families being used for this session.                                                                                                                                                                                                                                                                                                                                   |
| <b>Peer supports Refresh capability</b>    | Remote peer's ability to send and request full route table readvertisement (route refresh capability). For more information, see RFC 2918, <i>Route Refresh Capability for BGP-4</i> .                                                                                                                                                                                          |
| <b>Restart time configured on peer</b>     | Configured time allowed for restart on the neighbor.                                                                                                                                                                                                                                                                                                                            |

Table 28: show bgp neighbor Output Fields (*continued*)

| Field Name                                                 | Field Description                                                                                                                                                                                                                         |
|------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Stale routes from peer are kept for                        | When graceful restart is negotiated, the maximum time allowed to hold routes from neighbors after the BGP session has gone down.                                                                                                          |
| Peer does not support Restarter functionality              | Graceful restart restarter-mode is disabled on the peer.                                                                                                                                                                                  |
| Peer does not support Receiver functionality               | Graceful restart helper-mode is disabled on the peer.                                                                                                                                                                                     |
| Restart time requested by this peer                        | Restart time requested by this neighbor during capability negotiation.                                                                                                                                                                    |
| Restart flag received from the peer                        | When this field appears, the BGP speaker has restarted (Restarting), and this peer should not wait for the <b>end-of-rib</b> marker from the speaker before advertising routing information to the speaker.                               |
| NLRI that peer supports restart for                        | Neighbor supports graceful restart for this address family.                                                                                                                                                                               |
| NLRI peer can save forwarding state                        | Neighbor supporting this address family saves all forwarding states.                                                                                                                                                                      |
| NLRI that peer saved forwarding for                        | Neighbor saves all forwarding states for this address family.                                                                                                                                                                             |
| NLRI that restart is negotiated for                        | Router supports graceful restart for this address family.                                                                                                                                                                                 |
| NLRI of received end-of-rib markers                        | Address families for which end-of-routing-table markers are received from the neighbor.                                                                                                                                                   |
| NLRI of all end-of-rib markers sent                        | Address families for which end-of-routing-table markers are sent to the neighbor.                                                                                                                                                         |
| Peer supports 4 byte AS extension (peer-as 1)              | Peer understands 4-byte AS numbers in BGP messages. The peer is running Junos OS Release 9.1 or later.                                                                                                                                    |
| NLRIs for which peer can receive multiple paths            | Appears in the command output of the local router if the downstream peer is configured to receive multiple BGP routes to a single destination, instead of only receiving the active route.<br><br>Possible value is <b>inet-unicast</b> . |
| NLRIs for which peer can send multiple paths: inet-unicast | Appears in the command output of the local router if the upstream peer is configured to send multiple BGP routes to a single destination, instead of only sending the active route.<br><br>Possible value is <b>inet-unicast</b> .        |

Table 28: show bgp neighbor Output Fields (*continued*)

| Field Name                    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Table inet.number             | <p>Information about the routing table:</p> <ul style="list-style-type: none"> <li>• <b>RIB State</b>—BGP is in the graceful restart process for this routing table: <b>restart is complete</b> or <b>restart in progress</b>.</li> <li>• <b>Bit</b>—Number that represents the entry in the routing table for this peer.</li> <li>• <b>Send state</b>—State of the BGP group: <b>in sync</b>, <b>not in sync</b>, or <b>not advertising</b>.</li> <li>• <b>Active prefixes</b>—Number of prefixes received from the peer that are active in the routing table.</li> <li>• <b>Received prefixes</b>—Total number of prefixes from the peer, both active and inactive, that are in the routing table.</li> <li>• <b>Accepted prefixes</b>—Total number of prefixes from the peer that have been accepted by a routing policy.</li> <li>• <b>Suppressed due to damping</b>—Number of routes currently inactive because of damping or other reasons. These routes do not appear in the forwarding table and are not exported by routing protocols.</li> </ul> |
| Last traffic (seconds)        | Last time any traffic was received from the peer or sent to the peer, and the last time the local routing device checked.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Input messages                | Messages that BGP has received from the receive socket buffer, showing the total number of messages, number of update messages, number of times a policy is changed and refreshed, and the buffer size in octets. The buffer size is 16 KB.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Output messages               | Messages that BGP has written to the transmit socket buffer, showing the total number of messages, number of update messages, number of times a policy is changed and refreshed, and the buffer size in octets. The buffer size is 16 KB.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Input dropped path attributes | <p>Information about dropped path attributes:</p> <ul style="list-style-type: none"> <li>• <b>Code</b>—Path attribute code.</li> <li>• <b>Count</b>—Path attribute count.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Input ignored path attributes | <p>Information about ignored path attributes:</p> <ul style="list-style-type: none"> <li>• <b>Code</b>—Path attribute code.</li> <li>• <b>Count</b>—Path attribute count.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Output queue                  | Number of BGP packets that are queued to be transmitted to a particular neighbor for a particular routing table. Output queue 0 is for unicast NLRIs, and queue 1 is for multicast NLRIs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Trace options                 | Configured tracing of BGP protocol packets and operations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Trace file                    | Name of the file to receive the output of the tracing operation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Filter Updates rcv            | <p>(orf option only) Number of outbound-route filters received for each configured address family.</p> <p><b>NOTE:</b> The counter is cumulative. For example, the counter is increased after the remote peer either resends or clears the outbound route filtering prefix list.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

Table 28: show bgp neighbor Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Immediate</b>               | ( <b>orf</b> option only) Number of route updates received with the immediate flag set. The immediate flag indicates that the BGP peer should readvertise the updated routes.<br><br><b>NOTE:</b> The counter is cumulative. For example, the counter is increased after the remote peer either resends or clears the outbound route filtering prefix list. |
| <b>Filter</b>                  | ( <b>orf</b> option only) Type of prefix filter received: <b>prefix-based</b> or <b>extended-community</b> .                                                                                                                                                                                                                                                |
| <b>Received filter entries</b> | ( <b>orf</b> option only) List of received filters displayed.                                                                                                                                                                                                                                                                                               |
| <b>seq</b>                     | ( <b>orf</b> option only) Numerical order assigned to this prefix entry among all the received outbound route filter prefix entries.                                                                                                                                                                                                                        |
| <b>prefix</b>                  | ( <b>orf</b> option only) Address for the prefix entry that matches the filter.                                                                                                                                                                                                                                                                             |
| <b>minlength</b>               | ( <b>orf</b> option only) Minimum prefix length, in bits, required to match this prefix.                                                                                                                                                                                                                                                                    |
| <b>maxlength</b>               | ( <b>orf</b> option only) Maximum prefix length, in bits, required to match this prefix.                                                                                                                                                                                                                                                                    |
| <b>match</b>                   | ( <b>orf</b> option only) For this prefix match, whether to <b>permit</b> or <b>deny</b> route updates.                                                                                                                                                                                                                                                     |

## Sample Output

### show bgp neighbor

```

user@host > show bgp neighbor
Peer: 10.255.7.250+179 AS 10   Local: 10.255.7.248+63740 AS 10
  Type: Internal   State: Established   Flags: <Sync>
  Last State: OpenConfirm   Last Event: RecvKeepAlive
  Last Error: None
  Export: [ redist_static ]
  Options: <Preference LocalAddress PeerAS Refresh>
  Local Address: 10.255.7.248 Holdtime: 90 Preference: 170 Outbound Timer: 50
  Number of flaps: 0
  Peer ID: 10.255.7.250   Local ID: 10.255.7.248   Active Holdtime: 90
  Keepalive Interval: 30   Group index: 0   Peer index: 0
  BFD: disabled, down
  NLRI for restart configured on peer: inet-unicast
  NLRI advertised by peer: inet-unicast
  NLRI for this session: inet-unicast
  Peer supports Refresh capability (2)
  Stale routes from peer are kept for: 300
  Peer does not support Restarter functionality
  NLRI that restart is negotiated for: inet-unicast
  NLRI of received end-of-rib markers: inet-unicast
  NLRI of all end-of-rib markers sent: inet-unicast
  Peer supports 4 byte AS extension (peer-as 10)
  Peer does not support Addpath
  Table inet.0 Bit: 10000
    RIB State: BGP restart is complete
    Send state: in sync
    Active prefixes:           1
    Received prefixes:         1

```

```

Accepted prefixes:          1
Suppressed due to damping:  0
Advertised prefixes:        1
Last traffic (seconds): Received 9    Sent 5    Checked 5
Input messages:  Total 36    Updates 2    Refreshes 0    Octets 718
Output messages: Total 37    Updates 1    Refreshes 0    Octets 796
Output Queue[0]: 0

Peer: 10.255.162.214+52193 AS 100 Local: 10.255.167.205+179 AS 100
Type: Internal    State: Established (route reflector client)Flags: <Sync>
Last State: OpenConfirm    Last Event: RecvKeepAlive
Last Error: None
Options: <Preference LocalAddress Cluster AddressFamily Rib-group Refresh>
Address families configured: inet-unicast inet-vpn-unicast route-target
Local Address: 10.255.167.205 Holdtime: 90 Preference: 170
Number of flaps: 0
Peer ID: 10.255.162.214    Local ID: 10.255.167.205    Active Holdtime: 90
Keepalive Interval: 30    Group index: 0    Peer index: 1

```

### show bgp neighbor (CLNS)

```

user@host> show bgp neighbor
Peer: 10.245.245.1+179 AS 200 Local: 10.245.245.3+3770 AS 100
Type: External    State: Established    Flags: <ImportEval Sync>
Last State: OpenConfirm    Last Event: RecvKeepAlive
Last Error: None
Options: <Multihop Preference LocalAddress HoldTime AddressFamily PeerAS
Rib-group Refresh>
Address families configured: iso-vpn-unicast
Local Address: 10.245.245.3 Holdtime: 90 Preference: 170
Number of flaps: 0
Peer ID: 10.245.245.1    Local ID: 10.245.245.3    Active Holdtime: 90
Keepalive Interval: 30    Peer index: 0
NLRI advertised by peer: iso-vpn-unicast
NLRI for this session: iso-vpn-unicast
Peer supports Refresh capability (2)
Table bgp.isovpn.0 Bit: 10000
RIB State: BGP restart is complete
RIB State: VPN restart is complete
Send state: in sync
Active prefixes:          3
Received prefixes:        3
Suppressed due to damping: 0
Advertised prefixes:      3
Table aaa.iso.0
RIB State: BGP restart is complete
RIB State: VPN restart is complete
Send state: not advertising
Active prefixes:          3
Received prefixes:        3
Suppressed due to damping: 0
Last traffic (seconds): Received 6    Sent 5    Checked 5
Input messages:  Total 1736    Updates 4    Refreshes 0    Octets 33385
Output messages: Total 1738    Updates 3    Refreshes 0    Octets 33305
Output Queue[0]: 0
Output Queue[1]: 0

```

### show bgp neighbor (Layer 2 VPN)

```

user@host> show bgp neighbor
Peer: 10.69.103.2    AS 65100 Local: 10.69.103.1    AS 65103
Type: External    State: Active    Flags: <ImportEval>

```

```

Last State: Idle          Last Event: Start
Last Error: None
Export: [ BGP-INET-import ]
Options: <Preference LocalAddress HoldTime GracefulRestart AddressFamily PeerAS
Refresh>
Address families configured: inet-unicast
Local Address: 10.69.103.1 Holdtime: 90 Preference: 170
Number of flaps: 0
Peer: 10.69.104.2      AS 65100 Local: 10.69.104.1      AS 65104
Type: External      State: Active      Flags: <ImportEval>
Last State: Idle          Last Event: Start
Last Error: None
Export: [ BGP-L-import ]
Options: <Preference LocalAddress HoldTime GracefulRestart AddressFamily PeerAS
Refresh>
Address families configured: inet-labeled-unicast
Local Address: 10.69.104.1 Holdtime: 90 Preference: 170
Number of flaps: 0
Peer: 10.255.14.182+179 AS 69      Local: 10.255.14.176+2131 AS 69
Type: Internal      State: Established      Flags: <ImportEval>
Last State: OpenConfirm      Last Event: RecvKeepAlive
Last Error: None
Options: <Preference LocalAddress HoldTime GracefulRestart AddressFamily
Rib-group Refresh>
Address families configured: inet-vpn-unicast l2vpn
Local Address: 10.255.14.176 Holdtime: 90 Preference: 170
Number of flaps: 0
Peer ID: 10.255.14.182      Local ID: 10.255.14.176      Active Holdtime: 90
Keepalive Interval: 30
NLRI for restart configured on peer: inet-vpn-unicast l2vpn
NLRI advertised by peer: inet-vpn-unicast l2vpn
NLRI for this session: inet-vpn-unicast l2vpn
Peer supports Refresh capability (2)
Restart time configured on the peer: 120
Stale routes from peer are kept for: 300
Restart time requested by this peer: 120
NLRI that peer supports restart for: inet-vpn-unicast l2vpn
NLRI peer can save forwarding state: inet-vpn-unicast l2vpn
NLRI that peer saved forwarding for: inet-vpn-unicast l2vpn
NLRI that restart is negotiated for: inet-vpn-unicast l2vpn
NLRI of received end-of-rib markers: inet-vpn-unicast l2vpn
Table bgp.l3vpn.0 Bit: 10000
  RIB State: BGP restart in progress
  RIB State: VPN restart in progress
  Send state: in sync
  Active prefixes:          10
  Received prefixes:        10
  Suppressed due to damping: 0
Table bgp.l2vpn.0 Bit: 20000
  RIB State: BGP restart in progress
  RIB State: VPN restart in progress
  Send state: in sync
  Active prefixes:          1
  Received prefixes:        1
  Suppressed due to damping: 0
Table BGP-INET.inet.0 Bit: 30000
  RIB State: BGP restart in progress
  RIB State: VPN restart in progress
  Send state: in sync
  Active prefixes:          2
  Received prefixes:        2

```

```

    Suppressed due to damping: 0
Table BGP-L.inet.0 Bit: 40000
  RIB State: BGP restart in progress
  RIB State: VPN restart in progress
  Send state: in sync
  Active prefixes:          2
  Received prefixes:        2
  Suppressed due to damping: 0
Table LDP.inet.0 Bit: 50000
  RIB State: BGP restart is complete
  RIB State: VPN restart in progress
  Send state: in sync
  Active prefixes:          1
  Received prefixes:        1
  Suppressed due to damping: 0
Table OSPF.inet.0 Bit: 60000
  RIB State: BGP restart is complete
  RIB State: VPN restart in progress
  Send state: in sync
  Active prefixes:          2
  Received prefixes:        2
  Suppressed due to damping: 0
Table RIP.inet.0 Bit: 70000
  RIB State: BGP restart is complete
  RIB State: VPN restart in progress
  Send state: in sync
  Active prefixes:          2
  Received prefixes:        2
  Suppressed due to damping: 0
Table STATIC.inet.0 Bit: 80000
  RIB State: BGP restart is complete
  RIB State: VPN restart in progress
  Send state: in sync
  Active prefixes:          1
  Received prefixes:        1
  Suppressed due to damping: 0
Table L2VPN.l2vpn.0 Bit: 90000
  RIB State: BGP restart is complete
  RIB State: VPN restart in progress
  Send state: in sync
  Active prefixes:          1
  Received prefixes:        1
  Suppressed due to damping: 0
Last traffic (seconds): Received 0    Sent 0    Checked 0
Input messages: Total 14    Updates 13    Refreshes 0    Octets 1053
Output messages: Total 3    Updates 0    Refreshes 0    Octets 105
Output Queue[0]: 0
Output Queue[1]: 0
Output Queue[2]: 0
Output Queue[3]: 0
Output Queue[4]: 0
Output Queue[5]: 0
Output Queue[6]: 0
Output Queue[7]: 0
Output Queue[8]: 0

```

### show bgp neighbor (Layer 3 VPN)

```

user@host> show bgp neighbor
Peer: 4.4.4.4+179    AS 10045 Local: 5.5.5.5+1214    AS 10045
Type: Internal    State: Established    Flags: <ImportEval>

```

```

Last State: OpenConfirm   Last Event: RecvKeepAlive
Last Error: None
Export: [ match-all ] Import: [ match-all ]
Options: <Preference LocalAddress HoldTime GracefulRestart AddressFamily
        Rib-group Refresh>
Address families configured: inet-vpn-unicast
Local Address: 5.5.5.5 Holdtime: 90 Preference: 170
Flags for NLRI inet-labeled-unicast: TrafficStatistics
Traffic Statistics: Options: all File: /var/log/bstat.log
                                size 131072 files 10

Traffic Statistics Interval: 60
Number of flaps: 0
Peer ID: 192.168.1.110    Local ID: 192.168.1.111    Active Holdtime: 90
Keepalive Interval: 30
NLRI for restart configured on peer: inet-vpn-unicast
NLRI advertised by peer: inet-vpn-unicast
NLRI for this session: inet-vpn-unicast
Peer supports Refresh capability (2)
Restart time configured on the peer: 120
Stale routes from peer are kept for: 300
Restart time requested by this peer: 120
NLRI that peer supports restart for: inet-vpn-unicast
NLRI peer can save forwarding state: inet-vpn-unicast
NLRI that peer saved forwarding for: inet-vpn-unicast
NLRI that restart is negotiated for: inet-vpn-unicast
NLRI of received end-of-rib markers: inet-vpn-unicast
NLRI of all end-of-rib markers sent: inet-vpn-unicast
Table bgp.13vpn.0 Bit: 10000
  RIB State: BGP restart is complete
  RIB State: VPN restart is complete
  Send state: in sync
  Active prefixes:          2
  Received prefixes:        2
  Suppressed due to damping: 0
Table vpn-green.inet.0 Bit: 20001
  RIB State: BGP restart is complete
  RIB State: VPN restart is complete
  Send state: in sync
  Active prefixes:          2
  Received prefixes:        2
  Suppressed due to damping: 0
Last traffic (seconds): Received 15   Sent 20   Checked 20
Input messages:  Total 40   Updates 2   Refreshes 0   Octets 856
Output messages: Total 44   Updates 2   Refreshes 0   Octets 1066
Output Queue[0]: 0
Output Queue[1]: 0
Trace options: detail packets
Trace file: /var/log/bgpr.log size 131072 files 10

```

### show bgp neighbor neighbor-address

```

user@host> show bgp neighbor 192.168.1.111
Peer: 10.255.245.12+179 AS 35 Local: 10.255.245.13+2884 AS 35
Type: Internal   State: Established (route reflector client)Flags: <Sync>
Last State: OpenConfirm   Last Event: RecvKeepAlive
Last Error: None
Options: <Preference LocalAddress HoldTime Cluster AddressFamily Rib-group
Refresh>
Address families configured: inet-vpn-unicast inet-labeled-unicast
Local Address: 10.255.245.13 Holdtime: 90 Preference: 170
Flags for NLRI inet-vpn-unicast: AggregateLabel

```



```

Flags for NLRI inet-labeled-unicast: AggregateLabel
Number of flaps: 0
Peer ID: 10.255.245.12    Local ID: 10.255.245.13    Active Holdtime: 90
Keepalive Interval: 30
BFD: disabled
NLRI advertised by peer: inet-vpn-unicast inet-labeled-unicast
NLRI for this session: inet-vpn-unicast inet-labeled-unicast
Peer supports Refresh capability (2)
Restart time configured on the peer: 300
Stale routes from peer are kept for: 60
Restart time requested by this peer: 300
NLRI that peer supports restart for: inet-unicast inet6-unicast
NLRI that restart is negotiated for: inet-unicast inet6-unicast
NLRI of received end-of-rib markers: inet-unicast inet6-unicast
NLRI of all end-of-rib markers sent: inet-unicast inet6-unicast
Table inet.0 Bit: 10000
  RIB State: restart is complete
  Send state: in sync
  Active prefixes: 4
  Received prefixes: 6
  Suppressed due to damping: 0
Table inet6.0 Bit: 20000
  RIB State: restart is complete
  Send state: in sync
  Active prefixes: 0
  Received prefixes: 2
  Suppressed due to damping: 0
Last traffic (seconds): Received 3    Sent 3    Checked 3
Input messages: Total 9    Updates 6    Refreshes 0    Octets 403
Output messages: Total 7    Updates 3    Refreshes 0    Octets 365
Output Queue[0]: 0
Output Queue[1]: 0
Trace options: detail packets
Trace file: /var/log/bgpr size 131072 files 10

```

### show bgp neighbor neighbor-address

```

user@host> show bgp neighbor 192.168.4.222
Peer: 192.168.4.222+4902 AS 65501 Local: 192.168.4.221+179 AS 65500
  Type: External    State: Established    Flags: <Sync>
  Last State: OpenConfirm    Last Event: RecvKeepAlive
  Last Error: Cease
  Export: [ export-policy ] Import: [ import-policy ]
  Options: <Preference HoldTime AddressFamily PeerAS PrefixLimit Refresh>
  Address families configured: inet-unicast inet-multicast
  Holdtime: 60000 Preference: 170
  Number of flaps: 4
  Last flap event: RecvUpdate
  Error: 'Cease' Sent: 5 Recv: 0
  Peer ID: 10.255.245.6    Local ID: 10.255.245.5    Active Holdtime: 60000
  Keepalive Interval: 20000    Peer index: 0
  BFD: disabled, down
  Local Interface: fxp0.0
  NLRI advertised by peer: inet-unicast inet-multicast
  NLRI for this session: inet-unicast inet-multicast
  Peer supports Refresh capability (2)
  Table inet.0 Bit: 10000
    RIB State: BGP restart is complete
    Send state: in sync
    Active prefixes:      8
    Received prefixes:    10

```

```
Accepted prefixes:          10
Suppressed due to damping:  0
Advertised prefixes:        3
Table inet.2 Bit: 20000
RIB State: BGP restart is complete
Send state: in sync
Active prefixes:            0
Received prefixes:          0
Accepted prefixes:          0
Suppressed due to damping:  0
Advertised prefixes:        0
Last traffic (seconds): Received 357 Sent 357 Checked 357
Input messages: Total 4 Updates 2 Refreshes 0 Octets 211
Output messages: Total 4 Updates 1 Refreshes 0 Octets 147
Output Queue[0]: 0
Output Queue[1]: 0
Trace options: all
Trace file: /var/log/bgp size 10485760 files 10
```

### show bgp neighbor orf neighbor-address detail

```
user@host > show bgp neighbor orf 192.168.165.56 detail
Peer: 192.168.165.56+179 Type: External
Group: ext1

inet-unicast
  Filter updates rcv:          1 Immediate:          1
  Filter: prefix-based receive
  Received filter entries:
    seq 1: prefix 2.2.2.2/32: minlen 32: maxlen 32: match deny:

inet6-unicast
  Filter updates rcv:          0 Immediate:          1
  Filter: prefix-based receive
  Received filter entries:
    *.*
```

## show bgp replication

|                                 |                                                                                                                                                                                   |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <b>show bgp replication</b>                                                                                                                                                       |
| <b>Release Information</b>      | Command introduced in JUNOS Release 8.5.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                       |
| <b>Description</b>              | Displays the status of BGP state replication between the master and backup Routing Engines on devices that have nonstop active routing configured on them.                        |
| <b>Options</b>                  | This command has no options.                                                                                                                                                      |
| <b>Required Privilege Level</b> | view                                                                                                                                                                              |
| <b>List of Sample Output</b>    | <a href="#">show bgp replication (for Master) on page 308</a><br><a href="#">show bgp replication (for Backup) on page 308</a>                                                    |
| <b>Output Fields</b>            | <a href="#">Table 29 on page 307</a> lists the output fields for the <b>show bgp replication</b> command. Output fields are listed in the approximate order in which they appear. |

**Table 29: show bgp replication Output Fields**

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>session state</b>           | State of the current internal BGP state replication session, Up or Down, and the duration for which the session has been in the indicated state.                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>flaps</b>                   | Total number of flaps that occurred.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>protocol state</b>          | Current state of the protocol operation, Active, Connect, Idle, and the duration for which the protocol has been in the indicated state.                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>synchronization state</b>   | Synchronization state at the time of executing the command. The states can be: <ul style="list-style-type: none"> <li>• <b>Idle</b></li> <li>• <b>Neighbor</b>—Indicates that the neighbor state synchronization is in progress.</li> <li>• <b>AckWait</b>—Indicates that the request processing is over.</li> <li>• <b>ORF</b>—Indicates that the outbound routing filter synchronization is in progress.</li> <li>• <b>RIB</b>—Indicates that the routing table synchronization is in progress.</li> <li>• <b>Complete</b></li> </ul> |
| <b>number of peers waiting</b> | Total number of peers waiting for various messages: <ul style="list-style-type: none"> <li>• <b>AckWait</b>—Number of peers waiting for a connection establishment or completed acknowledgment messages.</li> <li>• <b>SoWait</b>—Number of peers waiting for TCP socket-related operations.</li> <li>• <b>Scheduled</b>—Number of peers being synchronized.</li> </ul>                                                                                                                                                                 |

Table 29: show bgp replication Output Fields (*continued*)

| Field Name               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>messages sent</b>     | <p>Number of various types of messages that have been sent since internal replication session became active:</p> <ul style="list-style-type: none"> <li>• <b>Open</b>—Number of Open messages sent.</li> <li>• <b>Establish</b>—Number of connection establishment acknowledgment messages sent.</li> <li>• <b>Update</b>—Number of update messages sent.</li> <li>• <b>Error</b>—Number of error messages sent.</li> <li>• <b>Complete</b>—Number of connection complete acknowledgment messages sent.</li> </ul>                                                                                                                               |
| <b>messages received</b> | <p>Total number of messages received:</p> <ul style="list-style-type: none"> <li>• <b>Open</b>—Number of Open messages received.</li> <li>• <b>Request</b>—Number of request messages received: <ul style="list-style-type: none"> <li>• <b>Wildcard</b>—Number of requests received that used wildcards in the target address.</li> <li>• <b>Targeted</b>—Number of requests received that used a specific address.</li> </ul> </li> <li>• <b>EstablishAck</b>—Number of connection establishment acknowledgement messages received.</li> <li>• <b>CompleteAck</b>—Number of connection completed acknowledgement messages received.</li> </ul> |

## Sample Output

### show bgp replication (for Master)

```

user@host> show bgp replication
Synchronization master:
  Session state: Up, Since: 44:07
  Flaps: 0
  Protocol state: Idle, Since: 14
  Synchronization state: Complete
  Number of peers waiting: AckWait: 0, SoWait: 0, Scheduled: 0
  Messages sent: Open 1, Establish 924, Update 381, Error 60, Complete 114
  Messages received: Open 1, Request 1 wildcard 113 targeted, EstablishAck 924,
  CompleteAck 114

```

### show bgp replication (for Backup)

```

user@host> show bgp replication
Synchronization backup:
  State: Established 13 ago
  , Unsync timer: 2

  Unsync entry queue:
    Instance: 0 Neighbor: 30.30.30.1 elapsed: 7
    Instance: 0 Neighbor: 40.40.40.3 elapsed: 7
    Instance: 0 Neighbor: 40.40.40.4 elapsed: 7
    Instance: 0 Neighbor: 40.40.40.5 elapsed: 7
    Instance: 0 Neighbor: 40.40.40.6 elapsed: 7
    Instance: 0 Neighbor: 40.40.40.1 elapsed: 7
    Instance: 0 Neighbor: 40.40.40.2 elapsed: 7

```

## show bgp summary

|                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                   | <pre>show bgp summary &lt;exact-instance <i>instance-name</i>&gt; &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Syntax (EX Series Switch and QFX Series)</b> | <pre>show bgp summary &lt;exact-instance <i>instance-name</i>&gt; &lt;instance <i>instance-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>                      | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p> <p><b>exact-instance</b> option introduced in Junos OS Release 11.4.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>                              | Display BGP summary information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Options</b>                                  | <p><b>none</b>—Display BGP summary information for all routing instances.</p> <p><b>exact-instance <i>instance-name</i></b>—(Optional) Display information for the specified instance only.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display information for all routing instances whose name begins with this string (for example, <b>cust1</b>, <b>cust11</b>, and <b>cust111</b> are all displayed when you run the <b>show bgp summary instance cust1</b> command). The instance name can be master for the main instance, or any valid configured instance name or its prefix.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                 | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>List of Sample Output</b>                    | <p><a href="#">show bgp summary (When a Peer Is Not Established) on page 312</a></p> <p><a href="#">show bgp summary (When a Peer Is Established) on page 312</a></p> <p><a href="#">show bgp summary (CLNS) on page 312</a></p> <p><a href="#">show bgp summary (Layer 2 VPN) on page 312</a></p> <p><a href="#">show bgp summary (Layer 3 VPN) on page 313</a></p>                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Output Fields</b>                            | <p><a href="#">Table 30 on page 309</a> describes the output fields for the <b>show bgp summary</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

**Table 30: show bgp summary Output Fields**

| Field Name | Field Description     |
|------------|-----------------------|
| Groups     | Number of BGP groups. |
| Peers      | Number of BGP peers.  |

Table 30: show bgp summary Output Fields (*continued*)

| Field Name          | Field Description                                                                                                                                                      |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Down peers</b>   | Number of down BGP peers.                                                                                                                                              |
| <b>Table</b>        | Name of routing table.                                                                                                                                                 |
| <b>Tot Paths</b>    | Total number of paths.                                                                                                                                                 |
| <b>Act Paths</b>    | Number of active routes.                                                                                                                                               |
| <b>Suppressed</b>   | Number of routes currently inactive because of damping or other reasons. These routes do not appear in the forwarding table and are not exported by routing protocols. |
| <b>History</b>      | Number of withdrawn routes stored locally to keep track of damping history.                                                                                            |
| <b>Damp State</b>   | Number of routes with a figure of merit greater than zero, but still active because the value has not reached the threshold at which suppression occurs.               |
| <b>Pending</b>      | Routes in process by BGP import policy.                                                                                                                                |
| <b>Peer</b>         | Address of each BGP peer. Each peer has one line of output.                                                                                                            |
| <b>AS</b>           | Peer's AS number.                                                                                                                                                      |
| <b>InPkt</b>        | Number of packets received from the peer.                                                                                                                              |
| <b>OutPkt</b>       | Number of packets sent to the peer.                                                                                                                                    |
| <b>OutQ</b>         | Number of BGP packets that are queued to be transmitted to a particular neighbor. It normally is 0 because the queue usually is emptied quickly.                       |
| <b>Flaps</b>        | Number of times the BGP session has gone down and then come back up.                                                                                                   |
| <b>Last Up/Down</b> | Last time since the neighbor transitioned to or from the established state.                                                                                            |

Table 30: show bgp summary Output Fields (*continued*)

| Field Name                                              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>State #Active<br/>/Received/Accepted<br/>/Damped</b> | <p>Multipurpose field that displays information about BGP peer sessions. The field's contents depend upon whether a session is established and whether it was established on the main routing device or in a routing instance.</p> <ul style="list-style-type: none"> <li>If a peer is not established, the field shows the state of the peer session: <b>Active</b>, <b>Connect</b>, or <b>Idle</b>. In general, the Idle state is the first stage of a connection. BGP is waiting for a Start event. A session can be idle for other reasons as well. The reason that a session is idle is sometimes displayed. For example: <b>Idle (Removal in progress)</b> or <b>Idle (LicenseFailure)</b>.</li> <li>If a BGP session is established on the main routing device, the field shows the number of active, received, accepted, and damped routes that are received from a neighbor and appear in the <b>inet.0</b> (main) and <b>inet.2</b> (multicast) routing tables. For example, <b>8/10/10/2</b> and <b>2/4/4/0</b> indicate the following: <ul style="list-style-type: none"> <li>8 active routes, 10 received routes, 10 accepted routes, and 2 damped routes from a BGP peer appear in the <b>inet.0</b> routing table.</li> <li>2 active routes, 4 received routes, 4 accepted routes, and no damped routes from a BGP peer appear in the <b>inet.2</b> routing table.</li> </ul> </li> <li>If a BGP session is established in a routing instance, the field indicates the established (<b>Establ</b>) state, identifies the specific routing table that receives BGP updates, and shows the number of active, received, and damped routes that are received from a neighbor. For example, <b>Establ VPN-AB.inet.0: 2/4/0</b> indicates the following: <ul style="list-style-type: none"> <li>The BGP session is established.</li> <li>Routes are received in the <b>VPN-AB.inet.0</b> routing table.</li> <li>The local routing device has two active routes, four received routes, and no damped routes from a BGP peer.</li> </ul> </li> </ul> <p>When a BGP session is established, the peers are exchanging update messages.</p> |

## Sample Output

### show bgp summary (When a Peer Is Not Established)

```

user@host> show bgp summary
Groups: 2 Peers: 4 Down peers: 1
Table      Tot Paths  Act Paths Suppressed  History  Damp State   Pending
inet.0      6          4          0          0        0      0        0
Peer        AS      InPkt    OutPkt    OutQ    Flaps  Last Up/Dwn
State|#Active/Received/Damped...
10.0.0.3     65002      86       90       0        2      42:54 0/0/0

0/0/0
10.0.0.4     65002      90       91       0        1      42:54 0/2/0

0/0/0
10.0.0.6     65002      87       90       0        3          3 Active
10.1.12.1    65001      89       89       0        1      42:54 4/4/0

0/0/0

```

### show bgp summary (When a Peer Is Established)

```

user@host> show bgp summary
Groups: 1 Peers: 3 Down peers: 0
Table      Tot Paths  Act Paths Suppressed  History  Damp State   Pending
inet.0      6          4          0          0        0      0        0
Peer        AS      InPkt    OutPkt    OutQ    Flaps  Last Up/Dwn
State|#Active/Received/Damped...
10.0.0.2     65002    88675    88652     0        2      42:38 2/4/0

0/0/0
10.0.0.3     65002    54528    54532     0        1     2w4d22h 0/0/0

0/0/0
10.0.0.4     65002    51597    51584     0        0     2w3d22h 2/2/0

0/0/0

```

### show bgp summary (CLNS)

```

user@host> show bgp summary
Groups: 1 Peers: 1 Down peers: 0
Peer        AS      InPkt    OutPkt    OutQ    Flaps  Last Up/Dwn
State|#Active/Received/Damped...
10.245.245.1 200     1735     1737     0        0    14:26:12 Establ
  bgp.isovpn.0: 3/3/0
  aaaa.iso.0: 3/3/0

```

### show bgp summary (Layer 2 VPN)

```

user@host> show bgp summary
Groups: 1 Peers: 5 Down peers: 0
Table      Tot Paths  Act Paths Suppressed  History  Damp State   Pending
bgp.l2vpn.0 1          1          0          0        0      0        0
inet.0      0          0          0          0        0      0        0
Peer        AS      InPkt    OutPkt    OutQ    Flaps  Last Up/Dwn
State|#Active/Received/Damped...
10.255.245.35 65299     72       74       0        1     19:00 Establ
  bgp.l2vpn.0: 1/1/0
  frame-vpn.l2vpn.0: 1/1/0

```



```

10.255.245.36 65299      2164      2423      0        4        19:50 Establ
  bgp.12vpn.0: 0/0/0
  frame-vpn.12vpn.0: 0/0/0
10.255.245.37 65299      36         37         0        4        17:07 Establ
  inet.0: 0/0/0
10.255.245.39 65299      138        168         0        6        53:48 Establ
  bgp.12vpn.0: 0/0/0
  frame-vpn.12vpn.0: 0/0/0
10.255.245.69 65299      134        140         0        6        53:42 Establ
  inet.0: 0/0/0

```

### show bgp summary (Layer 3 VPN)

```

user@host> show bgp summary
Groups: 2 Peers: 2 Down peers: 0
Table          Tot Paths  Act Paths Suppressed  History Damp State Pending
bgp.13vpn.0      2          2          0           0         0      0         0
Peer           AS      InPkt    OutPkt    OutQ    Flaps  Last Up/Dwn
State|#Active/Received/Damped...
10.39.1.5       2        21       22        0        0        6:26 Establ
  VPN-AB.inet.0: 1/1/0
10.255.71.15    1        19       21        0        0        6:17 Establ
  bgp.13vpn.0: 2/2/0
  VPN-A.inet.0: 1/1/0
  VPN-AB.inet.0: 2/2/0
  VPN-B.inet.0: 1/1/0

```

## show chassis alarms

---

|                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                               | show chassis alarms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Syntax (TX Matrix Routers)</b>                           | show chassis alarms<br><lcc <i>number</i>   scc>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Syntax (TX Matrix Plus Routers)</b>                      | show chassis alarms<br><lcc <i>number</i>   sfc <i>number</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Syntax (MX Series Routers)</b>                           | show chassis alarms<br><all-members><br><local><br><member <i>member-id</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Syntax (MX2010 and MX2020 3D Universal Edge Routers)</b> | show chassis alarms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Syntax (QFX Series)</b>                                  | show chassis alarms<br><interconnect-device <i>name</i> ><br><node-device <i>name</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Syntax (PTX Series Packet Transport Routers)</b>         | show chassis alarms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Syntax (ACX Series Universal Access Routers)</b>         | show chassis alarms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Release Information</b>                                  | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>sfc option for the TX Matrix Plus router introduced in Junos OS Release 9.6.<br>Command introduced in Junos OS Release 11.1 for the QFX Series.<br>Command introduced in Junos OS Release 12.1 for the PTX Series Packet Transport Routers.<br>Command introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.<br>Command introduced in Junos OS Release 12.3 for MX2020 3D Universal Edge Routers.<br>Command introduced in Junos OS Release 12.3 for MX2010 3D Universal Edge Routers. |
| <b>Description</b>                                          | Display information about the conditions that have been configured to trigger alarms.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Options</b>                                              | <b>none</b> —Display information about the conditions that have been configured to trigger alarms.<br><br><b>all-members</b> —(MX Series routers only) (Optional) Display information about alarm conditions for all the member routers of the Virtual Chassis configuration.<br><br><b>interconnect-device <i>name</i></b> —(QFabric systems only) (Optional) Display information about alarm conditions for the Interconnect device.                                                                                                                                                                                                     |

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

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

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**local**—(MX Series routers only) (Optional) Display information about alarm conditions for the local Virtual Chassis member.

**member *member-id***—(MX Series routers only) (Optional) Display information about alarm conditions for the specified member of the Virtual Chassis configuration. Replace *member-id* variable with a value of 0 or 1.

**node-device *name***—(QFabric systems only) (Optional) Display information about alarm conditions for the Node device.

**scc**—(TX Matrix router only) (Optional) Show information about the TX Matrix router (switch-card chassis).

**sfc *number***—(TX Matrix Plus router only) (Optional) Show information about the respective TX Matrix Plus router, which is the switch-fabric chassis. Replace *number* variable with 0.

**Additional Information** You cannot clear the alarms for chassis components. Instead, you must remedy the cause of the alarm. When a chassis alarm LED is lit, it indicates that you are running the router or switch in a manner that we do not recommend.

On routers, you can manually silence external devices connected to the alarm relay contacts by pressing the alarm cutoff button, located on the craft interface. Silencing the device does not remove the alarm messages from the display (if present on the router) or extinguish the alarm LEDs. In addition, new alarms that occur after you silence an external device reactivate the external device.

In Junos OS release 11.1 and later, alarms for fans also show the slot number of the fans in the CLI output.

In Junos OS Release 11.2 and later, the command output on EX8200 switches shows the detailed location (**Plane/FPC/PFE**) for link errors in the chassis.

In Junos OS Release 10.2 and later, an alarm is shown on T Series routers for a standby sonic clock generator (SCG) that is offline or absent.

You may often see the following error messages, in which only the error code is shown and no other information is provided:

```
Apr 12 08:04:10 send: red alarm set, device FPC 6, reason FPC 6 Major Errors - Error code:
257
Apr 12 08:04:19 send: red alarm set, device FPC 1, reason FPC 1 Major Errors - Error code:
559
```

To understand what CM\_ALARM error codes mean, you need to first identify the structure of the CM Alarm codes. A CM\_ALARM code has the following structure:

| Bits: | Error type: |
|-------|-------------|
| 1-31  | Major (1)   |
| 0     | Minor (0)   |

According to the table above, the LSB (bit 0) identifies the **Error Type** (major alarm, if the bit is set and minor alarm if the bit is unset). The rest of the bits (1 - 31) identify the actual error code.

Take an example of the following error code, which was logged on a T1600:

```
Apr 12 08:04:10 send: red alarm set, device FPC 1, reason FPC 1 Major Errors - Error code:
559
```

First, you have to convert 559 to binary; that is **1000101111**. The LSB in this case is 1, which means that this is a major alarm. After removing the LSB, you are left with **100010111**, which is equal to 279 in decimal. This is the actual error code, its meaning can be found from the following list:

| Chip Type: L Chip                        | Code |
|------------------------------------------|------|
| CMALARM_LCHIP_LOUT_DESRD_PARITY_ERR      | 1    |
| CMALARM_LCHIP_LOUT_DESRD_UNINIT_ERR      | 2    |
| CMALARM_LCHIP_LOUT_DESRD_ILLEGALLINK_ERR | 3    |
| CMALARM_LCHIP_LOUT_DESRD_ILLEGALSIZERR   | 4    |
| CMALARM_LCHIP_LOUT_HDRF_TOERR_ERR        | 5    |
| CMALARM_LCHIP_LOUT_HDRF_PARITY_ERR       | 6    |
| CMALARM_LCHIP_LOUT_HDRF_UCERR_ERR        | 7    |
| CMALARM_LCHIP_LOUT_NLIF_CRCDROP_ERR      | 8    |
| CMALARM_LCHIP_LOUT_NLIF_CRCERR_ERR       | 9    |
| CMALARM_LCHIP_UCODE_TIMEOUT_ERR          | 10   |

|                                            |    |
|--------------------------------------------|----|
| CMALARM_LCHIP_LIN_SRCTL_ACCT_DROP_ERR      | 11 |
| CMALARM_LCHIP_LIN_SRCTL_ACCT_ADDR_SIZE_ERR | 12 |
| CMALARM_LCHIP_SRAM_PARITY_ERR              | 13 |
| CMALARM_LCHIP_UCODE_OVFLW_ERR              | 14 |
| CMALARM_LCHIP_LOUT_HDRF_MTU_ERR            | 15 |

| Chip Type: M Chip               | Code |
|---------------------------------|------|
| CMALARM_MCHIP_ECC_UNCORRECT_ERR | 128  |

| Chip Type: N Chip                    | Code |
|--------------------------------------|------|
| CMALARM_NCHIP_RDDMA_JBUS_TIMEOUT_ERR | 256  |
| CMALARM_NCHIP_RDDMA_FIFO_OVFLW_ERR   | 257  |
| CMALARM_NCHIP_RDDMA_FIFO_UNFLW_ERR   | 258  |
| CMALARM_NCHIP_RDDMA_SIZE_ERR         | 259  |
| CMALARM_NCHIP_RDDMA_JBUS_CRC_ERR     | 260  |
| CMALARM_NCHIP_WRDMA_PKTR_ERR         | 261  |
| CMALARM_NCHIP_WRDMA_PKT_CRC_ERR      | 262  |
| CMALARM_NCHIP_WRDMA_JBUS_TIMEOUT_ERR | 263  |
| CMALARM_NCHIP_WRDMA_FIFO_OVFLW_ERR   | 264  |
| CMALARM_NCHIP_WRDMA_FIFO_UNFLW_ERR   | 265  |
| CMALARM_NCHIP_WRDMA_PKT_LEN_ERR      | 266  |
| CMALARM_NCHIP_WRDMA_JBUS_CRC_ERR     | 267  |
| CMALARM_NCHIP_PKTR_DMA_AGE_ERR       | 268  |
| CMALARM_NCHIP_PKTR_ICELLSIG_ERR      | 269  |
| CMALARM_NCHIP_PKTR_FTTL_ERR          | 270  |
| CMALARM_NCHIP_RODR_OFFSET_OVFLW_ERR  | 271  |
| CMALARM_NCHIP_PKTR_TMO_CELL_ERR      | 272  |

|                                           |             |
|-------------------------------------------|-------------|
| CMALARM_NCHIP_PKTR_TMO_OUTRANGE_ERR       | 273         |
| CMALARM_NCHIP_PKTR_MD_REQUEST_Q_OVFLW_ERR | 274         |
| CMALARM_NCHIP_PKTR_DMA_BUFFER_OVFLW_ERR   | 275         |
| CMALARM_NCHIP_PKTR_GRT_OVFLW_ERR          | 276         |
| CMALARM_NCHIP_FRQ_ERR                     | 277         |
| CMALARM_NCHIP_RODR_IN_Q_OVFLW_ERR         | 278         |
| CMALARM_NCHIP_DBUF_CRC_ERR                | 279         |
| <hr/>                                     |             |
| <b>Chip Type: R Chip</b>                  | <b>Code</b> |
| CMALARM_RCHIP_SRAM_PARITY_ERR             | 512         |
| <hr/>                                     |             |
| <b>Chip Type: R Chip</b>                  | <b>Code</b> |
| CMALARM_ICHIP_WO_DESRD_ID_ERR             | 601         |
| CMALARM_ICHIP_WO_DESRD_DATA_ERR           | 602         |
| CMALARM_ICHIP_WO_DESRD_OFLOW_ERR          | 603         |
| CMALARM_ICHIP_WO_HDRF_UCERR_ERR           | 604         |
| CMALARM_ICHIP_WO_HDRF_MTUERR_ERR          | 605         |
| CMALARM_ICHIP_WO_HDRF_PARITY_ERR          | 606         |
| CMALARM_ICHIP_WO_HDRF_TOERR_ERR           | 607         |
| CMALARM_ICHIP_WO_IP_CRC_ERR               | 608         |
| CMALARM_ICHIP_WO_IP_INTER_ERR             | 609         |
| CMALARM_ICHIP_WI_WAN_TIMEOUT_ERR          | 625         |
| CMALARM_ICHIP_WI_FAB_TIMEOUT_ERR          | 626         |
| CMALARM_ICHIP_RLDRAM_BIST_ERR             | 630         |
| CMALARM_ICHIP_SDRAM_BIST_ERR              | 631         |
| CMALARM_ICHIP_RLDRAM_PARITY_ERR           | 632         |
| CMALARM_ICHIP_SDRAM_UNCORRECT_ERR         | 633         |

|                                 |     |
|---------------------------------|-----|
| CMALARM_ICHIP_SDRAM_CORRECT_ERR | 634 |
|---------------------------------|-----|

|                             |     |
|-----------------------------|-----|
| CMALARM_ICHIP_FUSE_DONE_ERR | 635 |
|-----------------------------|-----|

According to the table above, the **279** error code corresponds to **CMALARM\_NCHIP\_DBUF\_CRC\_ERR**; this means that new CRC errors were seen on the NCHIP of this particular FPC, which is FPC as per the logs.

If you do not want to convert decimal to binary and vice versa, you may use the following shortcut:

For major alarms, the **Actual Error Code = (Error Code - 1)/2**, where **Error Code** is the code that you get in the log message. For example, if you get the following log:

Apr 12 08:04:10 send: red alarm set, device FPC 6, reason FPC 6 Major Errors - Error code: 257

Actual Error Code =  $(257-1)/2 = 128$ . Similarly, for minor alarms, Actual Error Code =  $(\text{Error Code})/2$

**Required Privilege Level**

view

**Related Documentation**

- *Configuring an Alarm Entry and Its Attributes*
- *Chassis Conditions That Trigger Alarms*

**List of Sample Output**

[show chassis alarms \(Alarms Active\) on page 320](#)  
[show chassis alarms \(No Alarms Active\) on page 320](#)  
[show chassis alarms \(Fan Tray\) on page 320](#)  
[show chassis alarms \(MX2010 Router\) on page 320](#)  
[show chassis alarms \(MX2020 Router\) on page 320](#)  
[show chassis alarms \(T4000 Router\) on page 321](#)  
[show chassis alarms \(Unreachable Destinations Present on a T Series Router\) on page 321](#)  
[show chassis alarms \(FPC Offline Due to Unreachable Destinations on a T Series Router\) on page 321](#)  
[show chassis alarms \(SCG Absent on a T Series Router\) on page 321](#)  
[show chassis alarms \(Alarms Active on a TX Matrix Router\) on page 321](#)  
[show chassis alarms \(TX Matrix Plus router with 3D SIBs\) on page 322](#)  
[show chassis alarms \(Alarms on a T4000 Router After the enhanced-mode Statement is Enabled\) on page 323](#)  
[show chassis alarms \(Backup Routing Engine\) on page 323](#)  
[show chassis alarms \(Alarms Active on the QFX Series\) on page 323](#)  
[show chassis alarms node-device \(Alarms Active on the QFabric System\) on page 323](#)  
[show chassis alarms \(Alarms Active on the QFabric System\) on page 323](#)  
[show chassis alarms \(Alarms Active on an EX8200 Switch\) on page 324](#)  
[show chassis alarms \(Alarms Active on a PTX5000 Packet Transport Router\) on page 324](#)

### [show chassis alarms \(Alarms Active on an ACX2000 Universal Access Router\) on page 324](#)

**Output Fields** [Table 31 on page 320](#) lists the output fields for the **show chassis alarms** command. Output fields are listed in the approximate order in which they appear.

**Table 31: show chassis alarms Output Fields**

| Field Name  | Field Description                                             |
|-------------|---------------------------------------------------------------|
| Alarm time  | Date and time the alarm was first recorded.                   |
| Class       | Severity class for this alarm: <b>Minor</b> or <b>Major</b> . |
| Description | Information about the alarm.                                  |

## Sample Output

### show chassis alarms (Alarms Active)

```
user@host> show chassis alarms
3 alarms are currently active
Alarm time          Class  Description
2000-02-07 10:12:22 UTC Major fxp0: ethernet link down
2000-02-07 10:11:54 UTC Minor YELLOW ALARM - PEM 1 Removed
2000-02-07 10:11:03 UTC Minor YELLOW ALARM - Lower Fan Tray Removed
```

### show chassis alarms (No Alarms Active)

```
user@host> show chassis alarms
No alarms are currently active
```

### show chassis alarms (Fan Tray)

```
user@host> show chassis alarms
4 alarms currently active
Alarm time          Class  Description
2010-11-11 20:27:38 UTC Major Side Fan Tray 7 Failure
2010-11-11 20:27:13 UTC Minor Side Fan Tray 7 Overspeed
2010-11-11 20:27:13 UTC Major Side Fan Tray 5 Failure
2010-11-11 20:27:13 UTC Major Side Fan Tray 0 Failure
```

### show chassis alarms (MX2010 Router)

```
user@host> show chassis alarms
7 alarms currently active
Alarm time          Class  Description
2012-08-07 00:46:06 PDT Major Fan Tray 2 Failure
2012-08-06 18:24:36 PDT Minor Redundant feed missing for PSM 6
2012-08-06 07:41:04 PDT Minor Redundant feed missing for PSM 8
2012-08-04 02:42:06 PDT Minor Redundant feed missing for PSM 5
2012-08-03 21:14:24 PDT Minor Loss of communication with Backup RE
2012-08-03 12:26:03 PDT Minor Redundant feed missing for PSM 4
2012-08-03 10:40:18 PDT Minor Redundant feed missing for PSM 7
```

### show chassis alarms (MX2020 Router)

```
user@host> show chassis alarms
```



```

1 alarms currently active
Alarm time Class Description
2012-10-03 12:14:59 PDT Minor Plane 0 not online

```

#### show chassis alarms (T4000 Router)

```

user@host> show chassis alarms
9 alarms currently active
Alarm time      Class Description
2007-06-02 01:41:10 UTC Minor RE 0 Not Supported
2007-06-02 01:41:10 UTC Minor CB 0 Not Supported
2007-06-02 01:41:10 UTC Minor Mixed Master and Backup RE types
2007-05-30 19:37:33 UTC Major SPMB 1 not online
2007-05-30 19:37:29 UTC Minor Front Bottom Fan Tray Absent
2007-05-30 19:37:13 UTC Major PEM 1 Input Failure
2007-05-30 19:37:13 UTC Major PEM 0 Not OK
2007-05-30 19:37:03 UTC Major PEM 0 Improper for Platform
2007-05-30 19:37:03 UTC Minor Backup RE Active

```

#### show chassis alarms (Unreachable Destinations Present on a T Series Router)

```

user@host> show chassis alarms
10 alarms currently active
Alarm time      Class Description
2011-08-30 18:43:53 PDT Major FPC 7 has unreachable destinations
2011-08-30 18:43:53 PDT Major FPC 5 has unreachable destinations
2011-08-30 18:43:52 PDT Major FPC 3 has unreachable destinations
2011-08-30 18:43:52 PDT Major FPC 2 has unreachable destinations
2011-08-30 18:43:52 PDT Minor SIB 0 Not Online
2011-08-30 18:43:33 PDT Minor SIB 4 Not Online
2011-08-30 18:43:28 PDT Minor SIB 3 Not Online
2011-08-30 18:43:05 PDT Minor SIB 2 Not Online
2011-08-30 18:43:28 PDT Minor SIB 1 Not Online
2011-08-30 18:43:05 PDT Major PEM 1 Not Ok

```

#### show chassis alarms (FPC Offline Due to Unreachable Destinations on a T Series Router)

```

user@host> show chassis alarms
10 alarms currently active
Alarm time      Class Description
2011-08-30 18:43:53 PDT Major FPC 7 offline due to unreachable destinations
2011-08-30 18:43:53 PDT Major FPC 5 offline due to unreachable destinations
2011-08-30 18:43:52 PDT Major FPC 3 offline due to unreachable destinations
2011-08-30 18:43:52 PDT Major FPC 2 offline due to unreachable destinations
2011-08-30 18:43:52 PDT Minor SIB 0 Not Online
2011-08-30 18:43:33 PDT Minor SIB 4 Not Online
2011-08-30 18:43:28 PDT Minor SIB 3 Not Online
2011-08-30 18:43:05 PDT Minor SIB 2 Not Online
2011-08-30 18:43:28 PDT Minor SIB 1 Not Online
2011-08-30 18:43:05 PDT Major PEM 1 Not Ok

```

#### show chassis alarms (SCG Absent on a T Series Router)

```

user@host> show chassis alarms
4 alarms currently active
Alarm time      Class Description
2011-01-23 21:42:46 PST Major SCG 0 NO EXT CLK MEAS-BKUP SCG ABS

```

#### show chassis alarms (Alarms Active on a TX Matrix Router)

```

user@host> show chassis alarms

```

scc-re0:

```
-----
8 alarms currently active
Alarm time      Class  Description
2004-08-05 18:43:53 PDT  Minor  LCC 0 Minor Errors
2004-08-05 18:43:53 PDT  Minor  SIB 3 Not Online
2004-08-05 18:43:52 PDT  Major  SIB 2 Absent
2004-08-05 18:43:52 PDT  Major  SIB 1 Absent
2004-08-05 18:43:52 PDT  Major  SIB 0 Absent
2004-08-05 18:43:33 PDT  Major  LCC 2 Major Errors
2004-08-05 18:43:28 PDT  Major  LCC 0 Major Errors
2004-08-05 18:43:05 PDT  Minor  LCC 2 Minor Errors
lcc0-re0:
```

```
-----
5 alarms currently active
Alarm time      Class  Description
2004-08-05 18:43:53 PDT  Minor  SIB 3 Not Online
2004-08-05 18:43:49 PDT  Major  SIB 2 Absent
2004-08-05 18:43:49 PDT  Major  SIB 1 Absent
2004-08-05 18:43:49 PDT  Major  SIB 0 Absent
2004-08-05 18:43:28 PDT  Major  PEM 0 Not OK
lcc2-re0:
```

```
-----
5 alarms currently active
Alarm time      Class  Description
2004-08-05 18:43:35 PDT  Minor  SIB 3 Not Online
2004-08-05 18:43:33 PDT  Major  SIB 2 Absent
2004-08-05 18:43:33 PDT  Major  SIB 1 Absent
2004-08-05 18:43:33 PDT  Major  SIB 0 Absent
2004-08-05 18:43:05 PDT  Minor  PEM 1 Absent
```

#### show chassis alarms (TX Matrix Plus router with 3D SIBs)

user@host> show chassis alarms  
sfc0-re0:

```
-----
Alarm time      Class  Description
2012-07-19 10:07:32 UTC  Minor  SIB F13 0 Temperature Warm
2012-07-19 10:07:07 UTC  Minor  SIB F2S 0/6 Temperature Warm
2012-07-19 10:07:07 UTC  Minor  SIB F2S 0/4 Temperature Warm
2012-07-19 10:07:07 UTC  Minor  SIB F2S 0/2 Temperature Warm
2012-07-19 10:07:07 UTC  Minor  SIB F2S 0/0 Temperature Warm
2012-07-19 10:07:07 UTC  Minor  SIB F13 6 Temperature Warm
2012-07-19 10:06:42 UTC  Minor  SIB F2S 2/6 Temperature Warm
2012-07-19 10:06:42 UTC  Minor  SIB F2S 2/4 Temperature Warm
2012-07-19 10:06:42 UTC  Minor  SIB F2S 2/2 Temperature Warm
2012-07-19 10:06:42 UTC  Minor  SIB F2S 2/0 Temperature Warm
2012-07-19 10:06:42 UTC  Minor  SIB F13 3 Temperature Warm
2012-07-19 10:06:17 UTC  Minor  Temperature Warm
2012-07-19 10:06:17 UTC  Minor  SIB F2S 1/6 Temperature Warm
2012-07-19 10:06:17 UTC  Minor  SIB F2S 1/4 Temperature Warm
2012-07-19 10:06:17 UTC  Minor  SIB F2S 1/2 Temperature Warm
2012-07-19 10:06:17 UTC  Minor  SIB F2S 1/0 Temperature Warm
lcc0-re0:
```

```
-----
Alarm time      Class  Description
2012-07-19 10:04:13 UTC  Minor  Temperature Warm
2012-07-19 10:04:13 UTC  Minor  SIB 2 Temperature Warm
2012-07-19 10:04:13 UTC  Minor  SIB 1 Temperature Warm
2012-07-19 10:04:13 UTC  Minor  SIB 0 Temperature Warm
```

```
lcc2-re0:
```

```
-----
Alarm time      Class  Description
2012-07-19 10:04:18 UTC  Minor  Temperature Warm
2012-07-19 10:04:18 UTC  Minor  SIB 2 Temperature Warm
2012-07-19 10:04:18 UTC  Minor  SIB 1 Temperature Warm
2012-07-19 10:04:18 UTC  Minor  SIB 0 Temperature Warm
```

#### show chassis alarms (Alarms on a T4000 Router After the enhanced-mode Statement is Enabled)

To enable improved virtual private LAN service (VPLS) MAC address learning on T4000 routers, you must include the **enhanced-mode** statement at the **[edit chassis network-services]** hierarchy level and reboot the router. When router reboots, only the T4000 Type 5 FPCs are required to be present on the router. If there are any other FPCs (apart from T4000 Type 5 FPCs) on the T4000 router, such FPCs become offline, and FPC misconfiguration alarms are generated. The **show chassis alarm** command output displays FPC misconfiguration (**FPC *fpc-slot* misconfig**) as the reason for the generation of the alarms.

```
user@host> show chassis alarms
2 alarms currently active
Alarm time      Class  Description
2011-10-22 10:10:47 PDT  Major  FPC 1 misconfig
2011-10-22 10:10:46 PDT  Major  FPC 0 misconfig
```

#### show chassis alarms (Backup Routing Engine)

```
user@host> show chassis alarms
2 alarms are currently active
Alarm time      Class  Description
2005-04-07 10:12:22 PDT  Minor  Host 1 Boot from alternate media
2005-04-07 10:11:54 PDT  Major  Host 1 compact-flash missing in Boot List
```

#### show chassis alarms (Alarms Active on the QFX Series)

```
user@switch> show chassis alarms
1 alarms currently active
Alarm time      Class  Description
2012-03-05 2:10:24 UTC  Major  FPC 0 PEM 0 Airflow not matching Chassis Airflow
```

#### show chassis alarms node-device (Alarms Active on the QFabric System)

```
user@switch> show chassis alarms node-device ED3691
node-device ED3694
3 alarms currently active
Alarm time      Class  Description
2011-08-24 16:04:15 UTC  Major  ED3694:fte-0/1/2: Link down
2011-08-24 16:04:14 UTC  Major  ED3694:fte-0/1/0: Link down
2011-08-24 14:21:14 UTC  Major  ED3694 PEM 0 is not supported/powered
```

#### show chassis alarms (Alarms Active on the QFabric System)

```
user@switch> show chassis alarms
IC-A0001:
-----
1 alarms currently active
Alarm time      Class  Description
2011-08-24 16:04:15 UTC  Minor  Backup RE Active

ED3694:
```

```

-----
3 alarms currently active
Alarm time          Class  Description
2011-08-24 16:04:15 UTC Major  ED3694:fte-0/1/2: Link down
2011-08-24 16:04:14 UTC Major  ED3694:fte-0/1/0: Link down
2011-08-24 14:21:14 UTC Major  ED3694 PEM 0 is not supported/powerd

```

```

SNG-0:
-----

```

```

NW-NG-0:
-----

```

```

1 alarms currently active
Alarm time          Class  Description
2011-08-24 15:49:27 UTC Major  ED3691 PEM 0 is not supported/powerd

```

### show chassis alarms (Alarms Active on an EX8200 Switch)

```

user@switch> show chassis alarms

```

```

6 alarms currently active
Alarm time          Class  Description
2010-12-02 19:15:22 UTC Major  Fan Tray Failure
2010-12-02 19:15:22 UTC Major  Fan Tray Failure
2010-12-02 19:15:14 UTC Minor  Check CB 0 Fabric Chip 1 on Plane/FPC/PFE: 1/5/0,
1/5/1, 1/5/2, 1/5/3, 1/7/0, 1/7/1, 1/7/2, 1/7/3, 2/5/0, 2/5/1, ...
2010-12-02 19:15:14 UTC Minor  Check CB 0 Fabric Chip 0 on Plane/FPC/PFE: 1/5/0,
1/5/1, 1/5/2, 1/5/3, 1/7/0, 1/7/1, 1/7/2, 1/7/3, 2/5/0, 2/5/1, ...
2010-12-02 19:14:18 UTC Major  PSU 1 Output Failure
2010-12-02 19:14:18 UTC Minor  Loss of communication with Backup RE

```

### show chassis alarms (Alarms Active on a PTX5000 Packet Transport Router)

```

user@switch> show chassis alarms

```

```

23 alarms currently active
Alarm time          Class  Description
2011-07-12 16:22:05 PDT Minor  No Redundant Power for Rear Chassis
2011-07-12 16:22:05 PDT Major  PDU 0 PSM 1 Not OK
2011-07-12 16:21:57 PDT Minor  No Redundant Power for Fan 0-2
2011-07-12 16:21:57 PDT Major  PDU 0 PSM 0 Not OK
2011-07-12 15:56:06 PDT Major  PDU 1 PSM 2 Not OK
2011-07-12 15:56:06 PDT Minor  No Redundant Power for FPC 0-7
2011-07-12 15:56:06 PDT Major  PDU 0 PSM 3 Not OK
2011-07-12 15:28:20 PDT Major  PDU 0 PSM 2 Not OK
2011-07-12 15:19:14 PDT Minor  Backup RE Active

```

### show chassis alarms (Alarms Active on an ACX2000 Universal Access Router)

```

user@host> show chassis alarms

```

```

7 alarms currently active
Alarm time          Class  Description
2012-05-22 11:19:09 UTC Major  xe-0/3/1: Link down
2012-05-22 11:19:09 UTC Major  xe-0/3/0: Link down
2012-05-22 11:19:09 UTC Major  ge-0/1/7: Link down
2012-05-22 11:19:09 UTC Major  ge-0/1/6: Link down
2012-05-22 11:19:09 UTC Major  ge-0/1/3: Link down
2012-05-22 11:19:09 UTC Major  ge-0/1/2: Link down
2012-05-22 11:19:09 UTC Major  ge-0/1/1: Link down

```

## show chassis craft-interface

|                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                               | show chassis craft-interface                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Syntax (MX Series Routers)</b>                           | show chassis craft-interface<br><all-members><br><local><br><member <i>member-id</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Syntax (MX2010 and MX2020 3D Universal Edge Routers)</b> | show chassis craft-interface                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Syntax (TX Matrix Routers)</b>                           | show chassis craft-interface<br><lcc <i>number</i>   scc>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Syntax (TX Matrix Plus Routers)</b>                      | show chassis craft-interface<br><lcc <i>number</i>   sfc <i>number</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Syntax (ACX Series Universal Access Routers)</b>         | show chassis craft-interface                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Release Information</b>                                  | <p>Command introduced before Junos OS Release 7.4.</p> <p><b>sfc</b> option for the TX Matrix Plus router introduced in Junos OS Release 9.6.</p> <p>Command introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.</p> <p>Command introduced in Junos OS Release 12.3 for MX2020 3D Universal Edge Routers.</p> <p>Command introduced in Junos OS Release 12.3 for MX2010 3D Universal Edge Routers.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>                                          | For routers or switches that have a display on the craft interface, show the messages that are currently displayed. On all routers except for the M20 router, you must enter this command on the master Routing Engine.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Options</b>                                              | <p><b>none</b>—(TX Matrix, TX Matrix Plus routers, MX2010, and MX2020 routers, and ACX Series routers only) On a TX Matrix router, show messages that are currently displayed on the craft interface on the TX Matrix router and its attached T640 routers. On a TX Matrix Plus router, show messages that are currently displayed on the craft interface on the TX Matrix Plus router and its attached routers.</p> <p><b>all-members</b>—(MX Series routers only) (Optional) Display information currently on the craft interface for all members of the Virtual Chassis configuration.</p> <p><b>lcc <i>number</i></b>—(TX Matrix, TX Matrix Plus routers only) (Optional) On a TX Matrix router, show messages that are currently displayed on the craft interface for a specified T640 router (line-card chassis) that is connected to the TX Matrix router. On a TX Matrix Plus router, show messages that are currently displayed on the craft interface for a specified router (line-card chassis) that is connected to the TX Matrix Plus router.</p> |

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

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**local**—(MX Series routers only) (Optional) Display information currently on the craft interface for the local Virtual Chassis member.

**member *member-id***—(MX Series routers only) (Optional) Display information currently on the craft interface for the specified member of the Virtual Chassis configuration. For an MX Series Virtual Chassis, replace *member-id* with a value of 0 or 1.

**scc**—(TX Matrix router only) (Optional) Show messages that are currently displayed on the craft interface for the TX Matrix router (switch-card chassis).

**sfc *number***—(TX Matrix Plus router only) (Optional) Show messages that are currently displayed on the craft interface for the respective TX Matrix Plus router (switch-fabric chassis). Replace *number* variable with 0.

**Required Privilege Level** view

**Related Documentation**

- [clear chassis display message](#)
- [set chassis display message](#)

**List of Sample Output**

- [show chassis craft-interface \(M20 Router\) on page 328](#)
- [show chassis craft-interface \(M40 Router\) on page 328](#)
- [show chassis craft-interface \(M120 Router\) on page 328](#)
- [show chassis craft-interface \(M160 Router\) on page 329](#)
- [show chassis craft-interface \(MX2010 Router\) on page 330](#)
- [show chassis craft-interface \(MX2020 Router\) on page 331](#)
- [show chassis craft-interface \(T4000 Router\) on page 332](#)
- [show chassis craft-interface \(TX Matrix Routing Matrix\) on page 332](#)
- [show chassis craft-interface \(TX Matrix Plus Routing Matrix\) on page 335](#)
- [show chassis craft-interface \(TX Matrix Plus router with 3D SIBs\) on page 337](#)
- [show chassis craft-interface \(ACX2000 Universal Access Router\) on page 339](#)

**Output Fields** [Table 32 on page 327](#) lists the output fields for the **show chassis craft-interface** command. Output fields are listed in the approximate order in which they appear.

Table 32: show chassis craft-interface Output Fields

| Field Name                               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LCD screen<br>or<br>FPM Display Contents | Contents of the Front Panel Module display: <ul style="list-style-type: none"> <li>• <b>router-name</b>—Name of the router.</li> <li>• <b>Up</b>—How long the router has been operational, in days, hours, minutes, and seconds.</li> <li>• <b>message</b>—Information about the router traffic load, the power supply status, the fan status, and the temperature status. The display of this information changes every 2 seconds. If a text message has been created with the <b>set chassis display</b> command, this message appears on all four lines of the craft interface display. The display alternates between the text message and the standard system status messages every 2 seconds.</li> </ul> |
| SFC Front Panel Switch Settings          | (TX Matrix Plus Routers)—Display the SFC front panel switch settings: <p>SFC Chassis Number and Config Size are settings on physical switches located on the left side of the craft interface of the TX Matrix Plus router.</p> <ul style="list-style-type: none"> <li>• <b>SFC Chassis Number</b>—This field always displays the value 00.</li> <li>• <b>Config Size</b>—The value of this field is 0 for the TX Matrix Plus router. The value of this field is 3 for TX Matrix Plus router with 3D SIBs.</li> </ul>                                                                                                                                                                                          |
| Front Panel System LEDs                  | (MX2010 and MX2020 Routers) Status of the Front Panel System LEDs. A dot (.) indicates the LED is not lit. An asterisk (*) indicates the LED is lit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Front Panel Alarm Indicators             | (MX2010 and MX2020 Routers) Status of the Front Panel Alarm indicators. A dot (.) indicates the relay is off. An asterisk (*) indicates the relay is active.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Input Relay                              | Status of the configured input relay ports—0 through 3. The mode is normally open or closed. The status is clear or raised.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Output Relay                             | Status of the configured output ports—0 or 1. The mode is normally open or closed. The status is clear or raised.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Front Panel FPC LEDs                     | (MX2010 and MX2020 Routers) Status of the Front Panel Flexible PIC Concentrator (FPC) LEDs. A dot (.) indicates the LED is not lit. An asterisk (*) indicates the LED is lit. On MX2010 routers, there are 10 (0-9) FPCs LEDs. On MX2020 routers, there are 20 (0-9 and 10-19) FPCs LEDs.                                                                                                                                                                                                                                                                                                                                                                                                                      |
| CB LEDs                                  | Status of the Control Board (CB) LEDs. A dot (.) indicates the LED is not lit. An asterisk (*) indicates the LED is lit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| PS LEDs                                  | (MX2010 and MX2020 Routers) Status of the Power Supply (PS) LEDs. A dot (.) indicates the LED is not lit. An asterisk (*) indicates the LED is lit. On MX2010 routers, there are 9 (0-8) PS LEDs. On MX2020 routers, there are 18 (0-8 and 9-17) PS LEDs.                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| FAN Tray LEDs                            | (MX2010 and MX2020 Routers) Status of the Fan Tray LEDs. A dot (.) indicates the LED is not lit. An asterisk (*) indicates the LED is lit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Front Panel SFB LEDs                     | (MX2010 and MX2020 Routers) Status of the Front Panel Switch Fabric Boards (SFB) LEDs. A dot (.) indicates the LED is not lit. An asterisk (*) indicates the LED is lit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Front Panel Chassis Info                 | (MX2010 and MX2020 Routers) Information about the chassis such as the chassis number and role. User can set the chassis number in multi-chassis configurations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

Table 32: show chassis craft-interface Output Fields (*continued*)

| Field Name              | Field Description                                                                                                                                                                                                                                                      |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MCS and SFM LEDs</b> | Status of the Miscellaneous Control Subsystem (MCS) and Switching and Forwarding Module (SFM) LEDs. A dot (.) indicates the LED is not lit. An asterisk (*) indicates the LED is lit. When neither a dot nor an asterisk is displayed, there is no board in that slot. |
| <b>SIB LEDs</b>         | Status of the Switch Interface Board (SIB) LEDs. A dot (.) indicates the LED is not lit. An asterisk (*) indicates the LED is lit.                                                                                                                                     |
| <b>SCG LEDs</b>         | Status of the SONET Clock Generator (SCG) LEDs. A dot (.) indicates the LED is not lit. An asterisk (*) indicates the LED is lit.                                                                                                                                      |

## Sample Output

### show chassis craft-interface (M20 Router)

```

user@host> show chassis craft-interface
Red alarm:      LED off, relay off
Yellow alarm:   LED on, relay on
Host OK LED:    On
Host fail LED:  Off
FPCs           0  1  2  3
-----
Green  .  *  *.
Red    ....
LCD screen:
+-----+
|host   |
|1 Alarm active|
|Y: FERF|
|       |
+-----+

```

### show chassis craft-interface (M40 Router)

```

user@host> show chassis craft-interface
Front Panel LCD Display: enabled
Red alarm:      LED off, relay off
Yellow alarm:   LED off, relay off
Host OK LED:    On
Host Fail LED:  Off
NICs           0  1  2  3  4  5  6  7
-----
Green  *.  *.  *.  *.
Red    .....
LCD Screen:
+-----+
|host   |
|Up: 27+18:52:37|
|       |
|52.649kpps Load|
+-----+

```

### show chassis craft-interface (M120 Router)

```

user@host> show chassis craft-interface

```



```

Front Panel System LEDs:
Routing Engine    0    1
-----
OK                *    .
Fail              .    .
Master            *    .

Front Panel Alarm Indicators:
-----
Red LED          *
Yellow LED       .
Major relay      *
Minor relay      .

Front Panel FPC LEDs:
FPC    0    1    2    3    4    5
-----
Red     .    .    .    .    .    .
Green   .    *    .    *    *    *

CB LEDs:
CB     0    1
-----
Amber   .    .
Green  *    *

PS LEDs:
PS     0    1
-----
Red     .    .
Green  *    *

FEB LEDs:
FEB    0    1    2    3    4    5
-----
Red     .    .    .    .    .    .
Green   .    .    .    *    *    *
Active  .    .    .    *    *    *

```

#### show chassis craft-interface (M160 Router)

```

user@host> show chassis craft-interface
FPM Display contents:
+-----+
|hosts          |
|Up: 1+16:46    |
|               |
|Fans OK        |
+-----+

Front Panel System LEDs:
Host    0    1
-----
OK       .    *
Fail     .    .
Master   .    *

Front Panel Alarm Indicators:
-----
Red LED   .
Yellow LED .

```

```

Major relay.
Minor relay.

Front Panel FPC LEDs:
FPC   0   1   2   3   4   5   6   7
-----
Red   .   .   .   .   .   .   .   .
Green *   *   .   .   .   .   .   .

MCS and SFM LEDs:
MCS   0   1       SFM   0   1   2   3
-----
Amber  .           .   .
Green  .           .   .
Blue   .   *       .   *   *

```

### show chassis craft-interface (MX2010 Router)

```

user@host > show chassis craft-interface
Front Panel System LEDs:
Routing Engine   0   1
-----
OK               *   .
Fail             .   *
Master           *   .

Front Panel Alarm Indicators:
-----
Red LED          .
Yellow LED       *
Major relay      .
Minor relay      *

Front Panel FPC LEDs:
FPC   0   1   2   3   4   5   6   7   8   9
-----
Red   .   .   .   .   .   .   .   .   .   .
Green *   *   .   .   .   .   .   .   *   *

CB LEDs:
CB    0   1
-----
Amber  .   .
Green  *   *

PS LEDs:
PS    0   1   2   3   4   5   6   7   8
-----
Red   .   .   .   .   .   .   .   .   .
Green .   .   .   .   *   *   *   *   *

Fan Tray LEDs:
FT    0   1   2   3
-----
Red   .   .   .   .
Green *   *   *   *

Front Panel SFB LEDs:
SFB   0   1   2   3   4   5   6   7
-----
Red   .   .   .   .   .   .   .   .

```

```
Green * * * * *
```

```
Front Panel Chassis Info:
```

```
Chassis Number 0x0
```

```
Chassis Role S
```

### show chassis craft-interface (MX2020 Router)

```
user@host > show chassis craft-interface
```

```
Front Panel System LEDs:
```

```
Routing Engine 0 1
```

```
-----
```

```
OK * *
```

```
Fail . .
```

```
Master * .
```

```
Front Panel Alarm Indicators:
```

```
-----
```

```
Red LED .
```

```
Yellow LED .
```

```
Major relay .
```

```
Minor relay .
```

```
Front Panel FPC LEDs:
```

```
FPC 0 1 2 3 4 5 6 7 8 9
```

```
-----
```

```
Red . . . . .
```

```
Green * * * * *
```

```
Front Panel FPC LEDs:
```

```
FPC 10 11 12 13 14 15 16 17 18 19
```

```
-----
```

```
Red . . . . .
```

```
Green * * * * *
```

```
CB LEDs:
```

```
CB 0 1
```

```
-----
```

```
Amber . .
```

```
Green * *
```

```
PS LEDs:
```

```
PS 0 1 2 3 4 5 6 7 8
```

```
-----
```

```
Red . . . . .
```

```
Green * * * * * . * *
```

```
PS LEDs:
```

```
PS 9 10 11 12 13 14 15 16 17
```

```
-----
```

```
Red . . . . .
```

```
Green * * * * *
```

```
Fan Tray LEDs:
```

```
FT 0 1 2 3
```

```
-----
```

```
Red . . . .
```

```
Green * * * *
```

```
Front Panel SFB LEDs:
```

```
SFB 0 1 2 3 4 5 6 7
```

```
-----
```

```
Red . . . . .
```

```
Green * * * * *
```

```
Front Panel Chassis Info:
```

```
Chassis Number 0x57
```

```
Chassis Role M
```

**show chassis craft-interface (T4000 Router)**

```
user@host> show chassis craft-interface
```

```
FPM Display contents:
```

```
+-----+
|stymphalian      |
|2 Alarms active  |
|R: Front Top Fan Tra|
|Y: PEM 1 Absent   |
+-----+
```

```
Front Panel System LEDs:
```

```
Routing Engine    0    1
-----
OK                *    *
Fail              .    .
Master            *    .
```

```
Front Panel Alarm Indicators:
```

```
-----
Red LED           *
Yellow LED        *
Major relay       *
Minor relay       *
```

```
Front Panel FPC LEDs:
```

```
FPC    0    1    2    3    4    5    6    7
-----
Red     .    .    .    .    .    .    .    .
Green   *    .    .    *    .    *    *    .
```

```
CB LEDs:
```

```
CB    0    1
-----
Amber  .    .
Green  *    *
Blue   *    .
```

```
SCG LEDs:
```

```
SCG   0    1
-----
Amber  .    .
Green  *    *
Blue   *    .
```

```
SIB LEDs:
```

```
SIB   0    1    2    3    4
-----
Red     .    .    .    .    .
Green   *    *    *    *    *
```

**show chassis craft-interface (TX Matrix Routing Matrix)**

```
user@host> show chassis craft-interface
```

```
scc-re0:
```

```
-----
FPM Display contents:
```

```
+-----+
|bradley          |
|8 Alarms active  |
|R: SIB 2 Absent   |
+-----+
```

```

      |R: SIB 1 Absent      |
      +-----+
Front Panel System LEDs:
Routing Engine    0    1
-----
OK                *    .
Fail              .    .
Master            *    .

Front Panel Alarm Indicators:
-----
Red LED          *
Yellow LED       *
Major relay      *
Minor relay      *

CB LEDs:
  CB    0    1
-----
Amber. .
Green  * .
Blue  * .

SIB LEDs:
  SIB    0    1    2    3    4
-----
Fail . . . . .
OK   . . . . *
Active . . . . *

lcc0-re0:
-----
FPM Display contents:
+-----+
|hybrid      |
|5 Alarms active|
|R: SIB 2 Absent|
|R: SIB 1 Absent|
+-----+
Front Panel System LEDs:
Routing Engine    0    1
-----
OK                *    .
Fail              .    .
Master            *    .

Front Panel Alarm Indicators:
-----
Red LED          *
Yellow LED       *
Major relay      *
Minor relay      *

Front Panel FPC LEDs:
FPC    0    1    2    3    4    5    6    7
-----
Red    . . . . .
Green.  *    *    . . . . .

CB LEDs:

```

```

      CB   0   1
-----
Amber. .
Green * .
Blue  * .

SCG LEDs:
      SCG  0   1
-----
Amber. .
Green * .
Blue  * .

SIB LEDs:
      SIB  0   1   2   3   4
-----
Red   . . . . .
Green . . . . *

1cc2-re0:
-----
FPM Display contents:
+-----+
| prius  |
| 5 Alarms active |
| R: SIB 2 Absent |
| R: SIB 1 Absent |
+-----+

Front Panel System LEDs:
Routing Engine   0   1
-----
OK                * .
Fail              . .
Master            * .

Front Panel Alarm Indicators:
-----
Red LED          *
Yellow LED       *
Major relay      *
Minor relay      *

Front Panel FPC LEDs:
FPC   0   1   2   3   4   5   6   7
-----
Red   . . . . .
Green * * * . . . .

CB LEDs:
      CB   0   1
-----
Amber. .
Green * .
Blue  * .

SCG LEDs:
      SCG  0   1
-----
Amber. .
Green * .

```

```

Blue   * .

SIB LEDs:
  SIB  0   1   2   3   4
-----
Red    . . . . .
Green  . . . . *
```

### show chassis craft-interface (TX Matrix Plus Routing Matrix)

```

user@host> show chassis craft-interface
sfc0-re0:
-----
FPM Display Contents:
+-----+
|noname          |
|12 Alarms active|
|R: SIB F13 12 Absent|
|R: SIB F13 9 Absent|
+-----+

SFC Front Panel Switch Settings:
SFC Chassis Number : 00
Config Size        : 1

Front Panel System LEDs:
Routing Engine    0   1
-----
OK                *   *
Fail              .   .
Master            *   .

Front Panel Alarm Indicators:
-----
Red LED           *
Yellow LED        *
Major relay       *
Minor relay       *

Front Panel F13 SIB LEDs:
SIB   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15
-----
Fail   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
OK      *   .   .   *   .   .   *   .   *   .   .   *   .   .   .
Active .   .   .   *   .   .   *   .   *   .   .   *   .   .   .

PS LEDs:
  PS   0   1
-----
Red    .   *
Green  *   .

Fan Tray LEDs:
  FT   0   1   2   3   4   5
-----
Red    .   .   .   .   *   *
Green  *   *   *   *   .   .

CB LEDs:
  CB   0   1
-----
```

```

Amber  .  .
Green  *  *
Blue   *  .

```

```
1cc0-re0:
```

```
-----
FPM Display contents:
```

```

+-----+
|noname1      |
|1 Alarm active|
|R: PEM 1 Not OK|
|             |
+-----+

```

```
Front Panel System LEDs:
```

```
Routing Engine    0    1
```

```

-----
OK                *    *
Fail              .    .
Master            *    .

```

```
Front Panel Alarm Indicators:
```

```

-----
Red LED          *
Yellow LED       .
Major relay      *
Minor relay      .

```

```
Front Panel FPC LEDs:
```

```
FPC    0    1    2    3    4    5    6    7
```

```

-----
Red      .    .    .    .    .    .    .    .
Green    .    *    .    *    *    .    .    *

```

```
CB LEDs:
```

```
CB    0    1
```

```

-----
Amber  .  .
Green  *  *
Blue   *  .

```

```
SCG LEDs:
```

```
SCG    0    1
```

```

-----
Amber  .  .
Green  *  *
Blue   *  .

```

```
SIB LEDs:
```

```
SIB    0    1    2    3    4
```

```

-----
Red      .    .    .    .    .
Green    *    *    *    *    *

```

```
1cc1-re0:
```

```
-----
FPM Display contents:
```

```

+-----+
|noname2      |
|2 Alarms active|
|R: FPC 0 PIC 0 Failu|

```



```

      |R: PEM 1 Not OK      |
      +-----+
Front Panel System LEDs:
Routing Engine    0    1
-----
OK                *    *
Fail              .    .
Master            *    .

Front Panel Alarm Indicators:
-----
Red LED          *
Yellow LED       .
Major relay      *
Minor relay      .

Front Panel FPC LEDs:
FPC    0    1    2    3    4    5    6    7
-----
Red     .    .    .    .    .    .    .    .
Green   *    *    *    .    .    *    .    .

CB LEDs:
   CB    0    1
-----
Amber    .    .
Green    *    *
Blue     *    .

SCG LEDs:
   SCG    0    1
-----
Amber    .    .
Green    *    *
Blue     *    .

SIB LEDs:
   SIB    0    1    2    3    4
-----
Red     .    .    .    .    .
Green   *    *    *    *    *

```

#### show chassis craft-interface (TX Matrix Plus router with 3D SIBs)

```

user@host> show chassis craft-interface
sfc0-re0:

```

```

-----
FPM Display Contents:
+-----+
|noname      |
|48 Alarms active |
|R: LCC 2 Major Error|
|R: LCC 0 Major Error|
+-----+

```

```

SFC Front Panel Switch Settings:
SFC Chassis Number : 00
Config Size        : 3

```

```

Front Panel System LEDs:

```

```

Routing Engine    0    1
-----
OK                *    *
Fail              .    .
Master            *    .

```

#### Front Panel Alarm Indicators:

```

-----
Red LED          *
Yellow LED       *
Major relay      *
Minor relay      *

```

#### Front Panel F13 SIB LEDs:

```

SIB    0    1    2    3    4    5    6    7    8    9   10   11   12   13   14   15
-----
Fail   .    .    .    .    .    .    .    .    .    .    .    .    .    .    .
OK     *    .    .    *    .    .    *    .    .    .    .    .    .    .    .
Active *    .    .    *    .    .    *    .    .    .    .    .    .    .    .

```

#### PS LEDs:

```

PS    0    1
-----
Red   *    .
Green .    *

```

#### Fan Tray LEDs:

```

FT    0    1    2    3    4    5
-----
Red   .    .    .    .    .    *
Green *    *    *    *    *    .

```

#### CB LEDs:

```

CB    0    1
-----
Amber .    .
Green *    *
Blue  *    .

```

#### lcc0-re0:

#### FPM Display contents:

```

+-----+
|noname1          |
|14 Alarms active |
|R: PEM 1 Not OK  |
|R: FPC 7 misconfig |
+-----+

```

#### Front Panel System LEDs:

```

Routing Engine    0    1
-----
OK                *    *
Fail              .    .
Master            *    .

```

#### Front Panel Alarm Indicators:

```

-----
Red LED          *
Yellow LED       *
Major relay      *

```

```

Minor relay  *

Front Panel FPC LEDs:
FPC    0    1    2    3    4    5    6    7
-----
Red     .    .    .    .    .    .    .    .
Green   .    .    .    .    *    .    .    .

CB LEDs:
  CB    0    1
-----
Amber   .    .
Green   *    *
Blue    *    .

SCG LEDs:
  SCG   0    1
-----
Amber   .    .
Green   *    *
Blue    *    .

SIB LEDs:
  SIB   0    1    2    3    4
-----
Red     .    .    .    .    .
Green   *    *    *    .    .

```

#### show chassis craft-interface (ACX2000 Universal Access Router)

```

user@host> show chassis craft-interface
Front Panel System LEDs:
Routing Engine
-----
OK                      *
Fail                    .

Front Panel Alarm Indicators:
-----
Red LED                 .
Yellow LED              .
Major relay             .
Minor relay             .

Input relay:
-----
Port   Mode   Status
0      Open   Clear
1      Open   Clear
2      Open   Clear
3      Open   Clear

Output relay:
-----
Port   Mode   Status
0      Open   Clear
1      Open   Clear

PS Status:
  PS    0    1
-----

```

Red . .  
Green \* \*

## show chassis environment

|                                                             |                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                               | show chassis environment                                                                                                                                                                                                                                                                                                          |
| <b>Syntax (T320, T640, T1600, and T4000 Routers)</b>        | show chassis environment<br><cb <i>cb-slot-number</i> ><br><fpc <i>fpc-slot-number</i> ><br><fpm><br><pem <i>pem-slot-number</i> ><br><routing-engine <i>re-slot-number</i> ><br><scg <i>scg-slot-number</i> ><br><sib <i>sib-slot-number</i> >                                                                                   |
| <b>Syntax (TX Matrix Routers)</b>                           | show chassis environment<br><lcc <i>number</i>   scc>                                                                                                                                                                                                                                                                             |
| <b>Syntax (TX Matrix Plus Routers)</b>                      | show chassis environment<br><cb <i>cb-slot-number</i> ><br><cip <i>cip-slot-number</i> ><br><fpc <i>fpc-slot-number</i> ><br><fpm><br><lcc <i>number</i> ><br><pem <i>pem-slot-number</i> ><br><routing-engine <i>re-slot-number</i> ><br><scg <i>scg-slot-number</i> ><br>< sfc <i>number</i> ><br><sib <i>sib-slot-number</i> > |
| <b>Syntax (MX Series Routers)</b>                           | show chassis environment<br><all-members><br><local><br><member <i>member-id</i> >                                                                                                                                                                                                                                                |
| <b>Syntax (MX2010 and MX2020 3D Universal Edge Routers)</b> | show chassis environment<br><adc <i>adc-slot-number</i> ><br><cb <i>cb-slot-number</i> ><br><fpc <i>fpc-slot-number</i> ><br><fpm><br><monitored><br><psm <i>psm-slot-number</i> ><br><routing-engine <i>re-slot-number</i> ><br><sfb <i>sfb-slot-number</i> >                                                                    |
| <b>Syntax (EX Series Switch)</b>                            | show chassis environment<br><all-members><br><cb <i>cb-slot-number</i> ><br><fpc <i>fpc-slot-number</i> ><br><local><br><member <i>member-id</i> ><br><routing-engine <i>re-slot-number</i> >                                                                                                                                     |
| <b>Syntax (EX Series Switch)</b>                            | show chassis environment<br><all-members>                                                                                                                                                                                                                                                                                         |

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                     | <pre>&lt;cb <i>cb-slot-number</i>&gt; &lt;fpc <i>fpc-slot-number</i>&gt; &lt;local&gt; &lt;member <i>member-id</i>&gt; &lt;power-supply-unit <i>psu-slot-number</i>&gt; &lt;routing-engine <i>slot-number</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Syntax (QFX Series)</b>                          | <pre>show chassis environment &lt;cb <i>slot-number</i> &lt;interconnect-device <i>name</i>&gt;&gt; &lt;fpc <i>slot-number</i> &lt;interconnect-device <i>name</i>&gt;&gt; &lt;interconnect-device <i>name</i> &lt;slot-number&gt; &lt;node-device <i>name</i>&gt; &lt;pem <i>slot-number</i> (interconnect-device <i>name</i> <i>slot-number</i>)   (node-device <i>name</i>)&gt; &lt;routing-engine <i>name</i> &lt;interconnect-device <i>name</i> <i>slot-number</i>&gt;&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Syntax (PTX Series Packet Transport Routers)</b> | <pre>show chassis environment &lt;cb <i>cb-slot-number</i>&gt; &lt;ccg <i>ccg-slot-number</i>&gt; &lt;fpc <i>fpc-slot-number</i>&gt; &lt;fpm&gt; &lt;monitored&gt; &lt;pdu <i>pdu-slot-number</i>&gt; &lt;routing-engine <i>re-slot-number</i>&gt; &lt;sib <i>sib-slot-number</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Syntax (ACX Series Universal Access Routers)</b> | <pre>show chassis environment &lt;cb <i>cb-slot-number</i>&gt; &lt;pem <i>pem-slot-number</i>&gt; &lt;routing-engine <i>re-slot-number</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>                          | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>sfc</b> option introduced for the TX Matrix Plus router in Junos OS Release 9.6.</p> <p>Command introduced in Junos OS Release 11.1 for QFX Series.</p> <p>Command introduced in Junos OS Release 12.1x48 for PTX Series Packet Transport Routers.</p> <p><b>monitored</b> option added in Junos OS Release 12.1x48 for PTX Series Packet Transport Routers.</p> <p>Command introduced in Junos OS Release 12.1 for T4000 Core Routers.</p> <p>Command introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.</p> <p>Command introduced in Junos OS Release 12.3 for MX2020 3D Universal Edge Routers.</p> <p>Command introduced in Junos OS Release 12.3 for MX2010 3D Universal Edge Routers.</p> <p><b>pem</b> option introduced in Junos OS Release 12.3 for ACX4000 Universal Access Routers.</p> |
| <b>Description</b>                                  | <p>Display environmental information about the router or switch chassis, including the temperature and information about the fans, power supplies, and Routing Engine.</p> <p>In addition on ACX4000 routers, display temperature information about the different channels of a Modular Interface Card (MIC). The number of channels displayed depends on the type of MIC installed.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

- Options** **none**—Display environmental information about the router or switch chassis. On a TX Matrix router, display environmental information about the TX Matrix router and its attached T640 routers. On a TX Matrix Plus router, display environmental information about the TX Matrix Plus router and its attached routers.
- all-members**—(MX Series routers and EX Series switches only) (Optional) Display chassis environmental information for all the members of the Virtual Chassis configuration.
- adc *adc-slot-number***—(MX2020 and MX2010 routers only) (Optional) Display chassis environmental information for the adapter cards. For MX2020 routers, replace ***adc-slot-number*** with a value from 0 through 19. For MX2010 routers, replace ***adc-slot-number*** with a value from 0 through 9.
- cb *cb-slot-number***—(ACX Series Universal Access Routers, EX Series switches, M120, M320, and M40e routers, MX Series routers, MX2020 routers, MX2010 routers, PTX Series Packet Transport Routers, QFX Series, and T Series routers, and TX Matrix Plus routers only) (Optional) Display chassis environmental information for the Control Board. On devices other than EX Series switches, replace ***cb-slot*** with 0 or 1. For the EX Series switches, see *EX Series Switches Hardware and CLI Terminology Mapping* for information on CB slot numbering.
- cip *cip-slot-number***—(TX Matrix Plus routers only) (Optional) Display chassis environmental information for the Connection Interface Panel (CIP). Replace the ***cip-slot-number*** variable with a value of 0 or 1.
- cb interconnect-device *name***—(QFabric systems only) (Optional) Display chassis environmental information for the Control Board on an Interconnect device.
- ccg *ccg-slot-number***—(PTX Series only) (Optional) Display chassis environmental information for the Centralized Clock Generator. Replace ***cb-slot*** with a value of 0 or 1.
- fpc *fpc-slot***—(EX Series switches, M120, M320, and M40e routers, MX Series routers, MX2010 routers, MX2020 routers, PTX Series Packet Transport Routers, QFX Series, QFX3500 switches, QFabric systems, T Series routers, and TX Matrix Plus routers) (Optional) Display chassis environmental information for a specified Flexible PIC Concentrator. For MX2010 routers, replace ***fpc-slot*** with a value from 0 through 9. For MX2020 routers, replace ***fpc-slot*** with a value from 0 through 19. For information about FPC numbering, see *show chassis environment fpc*. On a QFabric system, display chassis environmental information for a specified Flexible PIC Concentrator on an Interconnect device. On an EX Series switch, display chassis environmental information for a specified Flexible PIC Concentrator; see *EX Series Switches Hardware and CLI Terminology Mapping* for information on FPC numbering. On a TX Matrix Plus router with 3D SIBs replace ***fpc-slot*** with a value from 0 through 63.
- fpm**—(M120, M320, and M40e routers, MX2010 routers, MX2020 routers, PTX Series, Packet Transport Routers, T Series routers, and TX Matrix Plus routers only) (Optional) Display chassis environmental information for the craft interface (FPM).
- interconnect-device *name***—(QFabric systems only) (Optional) Display chassis environmental information for the Interconnect device.

**monitored**—(MX2020 routers and PTX Series Packet Transport Routers only) (Optional) Display chassis environmental information for monitored temperatures only. Temperatures that are not included in temperature alarm computations are not displayed.

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

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

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**local**—(MX Series routers and EX Series switches) (Optional) Display chassis environmental information for the local Virtual Chassis member.

**member *member-id***—(MX Series routers and EX Series switches only) (Optional) Display chassis environmental information for the specified member of the Virtual Chassis configuration. On MX Series routers, replace *member-id* variable with a value of 0 or 1. For EX Series switches, see *member* for member ID values.

**node-device *name***—(QFabric systems only) (Optional) Display chassis environmental information for the Node device.

**pdu *pdu-slot-number***—(PTX Series only) (Optional) Display chassis environmental information for the specified power distribution unit.

**pem**—(QFX3500 switches and QFabric systems only) (Optional) Display chassis environmental information for the Power Entry Module on the specified Interconnect device or Node device.

**pem *pem-slot-number***—(ACX Series Universal Access Routers, M120, M320, and M40e routers, MX Series routers, QFX Series, and T Series routers only) (Optional) Display chassis environmental information for the Power Entry Module on the specified Power Entry Module. For information about the options, see *show chassis environment pem*.

**psm *psm-slot-number***—(MX2020 and MX2010 routers only) (Optional) Display chassis environmental information for the power supply module. For MX2020 routers, replace *psm-slot-number* with a value from 0 through 17. For MX2010 routers, replace *psm-slot-number* with a value from 0 through 8.



**psu *psu-slot-number***—(EX Series switches only) (Optional) Display chassis environmental information for a specified power supply. See *EX Series Switches Hardware and CLI Terminology Mapping* for detailed information.

**routing-engine**—(QFX3500 switches and QFabric systems only) (Optional) Display chassis environmental information for the Routing Engine on the specified Interconnect device.

**routing-engine *re-slot-number***—(Optional) Display chassis environmental information for the specified Routing Engine. For information about the options, see *show chassis environment routing-engine*.

**scg**—(T Series routers only) (Optional) Display chassis environmental information about the SONET Clock Generator.

**scc**—(TX Matrix routers only) (Optional) Display chassis environmental information about the TX Matrix router (switch-card chassis).

**sfb *sfb-slot-number***—(MX2020 and MX2010 routers only) (Optional) Display chassis environmental information for the power supply module. Replace ***sfb-slot-number*** with a value from 0 through 7.

**sfc *number***—(TX Matrix Plus routers only) (Optional) Display chassis environmental information about the respective TX Matrix Plus router (switch-fabric chassis). Replace ***number*** variable with 0.

**sib *sib-slot-number***—(M320 routers, PTX Series Packet Transport Routers, and T Series routers only) (Optional) Display chassis environmental information about the specified switch interface board. For information about the options, see *show chassis environment sib*.

**Required Privilege Level**

view

**Related Documentation**

- *show chassis environment adc*
- *show chassis environment cb*
- *show chassis environment ccg*
- *show chassis environment cip*
- *show chassis environment fpc*
- *show chassis environment fpm*
- *show chassis environment lcc*
- *show chassis environment mcs*
- *show chassis environment monitored*
- *show chassis environment pcg*
- *show chassis environment pdu*

- *show chassis environment pem*
- *show chassis environment psm*
- *show chassis environment psu*
- *show chassis environment routing-engine*
- *show chassis environment scg*
- *show chassis environment sfb*
- *show chassis environment sib*
- *show chassis environment sfc*

**List of Sample Output**

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[show chassis environment \(J4300 or J6300 Router\) on page 348](#)  
[show chassis environment \(M5 Router\) on page 348](#)  
[show chassis environment \(M7i Router\) on page 349](#)  
[show chassis environment \(M10 Router\) on page 349](#)  
[show chassis environment \(M10i Router\) on page 349](#)  
[show chassis environment \(M20 Router\) on page 350](#)  
[show chassis environment \(M40 Router\) on page 350](#)  
[show chassis environment \(M40e Router\) on page 350](#)  
[show chassis environment \(M120 Router\) on page 351](#)  
[show chassis environment \(M160 Router\) on page 352](#)  
[show chassis environment \(M320 Router\) on page 352](#)  
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[show chassis environment \(PTX5000 Packet Transport Router\) on page 390](#)  
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**Output Fields** Table 33 on page 347 lists the output fields for the **show chassis environment** command. Output fields are listed in the approximate order in which they appear.

**Table 33: show chassis environment Output Fields**

| Field Name   | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Class</b> | <p>Information about the category or class of chassis component:</p> <ul style="list-style-type: none"> <li>• <b>Power:</b> Power information: <ul style="list-style-type: none"> <li>• (M5, M10, M20, and M40 routers and EX Series switches only) Power supply status: <b>OK</b>, <b>Testing</b>, (during initial power-on), <b>Failed</b>, or <b>Absent</b>.</li> <li>• (M7i, M10i, M40e, M120, M160, M320, and T Series routers and EX Series switches only) Power Entry Modules status: <b>OK</b>, <b>Testing</b>, (during initial power-on), <b>Check</b>, <b>Failed</b>, or <b>Absent</b>.</li> <li>• (PTX Series only) Power information is reported in PDU or PSM combinations. The status is: <b>OK</b>, <b>Testing</b>, (during initial power-on), <b>Check</b>, <b>Failed</b>, or <b>Absent</b>.</li> </ul> </li> <li>• <b>Temp:</b> Temperature of air flowing through the chassis in degrees Celsius (C) and Fahrenheit (F). On PTX Series Packet Transport Routers and MX2010 and MX2020 Routers, multiple cooling zones are supported. FRU temperatures in each zone are coordinated with the fan speed of fan trays in those zones.</li> <li>• <b>Pic:</b> On ACX4000 Routers, multiple temperature channels on a MIC. The status is: <b>OK</b> and the <b>Measurement</b> is in degrees Celsius (C) and Fahrenheit (F).</li> <li>• <b>Fan:</b> Fan status: <b>OK</b>, <b>Testing</b> (during initial power-on), <b>Failed</b>, or <b>Absent</b>. On PTX Series Packet Transport Routers and MX2010 and MX2020 Routers, multiple fan trays are supported. Fan status is reported in Fan Tray or Fan combinations. <b>Measurement</b> indicates actual fan RPM (PTX and MX2010 and MX2020 Routers only).</li> <li>• <b>Misc:</b> Information about other components of the chassis. <ul style="list-style-type: none"> <li>• On some routers, this field indicates the status of one or more additional components.</li> <li>• On the M40e, M160, and M320 router, <b>Misc</b> includes <b>CIP</b> (Connector Interface Panel). <b>OK</b> indicates that the CIP is present. <b>Absent</b> indicates that the CIP is not present.</li> <li>• On T Series routers, <b>Misc</b> includes <b>CIP</b> and <b>SPMB</b> (Switch Processor Mezzanine Board). <b>OK</b> indicates that the <b>CIP</b> or <b>SPMB</b> is present. <b>Absent</b> indicates that the <b>CIP</b> or <b>SPMB</b> is not present.</li> <li>• On PTX Series Packet Transport Routers, <b>Misc</b> includes the <b>SPMB</b> (Switch Processor Mezzanine Board). The SPMB is located on the control boards. <b>OK</b> indicates that the control board is present. <b>Absent</b> indicates that the control board is not present.</li> </ul> </li> </ul> |
| <b>Item</b>  | <p>(MX2010 and MX2020 Routers) Information about the chassis component: Routing Engines, Controls Boards (CBs), Switch Fabric Boards (SFBs), PICs, Flexible PIC Concentrators (FPCs), and Adapter Cards (ADCs).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

Table 33: show chassis environment Output Fields (*continued*)

| Field Name         | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Status</b>      | <p>(MX2010 and MX2020 Routers) Status of the specified chassis component. For example, if the Class is Fan, the fan status can be:</p> <ul style="list-style-type: none"> <li>• <b>OK:</b> The fans are operational.</li> <li>• <b>Testing:</b> The fans are being tested during initial power-on.</li> <li>• <b>Failed:</b> The fans have failed or the fans are not spinning.</li> <li>• <b>Absent:</b> The fan tray is not installed.</li> </ul> <p>If the Class is Power, the power supply status can be:</p> <ul style="list-style-type: none"> <li>• <b>OK:</b> The power component is operational.</li> <li>• <b>Testing:</b> The power component is being tested during initial power-on.</li> <li>• <b>Check:</b> There is insufficient power---that is, fewer than the minimum required feeds are connected.</li> <li>• <b>Failed:</b> The inputs leads have failed.</li> <li>• <b>Absent:</b> The power component is not installed.</li> </ul> |
| <b>Measurement</b> | <p>(MX2010 and MX2020 Routers) Dependant on the Class. For example, if the Class is Temp, indicates the temperature in degree Celsius and degrees Fahrenheit. If the Class is Fan, indicates actual fan RPM.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

## Sample Output

### show chassis environment (J2300 Router)

```

user@host> show chassis environment
Class Item           Status Measurement
Temp  Routing Engine    OK      40 degrees C / 104 degrees F
Fan   Fan              OK

```

### show chassis environment (J4300 or J6300 Router)

```

user@host> show chassis environment
Class Item           Status Measurement
Temp  Routing Engine    OK      41 degrees C / 105 degrees F
Fan   Fan 0             OK
      Fan 1             OK

```

### show chassis environment (M5 Router)

```

user@host> show chassis environment
Class Item           Status Measurement
Power Power Supply A    OK
      Power Supply B    Absent
Temp  FPC 0              OK      30 degrees C / 86 degrees F
      FEB              OK      33 degrees C / 91 degrees F
      PS Intake        OK      27 degrees C / 80 degrees F
      PS Exhaust       OK      27 degrees C / 80 degrees F
      Routing Engine   OK      34 degrees C / 93 degrees F
Fans  Left Fan 1       OK      Spinning at normal speed
      Left Fan 2       OK      Spinning at normal speed
      Left Fan 3       OK      Spinning at normal speed
      Left Fan 4       OK      Spinning at normal speed

```

```
Misc Craft Interface      OK
```

### show chassis environment (M7i Router)

```
user@host> show chassis environment
Class Item                Status      Measurement
Power Power Supply 0       OK
        Power Supply 1     Absent
Temp  Intake               OK          22 degrees C / 71 degrees F
        FPC 0              OK          23 degrees C / 73 degrees F
        Power Supplies     OK          23 degrees C / 73 degrees F
        CFEB Intake        OK          24 degrees C / 75 degrees F
        CFEB Exhaust       OK          29 degrees C / 84 degrees F
        Routing Engine     OK          26 degrees C / 78 degrees F
Fans  Fan 1                OK          Spinning at normal speed
        Fan 2              OK          Spinning at normal speed
        Fan 3              OK          Spinning at normal speed
        Fan 4              OK          Spinning at normal speed
```

### show chassis environment (M10 Router)

```
user@host> show chassis environment
Class Item                Status      Measurement
Power Power Supply A       OK
        Power Supply B     Failed
Temp  FPC 0                OK          36 degrees C / 96 degrees F
        FPC 1              OK          35 degrees C / 95 degrees F
        FEB                OK          34 degrees C / 93 degrees F
        PS Intake          OK          31 degrees C / 87 degrees F
        PS Exhaust         OK          34 degrees C / 93 degrees F
        Routing Engine     OK          35 degrees C / 95 degrees F
Fans  Left Fan 1           OK          Spinning at normal speed
        Left Fan 2         OK          Spinning at normal speed
        Left Fan 3         OK          Spinning at normal speed
        Left Fan 4         OK          Spinning at normal speed
Misc  Craft Interface     OK
```

### show chassis environment (M10i Router)

```
user@host> show chassis environment
Class Item                Status      Measurement
Power Power Supply 0       OK
        Power Supply 1     OK
        Power Supply 2     Absent
        Power Supply 3     Absent
Temp  Intake               OK          26 degrees C / 78 degrees F
        FPC 0              OK          27 degrees C / 80 degrees F
        FPC 1              OK          28 degrees C / 82 degrees F
        Lower Power Supplies OK          29 degrees C / 84 degrees F
        Upper Power Supplies OK          28 degrees C / 82 degrees F
        CFEB Intake        OK          27 degrees C / 80 degrees F
        CFEB Exhaust       OK          36 degrees C / 96 degrees F
        Routing Engine 0   OK          31 degrees C / 87 degrees F
        Routing Engine 1   OK          27 degrees C / 80 degrees F
Fans  Fan Tray 0 Fan 1     OK          Spinning at normal speed
        Fan Tray 0 Fan 2   OK          Spinning at normal speed
        Fan Tray 0 Fan 3   OK          Spinning at normal speed
        Fan Tray 0 Fan 4   OK          Spinning at normal speed
        Fan Tray 0 Fan 5   OK          Spinning at normal speed
```

|                  |        |                          |
|------------------|--------|--------------------------|
| Fan Tray 0 Fan 6 | OK     | Spinning at normal speed |
| Fan Tray 0 Fan 7 | OK     | Spinning at normal speed |
| Fan Tray 0 Fan 8 | OK     | Spinning at normal speed |
| Fan Tray 1 Fan 1 | Absent |                          |
| Fan Tray 1 Fan 2 | Absent |                          |
| Fan Tray 1 Fan 3 | Absent |                          |
| Fan Tray 1 Fan 4 | Absent |                          |
| Fan Tray 1 Fan 5 | Absent |                          |
| Fan Tray 1 Fan 6 | Absent |                          |
| Fan Tray 1 Fan 7 | Absent |                          |
| Fan Tray 1 Fan 8 | Absent |                          |

### show chassis environment (M20 Router)

```
user@host> show chassis environment
```

| Class | Item             | Status  | Measurement                 |
|-------|------------------|---------|-----------------------------|
| Power | Power Supply A   | OK      |                             |
|       | Power Supply B   | Absent  |                             |
| Temp  | FPC 0            | OK      | 28 degrees C / 82 degrees F |
|       | FPC 1            | OK      | 27 degrees C / 80 degrees F |
|       | Power Supply A   | OK      | 22 degrees C / 71 degrees F |
|       | Power Supply B   | Absent  |                             |
|       | SSB 0            | OK      | 30 degrees C / 86 degrees F |
|       | Backplane        | OK      | 22 degrees C / 71 degrees F |
|       | Routing Engine 0 | OK      | 26 degrees C / 78 degrees F |
|       | Routing Engine 1 | Testing |                             |
| Fans  | Rear Fan         | OK      | Spinning at normal speed    |
|       | Front Upper Fan  | OK      | Spinning at normal speed    |
|       | Front Middle Fan | OK      | Spinning at normal speed    |
|       | Front Bottom Fan | OK      | Spinning at normal speed    |
| Misc  | Craft Interface  | OK      |                             |

### show chassis environment (M40 Router)

```
user@host> show chassis environment
```

| Class | Item            | Status | Measurement                 |
|-------|-----------------|--------|-----------------------------|
| Power | Power Supply A  | OK     |                             |
|       | Power Supply B  | Absent |                             |
| Temp  | FPC 3           | OK     | 24 degrees C / 75 degrees F |
|       | FPC 6           | OK     | 26 degrees C / 78 degrees F |
|       | SCB             | OK     | 26 degrees C / 78 degrees F |
|       | Backplane @ A1  | OK     | 28 degrees C / 82 degrees F |
|       | Backplane @ A2  | OK     | 23 degrees C / 73 degrees F |
|       | Routing Engine  | OK     | 26 degrees C / 78 degrees F |
| Fans  | Top Impeller    | OK     | Spinning at normal speed    |
|       | Bottom impeller | OK     | Spinning at normal speed    |
|       | Rear Left Fan   | OK     | Spinning at normal speed    |
|       | Rear Center Fan | OK     | Spinning at normal speed    |
|       | Rear Right Fan  | OK     | Spinning at normal speed    |
| Misc  | Craft Interface | OK     |                             |

### show chassis environment (M40e Router)

```
user@host> show chassis environment
```

| Class | Item  | Status | Measurement                  |
|-------|-------|--------|------------------------------|
| Power | PEM 0 | OK     |                              |
|       | PEM 1 | Absent |                              |
| Temp  | PCG 0 | OK     | 44 degrees C / 111 degrees F |
|       | PCG 1 | OK     | 47 degrees C / 116 degrees F |

|      |                      |    |                              |
|------|----------------------|----|------------------------------|
|      | Routing Engine 0     | OK | 40 degrees C / 104 degrees F |
|      | Routing Engine 1     | OK | 37 degrees C / 98 degrees F  |
|      | MCS 0                | OK | 45 degrees C / 113 degrees F |
|      | MCS 1                | OK | 42 degrees C / 107 degrees F |
|      | SFM 0 SPP            | OK | 40 degrees C / 104 degrees F |
|      | SFM 0 SPR            | OK | 44 degrees C / 111 degrees F |
|      | SFM 1 SPP            | OK | 43 degrees C / 109 degrees F |
|      | SFM 1 SPR            | OK | 45 degrees C / 113 degrees F |
|      | FPC 0                | OK | 38 degrees C / 100 degrees F |
|      | FPC 1                | OK | 40 degrees C / 104 degrees F |
|      | FPC 2                | OK | 38 degrees C / 100 degrees F |
|      | FPC 4                | OK | 34 degrees C / 93 degrees F  |
|      | FPC 5                | OK | 43 degrees C / 109 degrees F |
|      | FPC 6                | OK | 41 degrees C / 105 degrees F |
|      | FPC 7                | OK | 43 degrees C / 109 degrees F |
|      | FPM CMB              | OK | 28 degrees C / 82 degrees F  |
|      | FPM Display          | OK | 28 degrees C / 82 degrees F  |
| Fans | Rear Bottom Blower   | OK | Spinning at normal speed     |
|      | Rear Top Blower      | OK | Spinning at normal speed     |
|      | Front Top Blower     | OK | Spinning at normal speed     |
|      | Fan Tray Rear Left   | OK | Spinning at normal speed     |
|      | Fan Tray Rear Right  | OK | Spinning at normal speed     |
|      | Fan Tray Front Left  | OK | Spinning at normal speed     |
|      | Fan Tray Front Right | OK | Spinning at normal speed     |
| Misc | CIP                  | OK |                              |

### show chassis environment (M120 Router)

```
user@host> show chassis environment
```

| Class | Item                 | Status | Measurement                  |
|-------|----------------------|--------|------------------------------|
| Temp  | PEM 0                | OK     |                              |
|       | PEM 1                | OK     |                              |
|       | Routing Engine 0     | OK     | 43 degrees C / 109 degrees F |
|       | Routing Engine 1     | OK     | 44 degrees C / 111 degrees F |
|       | CB 0 Intake          | OK     | 33 degrees C / 91 degrees F  |
|       | CB 0 Exhaust A       | OK     | 36 degrees C / 96 degrees F  |
|       | CB 0 Exhaust B       | OK     | 35 degrees C / 95 degrees F  |
|       | CB 1 Intake          | OK     | 34 degrees C / 93 degrees F  |
|       | CB 1 Exhaust A       | OK     | 38 degrees C / 100 degrees F |
|       | CB 1 Exhaust B       | OK     | 35 degrees C / 95 degrees F  |
|       | FEB 3 Intake         | OK     | 35 degrees C / 95 degrees F  |
|       | FEB 3 Exhaust A      | OK     | 37 degrees C / 98 degrees F  |
|       | FEB 3 Exhaust B      | OK     | 39 degrees C / 102 degrees F |
|       | FEB 4 Intake         | OK     | 33 degrees C / 91 degrees F  |
|       | FEB 4 Exhaust A      | OK     | 39 degrees C / 102 degrees F |
|       | FEB 4 Exhaust B      | OK     | 36 degrees C / 96 degrees F  |
|       | FPC 2 Exhaust A      | OK     | 32 degrees C / 89 degrees F  |
|       | FPC 2 Exhaust B      | OK     | 31 degrees C / 87 degrees F  |
|       | FPC 3 Exhaust A      | OK     | 32 degrees C / 89 degrees F  |
|       | FPC 3 Exhaust B      | OK     | 33 degrees C / 91 degrees F  |
|       | FPC 4 Exhaust A      | OK     | 32 degrees C / 89 degrees F  |
|       | FPC 4 Exhaust B      | OK     | 30 degrees C / 86 degrees F  |
| Fans  | Front Top Tray Fan 1 | OK     | Spinning at normal speed     |
|       | Front Top Tray Fan 2 | OK     | Spinning at normal speed     |
|       | Front Top Tray Fan 3 | OK     | Spinning at normal speed     |
|       | Front Top Tray Fan 4 | OK     | Spinning at normal speed     |
|       | Front Top Tray Fan 5 | OK     | Spinning at normal speed     |
|       | Front Top Tray Fan 6 | OK     | Spinning at normal speed     |
|       | Front Top Tray Fan 7 | OK     | Spinning at normal speed     |
|       | Front Top Tray Fan 8 | OK     | Spinning at normal speed     |

|                         |    |                          |
|-------------------------|----|--------------------------|
| Front Bottom Tray Fan 1 | OK | Spinning at normal speed |
| Front Bottom Tray Fan 2 | OK | Spinning at normal speed |
| Front Bottom Tray Fan 3 | OK | Spinning at normal speed |
| Front Bottom Tray Fan 4 | OK | Spinning at normal speed |
| Front Bottom Tray Fan 5 | OK | Spinning at normal speed |
| Front Bottom Tray Fan 6 | OK | Spinning at normal speed |
| Front Bottom Tray Fan 7 | OK | Spinning at normal speed |
| Front Bottom Tray Fan 8 | OK | Spinning at normal speed |
| Rear Top Tray Fan 1     | OK | Spinning at normal speed |
| Rear Top Tray Fan 2     | OK | Spinning at normal speed |
| Rear Top Tray Fan 3     | OK | Spinning at normal speed |
| Rear Top Tray Fan 4     | OK | Spinning at normal speed |
| Rear Top Tray Fan 5     | OK | Spinning at normal speed |
| Rear Top Tray Fan 6     | OK | Spinning at normal speed |
| Rear Top Tray Fan 7     | OK | Spinning at normal speed |
| Rear Top Tray Fan 8     | OK | Spinning at normal speed |
| Rear Bottom Tray Fan 1  | OK | Spinning at normal speed |
| Rear Bottom Tray Fan 2  | OK | Spinning at normal speed |
| Rear Bottom Tray Fan 3  | OK | Spinning at normal speed |
| Rear Bottom Tray Fan 4  | OK | Spinning at normal speed |
| Rear Bottom Tray Fan 5  | OK | Spinning at normal speed |
| Rear Bottom Tray Fan 6  | OK | Spinning at normal speed |
| Rear Bottom Tray Fan 7  | OK | Spinning at normal speed |
| Rear Bottom Tray Fan 8  | OK | Spinning at normal speed |

#### show chassis environment (M160 Router)

```

user@host> show chassis environment

```

| Class | Item                 | Status | Measurement                  |
|-------|----------------------|--------|------------------------------|
| Power | PEM 0                | OK     | PEM 1                        |
|       |                      |        | Absent                       |
| Temp  | PCG 0                | OK     | 45 degrees C / 113 degrees F |
|       | PCG 1                | Absent |                              |
|       | Routing Engine 0     | OK     | 35 degrees C / 95 degrees F  |
|       | Routing Engine 1     | Absent |                              |
|       | MCS 0                | OK     | 50 degrees C / 122 degrees F |
|       | SFM 0 SPP            | OK     | 47 degrees C / 116 degrees F |
|       | SFM 0 SPR            | OK     | 49 degrees C / 120 degrees F |
|       | SFM 1 SPP            | OK     | 50 degrees C / 122 degrees F |
|       | SFM 1 SPR            | OK     | 50 degrees C / 122 degrees F |
|       | SFM 2 SPP            | OK     | 51 degrees C / 123 degrees F |
|       | SFM 2 SPR            | OK     | 52 degrees C / 125 degrees F |
|       | SFM 3 SPP            | OK     | 52 degrees C / 125 degrees F |
|       | SFM 3 SPR            | OK     | 48 degrees C / 118 degrees F |
|       | FPC 0                | OK     | 45 degrees C / 113 degrees F |
|       | FPC 6                | OK     | 43 degrees C / 109 degrees F |
|       | FPM CMB              | OK     | 31 degrees C / 87 degrees F  |
|       | FPM Display          | OK     | 33 degrees C / 91 degrees F  |
| Fans  | Rear Bottom Blower   | OK     | Spinning at normal speed     |
|       | Rear Top Blower      | OK     | Spinning at normal speed     |
|       | Front Top Blower     | OK     | Spinning at normal speed     |
|       | Fan Tray Rear Left   | OK     | Spinning at normal speed     |
|       | Fan Tray Rear Right  | OK     | Spinning at normal speed     |
|       | Fan Tray Front Left  | OK     | Spinning at normal speed     |
|       | Fan Tray Front Right | OK     | Spinning at normal speed     |
| Misc  | CIP                  | OK     |                              |

#### show chassis environment (M320 Router)

```

user@host> show chassis environment

```



| Class | Item                   | Status | Measurement                  |
|-------|------------------------|--------|------------------------------|
| Temp  | PEM 0                  | Absent |                              |
|       | PEM 1                  | Absent |                              |
|       | PEM 2                  | OK     |                              |
|       | PEM 3                  | OK     |                              |
|       | Routing Engine 0       | OK     | 33 degrees C / 91 degrees F  |
|       | Routing Engine 1       | OK     | 32 degrees C / 89 degrees F  |
|       | CB 0                   | OK     | 36 degrees C / 96 degrees F  |
|       | CB 1                   | OK     | 36 degrees C / 96 degrees F  |
|       | SIB 0                  | OK     | 38 degrees C / 100 degrees F |
|       | SIB 1                  | OK     | 29 degrees C / 84 degrees F  |
|       | SIB 2                  | OK     | 38 degrees C / 100 degrees F |
|       | SIB 3                  | OK     | 41 degrees C / 105 degrees F |
|       | FPC 0 Intake           | OK     | 28 degrees C / 82 degrees F  |
|       | FPC 0 Exhaust          | OK     | 40 degrees C / 104 degrees F |
|       | FPC 1 Intake           | OK     | 29 degrees C / 84 degrees F  |
|       | FPC 1 Exhaust          | OK     | 39 degrees C / 102 degrees F |
|       | FPC 2 Intake           | OK     | 28 degrees C / 82 degrees F  |
|       | FPC 2 Exhaust          | OK     | 38 degrees C / 100 degrees F |
|       | FPC 3 Intake           | OK     | 28 degrees C / 82 degrees F  |
|       | FPC 3 Exhaust          | OK     | 39 degrees C / 102 degrees F |
|       | FPC 6 Intake           | OK     | 27 degrees C / 80 degrees F  |
|       | FPC 6 Exhaust          | OK     | 39 degrees C / 102 degrees F |
|       | FPC 7 Intake           | OK     | 27 degrees C / 80 degrees F  |
|       | FPC 7 Exhaust          | OK     | 42 degrees C / 107 degrees F |
|       | FPM GBUS               | OK     | 30 degrees C / 86 degrees F  |
| Fan   | Top Left Front fan     | OK     | Spinning at normal speed     |
|       | Top Right Rear fan     | OK     | Spinning at normal speed     |
|       | Top Right Front fan    | OK     | Spinning at normal speed     |
|       | Top Left Rear fan      | OK     | Spinning at normal speed     |
|       | Bottom Left Front fan  | OK     | Spinning at normal speed     |
|       | Bottom Right Rear fan  | OK     | Spinning at normal speed     |
|       | Bottom Right Front fan | OK     | Spinning at normal speed     |
|       | Bottom Left Rear fan   | OK     | Spinning at normal speed     |
|       | Rear Fan 1 (TOP)       | OK     | Spinning at normal speed     |
|       | Rear Fan 2             | OK     | Spinning at normal speed     |
|       | Rear Fan 3             | OK     | Spinning at normal speed     |
|       | Rear Fan 4             | OK     | Spinning at normal speed     |
|       | Rear Fan 5             | OK     | Spinning at normal speed     |
|       | Rear Fan 6             | OK     | Spinning at normal speed     |
|       | Rear Fan 7 (Bottom)    | OK     | Spinning at normal speed     |
| Misc  | CIP                    | OK     |                              |

### show chassis environment (MX240 Router)

user@host> show chassis environment

| Class | Item             | Status | Measurement                  |
|-------|------------------|--------|------------------------------|
| Temp  | PEM 0            | OK     | 40 degrees C / 104 degrees F |
|       | PEM 1            | OK     | 45 degrees C / 113 degrees F |
|       | PEM 2            | Absent |                              |
|       | PEM 3            | Absent |                              |
|       | Routing Engine 0 | OK     | 39 degrees C / 102 degrees F |
|       | Routing Engine 1 | OK     | 37 degrees C / 98 degrees F  |
|       | CB 0 Intake      | OK     | 36 degrees C / 96 degrees F  |
|       | CB 0 Exhaust A   | OK     | 34 degrees C / 93 degrees F  |
|       | CB 0 Exhaust B   | OK     | 38 degrees C / 100 degrees F |
|       | CB 0 ACBC        | OK     | 37 degrees C / 98 degrees F  |
|       | CB 0 SF A        | OK     | 49 degrees C / 120 degrees F |
|       | CB 0 SF B        | OK     | 41 degrees C / 105 degrees F |
|       | CB 1 Intake      | OK     | 37 degrees C / 98 degrees F  |

|      |                    |    |                              |
|------|--------------------|----|------------------------------|
|      | CB 1 Exhaust A     | OK | 34 degrees C / 93 degrees F  |
|      | CB 1 Exhaust B     | OK | 39 degrees C / 102 degrees F |
|      | CB 1 ACBC          | OK | 38 degrees C / 100 degrees F |
|      | CB 1 SF A          | OK | 47 degrees C / 116 degrees F |
|      | CB 1 SF B          | OK | 41 degrees C / 105 degrees F |
|      | FPC 1 Intake       | OK | 33 degrees C / 91 degrees F  |
|      | FPC 1 Exhaust A    | OK | 38 degrees C / 100 degrees F |
|      | FPC 1 Exhaust B    | OK | 53 degrees C / 127 degrees F |
|      | FPC 1 I3 0 TSensor | OK | 50 degrees C / 122 degrees F |
|      | FPC 1 I3 0 Chip    | OK | 53 degrees C / 127 degrees F |
|      | FPC 1 I3 1 TSensor | OK | 49 degrees C / 120 degrees F |
|      | FPC 1 I3 1 Chip    | OK | 52 degrees C / 125 degrees F |
|      | FPC 1 I3 2 TSensor | OK | 47 degrees C / 116 degrees F |
|      | FPC 1 I3 2 Chip    | OK | 49 degrees C / 120 degrees F |
|      | FPC 1 I3 3 TSensor | OK | 44 degrees C / 111 degrees F |
|      | FPC 1 I3 3 Chip    | OK | 46 degrees C / 114 degrees F |
|      | FPC 1 IA 0 TSensor | OK | 45 degrees C / 113 degrees F |
|      | FPC 1 IA 0 Chip    | OK | 44 degrees C / 111 degrees F |
|      | FPC 1 IA 1 TSensor | OK | 44 degrees C / 111 degrees F |
|      | FPC 1 IA 1 Chip    | OK | 48 degrees C / 118 degrees F |
|      | FPC 2 Intake       | OK | 32 degrees C / 89 degrees F  |
|      | FPC 2 Exhaust A    | OK | 40 degrees C / 104 degrees F |
|      | FPC 2 Exhaust B    | OK | 52 degrees C / 125 degrees F |
|      | FPC 2 I3 0 TSensor | OK | 52 degrees C / 125 degrees F |
|      | FPC 2 I3 0 Chip    | OK | 56 degrees C / 132 degrees F |
|      | FPC 2 I3 1 TSensor | OK | 52 degrees C / 125 degrees F |
|      | FPC 2 I3 1 Chip    | OK | 55 degrees C / 131 degrees F |
|      | FPC 2 I3 2 TSensor | OK | 49 degrees C / 120 degrees F |
|      | FPC 2 I3 2 Chip    | OK | 52 degrees C / 125 degrees F |
|      | FPC 2 I3 3 TSensor | OK | 44 degrees C / 111 degrees F |
|      | FPC 2 I3 3 Chip    | OK | 48 degrees C / 118 degrees F |
|      | FPC 2 IA 0 TSensor | OK | 50 degrees C / 122 degrees F |
|      | FPC 2 IA 0 Chip    | OK | 48 degrees C / 118 degrees F |
|      | FPC 2 IA 1 TSensor | OK | 47 degrees C / 116 degrees F |
|      | FPC 2 IA 1 Chip    | OK | 53 degrees C / 127 degrees F |
| Fans | Front Fan          | OK | Spinning at normal speed     |
|      | Middle Fan         | OK | Spinning at normal speed     |
|      | Rear Fan           | OK | Spinning at normal speed     |

#### show chassis environment (MX240 Router with Enhanced MX SCB)

```
user@host> show chassis environment
```

| Class | Item             | Status | Measurement                  |
|-------|------------------|--------|------------------------------|
| Temp  | PEM 0            | OK     | 40 degrees C / 104 degrees F |
|       | PEM 1            | OK     | 45 degrees C / 113 degrees F |
|       | PEM 2            | Absent |                              |
|       | PEM 3            | Absent |                              |
|       | Routing Engine 0 | OK     | 39 degrees C / 102 degrees F |
|       | Routing Engine 1 | OK     | 37 degrees C / 98 degrees F  |
|       | CB 0 Intake      | OK     | 36 degrees C / 96 degrees F  |
|       | CB 0 Exhaust A   | OK     | 34 degrees C / 93 degrees F  |
|       | CB 0 Exhaust B   | OK     | 38 degrees C / 100 degrees F |
|       | CB 0 ACBC        | OK     | 37 degrees C / 98 degrees F  |
|       | CB 0 XF A        | OK     | 49 degrees C / 120 degrees F |
|       | CB 0 XF B        | OK     | 41 degrees C / 105 degrees F |
|       | CB 1 Intake      | OK     | 37 degrees C / 98 degrees F  |
|       | CB 1 Exhaust A   | OK     | 34 degrees C / 93 degrees F  |
|       | CB 1 Exhaust B   | OK     | 39 degrees C / 102 degrees F |
|       | CB 1 ACBC        | OK     | 38 degrees C / 100 degrees F |
|       | CB 1 XF A        | OK     | 47 degrees C / 116 degrees F |
|       | CB 1 XF B        | OK     | 41 degrees C / 105 degrees F |

|      |                    |    |                              |
|------|--------------------|----|------------------------------|
|      | FPC 1 Intake       | OK | 33 degrees C / 91 degrees F  |
|      | FPC 1 Exhaust A    | OK | 38 degrees C / 100 degrees F |
|      | FPC 1 Exhaust B    | OK | 53 degrees C / 127 degrees F |
|      | FPC 1 I3 0 TSensor | OK | 50 degrees C / 122 degrees F |
|      | FPC 1 I3 0 Chip    | OK | 53 degrees C / 127 degrees F |
|      | FPC 1 I3 1 TSensor | OK | 49 degrees C / 120 degrees F |
|      | FPC 1 I3 1 Chip    | OK | 52 degrees C / 125 degrees F |
|      | FPC 1 I3 2 TSensor | OK | 47 degrees C / 116 degrees F |
|      | FPC 1 I3 2 Chip    | OK | 49 degrees C / 120 degrees F |
|      | FPC 1 I3 3 TSensor | OK | 44 degrees C / 111 degrees F |
|      | FPC 1 I3 3 Chip    | OK | 46 degrees C / 114 degrees F |
|      | FPC 1 IA 0 TSensor | OK | 45 degrees C / 113 degrees F |
|      | FPC 1 IA 0 Chip    | OK | 44 degrees C / 111 degrees F |
|      | FPC 1 IA 1 TSensor | OK | 44 degrees C / 111 degrees F |
|      | FPC 1 IA 1 Chip    | OK | 48 degrees C / 118 degrees F |
|      | FPC 2 Intake       | OK | 32 degrees C / 89 degrees F  |
|      | FPC 2 Exhaust A    | OK | 40 degrees C / 104 degrees F |
|      | FPC 2 Exhaust B    | OK | 52 degrees C / 125 degrees F |
|      | FPC 2 I3 0 TSensor | OK | 52 degrees C / 125 degrees F |
|      | FPC 2 I3 0 Chip    | OK | 56 degrees C / 132 degrees F |
|      | FPC 2 I3 1 TSensor | OK | 52 degrees C / 125 degrees F |
|      | FPC 2 I3 1 Chip    | OK | 55 degrees C / 131 degrees F |
|      | FPC 2 I3 2 TSensor | OK | 49 degrees C / 120 degrees F |
|      | FPC 2 I3 2 Chip    | OK | 52 degrees C / 125 degrees F |
|      | FPC 2 I3 3 TSensor | OK | 44 degrees C / 111 degrees F |
|      | FPC 2 I3 3 Chip    | OK | 48 degrees C / 118 degrees F |
|      | FPC 2 IA 0 TSensor | OK | 50 degrees C / 122 degrees F |
|      | FPC 2 IA 0 Chip    | OK | 48 degrees C / 118 degrees F |
|      | FPC 2 IA 1 TSensor | OK | 47 degrees C / 116 degrees F |
|      | FPC 2 IA 1 Chip    | OK | 53 degrees C / 127 degrees F |
| Fans | Front Fan          | OK | Spinning at normal speed     |
|      | Middle Fan         | OK | Spinning at normal speed     |
|      | Rear Fan           | OK | Spinning at normal speed     |

### show chassis environment (MX480 Router)

|                                     |                    |        |                              |
|-------------------------------------|--------------------|--------|------------------------------|
| user@host> show chassis environment |                    |        |                              |
| Class                               | Item               | Status | Measurement                  |
| Temp                                | PEM 0              | OK     | 35 degrees C / 95 degrees F  |
|                                     | PEM 1              | OK     | 40 degrees C / 104 degrees F |
|                                     | PEM 2              | Absent |                              |
|                                     | PEM 3              | Absent |                              |
|                                     | Routing Engine 0   | OK     | 44 degrees C / 111 degrees F |
|                                     | Routing Engine 1   | OK     | 45 degrees C / 113 degrees F |
|                                     | CB 0 Intake        | OK     | 36 degrees C / 96 degrees F  |
|                                     | CB 0 Exhaust A     | OK     | 38 degrees C / 100 degrees F |
|                                     | CB 0 Exhaust B     | OK     | 39 degrees C / 102 degrees F |
|                                     | CB 0 ACBC          | OK     | 37 degrees C / 98 degrees F  |
|                                     | CB 0 SF A          | OK     | 51 degrees C / 123 degrees F |
|                                     | CB 0 SF B          | OK     | 44 degrees C / 111 degrees F |
|                                     | CB 1 Intake        | OK     | 36 degrees C / 96 degrees F  |
|                                     | CB 1 Exhaust A     | OK     | 39 degrees C / 102 degrees F |
|                                     | CB 1 Exhaust B     | OK     | 40 degrees C / 104 degrees F |
|                                     | CB 1 ACBC          | OK     | 37 degrees C / 98 degrees F  |
|                                     | CB 1 SF A          | OK     | 50 degrees C / 122 degrees F |
|                                     | CB 1 SF B          | OK     | 43 degrees C / 109 degrees F |
|                                     | FPC 0 Intake       | OK     | 36 degrees C / 96 degrees F  |
|                                     | FPC 0 Exhaust A    | OK     | 39 degrees C / 102 degrees F |
|                                     | FPC 0 Exhaust B    | OK     | 51 degrees C / 123 degrees F |
|                                     | FPC 0 I3 0 TSensor | OK     | 49 degrees C / 120 degrees F |
|                                     | FPC 0 I3 0 Chip    | OK     | 56 degrees C / 132 degrees F |

|      |                    |    |                              |
|------|--------------------|----|------------------------------|
|      | FPC 0 I3 1 TSensor | OK | 47 degrees C / 116 degrees F |
|      | FPC 0 I3 1 Chip    | OK | 52 degrees C / 125 degrees F |
|      | FPC 0 I3 2 TSensor | OK | 46 degrees C / 114 degrees F |
|      | FPC 0 I3 2 Chip    | OK | 48 degrees C / 118 degrees F |
|      | FPC 0 I3 3 TSensor | OK | 42 degrees C / 107 degrees F |
|      | FPC 0 I3 3 Chip    | OK | 45 degrees C / 113 degrees F |
|      | FPC 0 IA 0 TSensor | OK | 45 degrees C / 113 degrees F |
|      | FPC 0 IA 0 Chip    | OK | 45 degrees C / 113 degrees F |
|      | FPC 0 IA 1 TSensor | OK | 44 degrees C / 111 degrees F |
|      | FPC 0 IA 1 Chip    | OK | 48 degrees C / 118 degrees F |
|      | FPC 1 Intake       | OK | 37 degrees C / 98 degrees F  |
|      | FPC 1 Exhaust A    | OK | 41 degrees C / 105 degrees F |
|      | FPC 1 Exhaust B    | OK | 52 degrees C / 125 degrees F |
|      | FPC 1 I3 0 TSensor | OK | 51 degrees C / 123 degrees F |
|      | FPC 1 I3 0 Chip    | OK | 57 degrees C / 134 degrees F |
|      | FPC 1 I3 1 TSensor | OK | 48 degrees C / 118 degrees F |
|      | FPC 1 I3 1 Chip    | OK | 52 degrees C / 125 degrees F |
|      | FPC 1 I3 2 TSensor | OK | 46 degrees C / 114 degrees F |
|      | FPC 1 I3 2 Chip    | OK | 50 degrees C / 122 degrees F |
|      | FPC 1 I3 3 TSensor | OK | 42 degrees C / 107 degrees F |
|      | FPC 1 I3 3 Chip    | OK | 46 degrees C / 114 degrees F |
|      | FPC 1 IA 0 TSensor | OK | 49 degrees C / 120 degrees F |
|      | FPC 1 IA 0 Chip    | OK | 48 degrees C / 118 degrees F |
|      | FPC 1 IA 1 TSensor | OK | 46 degrees C / 114 degrees F |
|      | FPC 1 IA 1 Chip    | OK | 50 degrees C / 122 degrees F |
| Fans | Top Rear Fan       | OK | Spinning at normal speed     |
|      | Bottom Rear Fan    | OK | Spinning at normal speed     |
|      | Top Middle Fan     | OK | Spinning at normal speed     |
|      | Bottom Middle Fan  | OK | Spinning at normal speed     |
|      | Top Front Fan      | OK | Spinning at normal speed     |
|      | Bottom Front Fan   | OK | Spinning at normal speed     |

### show chassis environment (MX480 Router with Enhanced MX SCB)

```
user@host> show chassis environment
```

| Class | Item               | Status | Measurement                  |
|-------|--------------------|--------|------------------------------|
| Temp  | PEM 0              | OK     | 35 degrees C / 95 degrees F  |
|       | PEM 1              | OK     | 40 degrees C / 104 degrees F |
|       | PEM 2              | Absent |                              |
|       | PEM 3              | Absent |                              |
|       | Routing Engine 0   | OK     | 44 degrees C / 111 degrees F |
|       | Routing Engine 1   | OK     | 45 degrees C / 113 degrees F |
|       | CB 0 Intake        | OK     | 36 degrees C / 96 degrees F  |
|       | CB 0 Exhaust A     | OK     | 38 degrees C / 100 degrees F |
|       | CB 0 Exhaust B     | OK     | 39 degrees C / 102 degrees F |
|       | CB 0 ACBC          | OK     | 37 degrees C / 98 degrees F  |
|       | CB 0 XF A          | OK     | 51 degrees C / 123 degrees F |
|       | CB 0 XF B          | OK     | 44 degrees C / 111 degrees F |
|       | CB 1 Intake        | OK     | 36 degrees C / 96 degrees F  |
|       | CB 1 Exhaust A     | OK     | 39 degrees C / 102 degrees F |
|       | CB 1 Exhaust B     | OK     | 40 degrees C / 104 degrees F |
|       | CB 1 ACBC          | OK     | 37 degrees C / 98 degrees F  |
|       | CB 1 XF A          | OK     | 50 degrees C / 122 degrees F |
|       | CB 1 XF B          | OK     | 43 degrees C / 109 degrees F |
|       | FPC 0 Intake       | OK     | 36 degrees C / 96 degrees F  |
|       | FPC 0 Exhaust A    | OK     | 39 degrees C / 102 degrees F |
|       | FPC 0 Exhaust B    | OK     | 51 degrees C / 123 degrees F |
|       | FPC 0 I3 0 TSensor | OK     | 49 degrees C / 120 degrees F |
|       | FPC 0 I3 0 Chip    | OK     | 56 degrees C / 132 degrees F |
|       | FPC 0 I3 1 TSensor | OK     | 47 degrees C / 116 degrees F |
|       | FPC 0 I3 1 Chip    | OK     | 52 degrees C / 125 degrees F |

|                    |    |                              |
|--------------------|----|------------------------------|
| FPC 0 I3 2 TSensor | OK | 46 degrees C / 114 degrees F |
| FPC 0 I3 2 Chip    | OK | 48 degrees C / 118 degrees F |
| FPC 0 I3 3 TSensor | OK | 42 degrees C / 107 degrees F |
| FPC 0 I3 3 Chip    | OK | 45 degrees C / 113 degrees F |
| FPC 0 IA 0 TSensor | OK | 45 degrees C / 113 degrees F |
| FPC 0 IA 0 Chip    | OK | 45 degrees C / 113 degrees F |
| FPC 0 IA 1 TSensor | OK | 44 degrees C / 111 degrees F |
| FPC 0 IA 1 Chip    | OK | 48 degrees C / 118 degrees F |
| FPC 1 Intake       | OK | 37 degrees C / 98 degrees F  |
| FPC 1 Exhaust A    | OK | 41 degrees C / 105 degrees F |
| FPC 1 Exhaust B    | OK | 52 degrees C / 125 degrees F |
| FPC 1 I3 0 TSensor | OK | 51 degrees C / 123 degrees F |
| FPC 1 I3 0 Chip    | OK | 57 degrees C / 134 degrees F |
| FPC 1 I3 1 TSensor | OK | 48 degrees C / 118 degrees F |
| FPC 1 I3 1 Chip    | OK | 52 degrees C / 125 degrees F |
| FPC 1 I3 2 TSensor | OK | 46 degrees C / 114 degrees F |
| FPC 1 I3 2 Chip    | OK | 50 degrees C / 122 degrees F |
| FPC 1 I3 3 TSensor | OK | 42 degrees C / 107 degrees F |
| FPC 1 I3 3 Chip    | OK | 46 degrees C / 114 degrees F |
| FPC 1 IA 0 TSensor | OK | 49 degrees C / 120 degrees F |
| FPC 1 IA 0 Chip    | OK | 48 degrees C / 118 degrees F |
| FPC 1 IA 1 TSensor | OK | 46 degrees C / 114 degrees F |
| FPC 1 IA 1 Chip    | OK | 50 degrees C / 122 degrees F |
| Fans Top Rear Fan  | OK | Spinning at normal speed     |
| Bottom Rear Fan    | OK | Spinning at normal speed     |
| Top Middle Fan     | OK | Spinning at normal speed     |
| Bottom Middle Fan  | OK | Spinning at normal speed     |
| Top Front Fan      | OK | Spinning at normal speed     |
| Bottom Front Fan   | OK | Spinning at normal speed     |

### show chassis environment (MX960 Router)

```
user@host> show chassis environment
```

| Class | Item             | Status | Measurement                  |
|-------|------------------|--------|------------------------------|
| Temp  | PEM 0            | Absent |                              |
|       | PEM 1            | Absent |                              |
|       | PEM 2            | Check  |                              |
|       | PEM 3            | OK     | 35 degrees C / 95 degrees F  |
|       | Routing Engine 0 | OK     | 37 degrees C / 98 degrees F  |
|       | Routing Engine 1 | Absent |                              |
|       | CB 0 Intake      | OK     | 24 degrees C / 75 degrees F  |
|       | CB 0 Exhaust A   | OK     | 30 degrees C / 86 degrees F  |
|       | CB 0 Exhaust B   | OK     | 27 degrees C / 80 degrees F  |
|       | CB 1 Intake      | Absent |                              |
|       | CB 1 Exhaust A   | Absent |                              |
|       | CB 1 Exhaust B   | Absent |                              |
|       | CB 1 ACBC        | Absent |                              |
|       | CB 1 SF A        | Absent |                              |
|       | CB 1 SF B        | Absent |                              |
|       | CB 2 Intake      | Absent |                              |
|       | CB 2 Exhaust A   | Absent |                              |
|       | CB 2 Exhaust B   | Absent |                              |
|       | CB 2 ACBC        | Absent |                              |
|       | CB 2 SF A        | Absent |                              |
|       | CB 2 SF B        | Absent |                              |
|       | FPC 4 Intake     | OK     | 24 degrees C / 75 degrees F  |
|       | FPC 4 Exhaust A  | OK     | 36 degrees C / 96 degrees F  |
|       | FPC 4 Exhaust B  | OK     | 38 degrees C / 100 degrees F |
|       | FPC 7 Intake     | OK     | 24 degrees C / 75 degrees F  |
|       | FPC 7 Exhaust A  | OK     | 36 degrees C / 96 degrees F  |
|       | FPC 7 Exhaust B  | OK     | 42 degrees C / 107 degrees F |

|      |                      |        |                          |
|------|----------------------|--------|--------------------------|
| Fans | Top Fan Tray Temp    | Failed |                          |
|      | Top Tray Fan 1       | OK     | Spinning at normal speed |
|      | Top Tray Fan 2       | OK     | Spinning at normal speed |
|      | Top Tray Fan 3       | OK     | Spinning at normal speed |
|      | Top Tray Fan 4       | OK     | Spinning at normal speed |
|      | Top Tray Fan 5       | OK     | Spinning at normal speed |
|      | Top Tray Fan 6       | OK     | Spinning at normal speed |
|      | Bottom Fan Tray Temp | Failed |                          |
|      | Bottom Tray Fan 1    | OK     | Spinning at normal speed |
|      | Bottom Tray Fan 2    | OK     | Spinning at normal speed |
|      | Bottom Tray Fan 3    | OK     | Spinning at normal speed |
|      | Bottom Tray Fan 4    | OK     | Spinning at normal speed |
|      | Bottom Tray Fan 5    | OK     | Spinning at normal speed |
|      | Bottom Tray Fan 6    | OK     | Spinning at normal speed |

### show chassis environment (MX960 Router with Enhanced MX SCB)

```
user@host> show chassis environment
```

| Class | Item                 | Status | Measurement                  |
|-------|----------------------|--------|------------------------------|
| Temp  | PEM 0                | Absent |                              |
|       | PEM 1                | OK     | 50 degrees C / 122 degrees F |
|       | PEM 2                | OK     | 50 degrees C / 122 degrees F |
|       | PEM 3                | OK     | 50 degrees C / 122 degrees F |
|       | Routing Engine 0     | OK     | 42 degrees C / 107 degrees F |
|       | Routing Engine 0 CPU | OK     | 51 degrees C / 123 degrees F |
|       | Routing Engine 1     | OK     | 39 degrees C / 102 degrees F |
|       | Routing Engine 1 CPU | OK     | 44 degrees C / 111 degrees F |
|       | CB 0 Intake          | OK     | 35 degrees C / 95 degrees F  |
|       | CB 0 Exhaust A       | OK     | 36 degrees C / 96 degrees F  |
|       | CB 0 Exhaust B       | OK     | 43 degrees C / 109 degrees F |
|       | CB 0 ACBC            | OK     | 38 degrees C / 100 degrees F |
|       | CB 0 XF A            | OK     | 53 degrees C / 127 degrees F |
|       | CB 0 XF B            | OK     | 47 degrees C / 116 degrees F |
|       | CB 1 Intake          | OK     | 35 degrees C / 95 degrees F  |
|       | CB 1 Exhaust A       | OK     | 35 degrees C / 95 degrees F  |
|       | CB 1 Exhaust B       | OK     | 41 degrees C / 105 degrees F |
|       | CB 1 ACBC            | OK     | 38 degrees C / 100 degrees F |
|       | CB 1 XF A            | OK     | 52 degrees C / 125 degrees F |
|       | CB 1 XF B            | OK     | 47 degrees C / 116 degrees F |
|       | CB 2 Intake          | OK     | 32 degrees C / 89 degrees F  |
|       | CB 2 Exhaust A       | OK     | 30 degrees C / 86 degrees F  |
|       | CB 2 Exhaust B       | OK     | 35 degrees C / 95 degrees F  |
|       | CB 2 ACBC            | OK     | 33 degrees C / 91 degrees F  |
|       | CB 2 XF A            | OK     | 51 degrees C / 123 degrees F |
|       | CB 2 XF B            | OK     | 50 degrees C / 122 degrees F |
|       | FPC 0 Intake         | OK     | 35 degrees C / 95 degrees F  |
|       | FPC 0 Exhaust A      | OK     | 39 degrees C / 102 degrees F |
|       | FPC 0 Exhaust B      | OK     | 50 degrees C / 122 degrees F |
|       | FPC 0 I3 0 TSensor   | OK     | 50 degrees C / 122 degrees F |
|       | FPC 0 I3 0 Chip      | OK     | 56 degrees C / 132 degrees F |
|       | FPC 0 I3 1 TSensor   | OK     | 47 degrees C / 116 degrees F |
|       | FPC 0 I3 1 Chip      | OK     | 50 degrees C / 122 degrees F |
|       | FPC 0 I3 2 TSensor   | OK     | 45 degrees C / 113 degrees F |
|       | FPC 0 I3 2 Chip      | OK     | 48 degrees C / 118 degrees F |
|       | FPC 0 I3 3 TSensor   | OK     | 41 degrees C / 105 degrees F |
|       | FPC 0 I3 3 Chip      | OK     | 44 degrees C / 111 degrees F |
|       | FPC 0 IA 0 TSensor   | OK     | 45 degrees C / 113 degrees F |
|       | FPC 0 IA 0 Chip      | OK     | 45 degrees C / 113 degrees F |
|       | FPC 0 IA 1 TSensor   | OK     | 44 degrees C / 111 degrees F |
|       | FPC 0 IA 1 Chip      | OK     | 48 degrees C / 118 degrees F |
|       | FPC 1 Intake         | OK     | 36 degrees C / 96 degrees F  |

|                         |    |                              |
|-------------------------|----|------------------------------|
| FPC 1 Exhaust A         | OK | 47 degrees C / 116 degrees F |
| FPC 1 Exhaust B         | OK | 43 degrees C / 109 degrees F |
| FPC 1 LU 0 TCAM TSensor | OK | 53 degrees C / 127 degrees F |
| FPC 1 LU 0 TCAM Chip    | OK | 57 degrees C / 134 degrees F |
| FPC 1 LU 0 TSensor      | OK | 53 degrees C / 127 degrees F |
| FPC 1 LU 0 Chip         | OK | 60 degrees C / 140 degrees F |
| FPC 1 MQ 0 TSensor      | OK | 53 degrees C / 127 degrees F |
| FPC 1 MQ 0 Chip         | OK | 56 degrees C / 132 degrees F |
| FPC 1 LU 1 TCAM TSensor | OK | 51 degrees C / 123 degrees F |
| FPC 1 LU 1 TCAM Chip    | OK | 52 degrees C / 125 degrees F |
| FPC 1 LU 1 TSensor      | OK | 51 degrees C / 123 degrees F |
| FPC 1 LU 1 Chip         | OK | 53 degrees C / 127 degrees F |
| FPC 1 MQ 1 TSensor      | OK | 51 degrees C / 123 degrees F |
| FPC 1 MQ 1 Chip         | OK | 58 degrees C / 136 degrees F |
| FPC 2 Intake            | OK | 35 degrees C / 95 degrees F  |
| FPC 2 Exhaust A         | OK | 39 degrees C / 102 degrees F |
| FPC 2 Exhaust B         | OK | 54 degrees C / 129 degrees F |
| FPC 2 I3 0 TSensor      | OK | 52 degrees C / 125 degrees F |
| FPC 2 I3 0 Chip         | OK | 59 degrees C / 138 degrees F |
| FPC 2 I3 1 TSensor      | OK | 48 degrees C / 118 degrees F |
| FPC 2 I3 1 Chip         | OK | 52 degrees C / 125 degrees F |
| FPC 2 I3 2 TSensor      | OK | 47 degrees C / 116 degrees F |
| FPC 2 I3 2 Chip         | OK | 49 degrees C / 120 degrees F |
| FPC 2 I3 3 TSensor      | OK | 41 degrees C / 105 degrees F |
| FPC 2 I3 3 Chip         | OK | 44 degrees C / 111 degrees F |
| FPC 2 IA 0 TSensor      | OK | 47 degrees C / 116 degrees F |
| FPC 2 IA 0 Chip         | OK | 46 degrees C / 114 degrees F |
| FPC 2 IA 1 TSensor      | OK | 45 degrees C / 113 degrees F |
| FPC 2 IA 1 Chip         | OK | 49 degrees C / 120 degrees F |
| FPC 3 Intake            | OK | 34 degrees C / 93 degrees F  |
| FPC 3 Exhaust A         | OK | 34 degrees C / 93 degrees F  |
| FPC 3 Exhaust B         | OK | 47 degrees C / 116 degrees F |
| FPC 3 I3 0 TSensor      | OK | 48 degrees C / 118 degrees F |
| FPC 3 I3 0 Chip         | OK | 52 degrees C / 125 degrees F |
| FPC 3 I3 1 TSensor      | OK | 46 degrees C / 114 degrees F |
| FPC 3 I3 1 Chip         | OK | 48 degrees C / 118 degrees F |
| FPC 3 IA 0 TSensor      | OK | 41 degrees C / 105 degrees F |
| FPC 3 IA 0 Chip         | OK | 40 degrees C / 104 degrees F |
| FPC 5 Intake            | OK | 42 degrees C / 107 degrees F |
| FPC 5 Exhaust A         | OK | 42 degrees C / 107 degrees F |
| FPC 5 Exhaust B         | OK | 53 degrees C / 127 degrees F |
| FPC 5 LU 0 TSensor      | OK | 53 degrees C / 127 degrees F |
| FPC 5 LU 0 Chip         | OK | 54 degrees C / 129 degrees F |
| FPC 5 LU 1 TSensor      | OK | 53 degrees C / 127 degrees F |
| FPC 5 LU 1 Chip         | OK | 61 degrees C / 141 degrees F |
| FPC 5 LU 2 TSensor      | OK | 53 degrees C / 127 degrees F |
| FPC 5 LU 2 Chip         | OK | 51 degrees C / 123 degrees F |
| FPC 5 LU 3 TSensor      | OK | 53 degrees C / 127 degrees F |
| FPC 5 LU 3 Chip         | OK | 53 degrees C / 127 degrees F |
| FPC 5 MQ 0 TSensor      | OK | 47 degrees C / 116 degrees F |
| FPC 5 MQ 0 Chip         | OK | 52 degrees C / 125 degrees F |
| FPC 5 MQ 1 TSensor      | OK | 47 degrees C / 116 degrees F |
| FPC 5 MQ 1 Chip         | OK | 52 degrees C / 125 degrees F |
| FPC 5 MQ 2 TSensor      | OK | 47 degrees C / 116 degrees F |
| FPC 5 MQ 2 Chip         | OK | 46 degrees C / 114 degrees F |
| FPC 5 MQ 3 TSensor      | OK | 47 degrees C / 116 degrees F |
| FPC 5 MQ 3 Chip         | OK | 45 degrees C / 113 degrees F |
| FPC 7 Intake            | OK | 36 degrees C / 96 degrees F  |
| FPC 7 Exhaust A         | OK | 35 degrees C / 95 degrees F  |
| FPC 7 Exhaust B         | OK | 33 degrees C / 91 degrees F  |
| FPC 7 QX 0 TSensor      | OK | 42 degrees C / 107 degrees F |

|      |                         |    |                              |
|------|-------------------------|----|------------------------------|
|      | FPC 7 QX 0 Chip         | OK | 47 degrees C / 116 degrees F |
|      | FPC 7 LU 0 TCAM TSensor | OK | 42 degrees C / 107 degrees F |
|      | FPC 7 LU 0 TCAM Chip    | OK | 44 degrees C / 111 degrees F |
|      | FPC 7 LU 0 TSensor      | OK | 42 degrees C / 107 degrees F |
|      | FPC 7 LU 0 Chip         | OK | 46 degrees C / 114 degrees F |
|      | FPC 7 MQ 0 TSensor      | OK | 42 degrees C / 107 degrees F |
|      | FPC 7 MQ 0 Chip         | OK | 45 degrees C / 113 degrees F |
|      | FPC 8 Intake            | OK | 33 degrees C / 91 degrees F  |
|      | FPC 8 Exhaust A         | OK | 33 degrees C / 91 degrees F  |
|      | FPC 8 Exhaust B         | OK | 36 degrees C / 96 degrees F  |
|      | FPC 8 I3 0 TSensor      | OK | 38 degrees C / 100 degrees F |
|      | FPC 8 I3 0 Chip         | OK | 43 degrees C / 109 degrees F |
|      | FPC 8 BDS 0 TSensor     | OK | 37 degrees C / 98 degrees F  |
|      | FPC 8 BDS 0 Chip        | OK | 36 degrees C / 96 degrees F  |
|      | FPC 8 IA 0 TSensor      | OK | 37 degrees C / 98 degrees F  |
|      | FPC 8 IA 0 Chip         | OK | 37 degrees C / 98 degrees F  |
|      | FPC 10 Intake           | OK | 38 degrees C / 100 degrees F |
|      | FPC 10 Exhaust A        | OK | 36 degrees C / 96 degrees F  |
|      | FPC 10 Exhaust B        | OK | 41 degrees C / 105 degrees F |
|      | FPC 10 I3 0 TSensor     | OK | 40 degrees C / 104 degrees F |
|      | FPC 10 I3 0 Chip        | OK | 42 degrees C / 107 degrees F |
|      | FPC 10 I3 1 TSensor     | OK | 40 degrees C / 104 degrees F |
|      | FPC 10 I3 1 Chip        | OK | 44 degrees C / 111 degrees F |
|      | FPC 10 I3 2 TSensor     | OK | 42 degrees C / 107 degrees F |
|      | FPC 10 I3 2 Chip        | OK | 43 degrees C / 109 degrees F |
|      | FPC 10 I3 3 TSensor     | OK | 39 degrees C / 102 degrees F |
|      | FPC 10 I3 3 Chip        | OK | 44 degrees C / 111 degrees F |
|      | FPC 10 IA 0 TSensor     | OK | 36 degrees C / 96 degrees F  |
|      | FPC 10 IA 0 Chip        | OK | 36 degrees C / 96 degrees F  |
|      | FPC 10 IA 1 TSensor     | OK | 43 degrees C / 109 degrees F |
|      | FPC 10 IA 1 Chip        | OK | 42 degrees C / 107 degrees F |
| Fans | Top Fan Tray Temp       | OK | 37 degrees C / 98 degrees F  |
|      | Top Tray Fan 1          | OK | Spinning at normal speed     |
|      | Top Tray Fan 2          | OK | Spinning at normal speed     |
|      | Top Tray Fan 3          | OK | Spinning at normal speed     |
|      | Top Tray Fan 4          | OK | Spinning at normal speed     |
|      | Top Tray Fan 5          | OK | Spinning at normal speed     |
|      | Top Tray Fan 6          | OK | Spinning at normal speed     |
|      | Bottom Fan Tray Temp    | OK | 28 degrees C / 82 degrees F  |
|      | Bottom Tray Fan 1       | OK | Spinning at normal speed     |
|      | Bottom Tray Fan 2       | OK | Spinning at normal speed     |
|      | Bottom Tray Fan 3       | OK | Spinning at normal speed     |
|      | Bottom Tray Fan 4       | OK | Spinning at normal speed     |
|      | Bottom Tray Fan 5       | OK | Spinning at normal speed     |
|      | Bottom Tray Fan 6       | OK | Spinning at normal speed     |

### show chassis environment (MX2020 Router)

|                                     |        |        |                              |
|-------------------------------------|--------|--------|------------------------------|
| user@host> show chassis environment |        |        |                              |
| Class                               | Item   | Status | Measurement                  |
| Temp                                | PSM 0  | Absent |                              |
|                                     | PSM 1  | Absent |                              |
|                                     | PSM 2  | OK     | 41 degrees C / 105 degrees F |
|                                     | PSM 3  | OK     | 39 degrees C / 102 degrees F |
|                                     | PSM 4  | OK     | 39 degrees C / 102 degrees F |
|                                     | PSM 5  | OK     | 38 degrees C / 100 degrees F |
|                                     | PSM 6  | OK     | 38 degrees C / 100 degrees F |
|                                     | PSM 7  | OK     | 38 degrees C / 100 degrees F |
|                                     | PSM 8  | OK     | 37 degrees C / 98 degrees F  |
|                                     | PSM 9  | Absent |                              |
|                                     | PSM 10 | Absent |                              |



|                      |        |                              |
|----------------------|--------|------------------------------|
| PSM 11               | OK     | 47 degrees C / 116 degrees F |
| PSM 12               | OK     | 45 degrees C / 113 degrees F |
| PSM 13               | OK     | 44 degrees C / 111 degrees F |
| PSM 14               | OK     | 44 degrees C / 111 degrees F |
| PSM 15               | OK     | 43 degrees C / 109 degrees F |
| PSM 16               | OK     | 42 degrees C / 107 degrees F |
| PSM 17               | OK     | 41 degrees C / 105 degrees F |
| PDM 0                | OK     |                              |
| PDM 1                | Absent |                              |
| PDM 2                | Absent |                              |
| PDM 3                | OK     |                              |
| CB 0 IntakeA-Zone0   | OK     | 45 degrees C / 113 degrees F |
| CB 0 IntakeB-Zone1   | OK     | 34 degrees C / 93 degrees F  |
| CB 0 IntakeC-Zone0   | OK     | 48 degrees C / 118 degrees F |
| CB 0 ExhaustA-Zone0  | OK     | 45 degrees C / 113 degrees F |
| CB 0 ExhaustB-Zone1  | OK     | 37 degrees C / 98 degrees F  |
| CB 0 TCBC-Zone0      | OK     | 41 degrees C / 105 degrees F |
| CB 1 IntakeA-Zone0   | OK     | 46 degrees C / 114 degrees F |
| CB 1 IntakeB-Zone1   | OK     | 42 degrees C / 107 degrees F |
| CB 1 IntakeC-Zone0   | OK     | 49 degrees C / 120 degrees F |
| CB 1 ExhaustA-Zone0  | OK     | 46 degrees C / 114 degrees F |
| CB 1 ExhaustB-Zone1  | OK     | 41 degrees C / 105 degrees F |
| CB 1 TCBC-Zone0      | OK     | 46 degrees C / 114 degrees F |
| SPMB 0 Intake        | OK     | 33 degrees C / 91 degrees F  |
| SPMB 1 Intake        | OK     | 42 degrees C / 107 degrees F |
| Routing Engine 0     | OK     | 35 degrees C / 95 degrees F  |
| Routing Engine 0 CPU | OK     | 34 degrees C / 93 degrees F  |
| Routing Engine 1     | OK     | 44 degrees C / 111 degrees F |
| Routing Engine 1 CPU | OK     | 42 degrees C / 107 degrees F |
| SFB 0 Intake-Zone0   | OK     | 55 degrees C / 131 degrees F |
| SFB 0 Exhaust-Zone1  | OK     | 48 degrees C / 118 degrees F |
| SFB 0 IntakeA-Zone0  | OK     | 50 degrees C / 122 degrees F |
| SFB 0 IntakeB-Zone1  | OK     | 40 degrees C / 104 degrees F |
| SFB 0 Exhaust-Zone0  | OK     | 52 degrees C / 125 degrees F |
| SFB 0 SFB-XF2-Zone1  | OK     | 61 degrees C / 141 degrees F |
| SFB 0 SFB-XF1-Zone0  | OK     | 69 degrees C / 156 degrees F |
| SFB 0 SFB-XF0-Zone0  | OK     | 68 degrees C / 154 degrees F |
| SFB 1 Intake-Zone0   | OK     | 56 degrees C / 132 degrees F |
| SFB 1 Exhaust-Zone1  | OK     | 47 degrees C / 116 degrees F |
| SFB 1 IntakeA-Zone0  | OK     | 51 degrees C / 123 degrees F |
| SFB 1 IntakeB-Zone1  | OK     | 40 degrees C / 104 degrees F |
| SFB 1 Exhaust-Zone0  | OK     | 51 degrees C / 123 degrees F |
| SFB 1 SFB-XF2-Zone1  | OK     | 62 degrees C / 143 degrees F |
| SFB 1 SFB-XF1-Zone0  | OK     | 67 degrees C / 152 degrees F |
| SFB 1 SFB-XF0-Zone0  | OK     | 69 degrees C / 156 degrees F |
| SFB 2 Intake-Zone0   | OK     | 56 degrees C / 132 degrees F |
| SFB 2 Exhaust-Zone1  | OK     | 47 degrees C / 116 degrees F |
| SFB 2 IntakeA-Zone0  | OK     | 51 degrees C / 123 degrees F |
| SFB 2 IntakeB-Zone1  | OK     | 40 degrees C / 104 degrees F |
| SFB 2 Exhaust-Zone0  | OK     | 53 degrees C / 127 degrees F |
| SFB 2 SFB-XF2-Zone1  | OK     | 65 degrees C / 149 degrees F |
| SFB 2 SFB-XF1-Zone0  | OK     | 69 degrees C / 156 degrees F |
| SFB 2 SFB-XF0-Zone0  | OK     | 70 degrees C / 158 degrees F |
| SFB 3 Intake-Zone0   | OK     | 57 degrees C / 134 degrees F |
| SFB 3 Exhaust-Zone1  | OK     | 48 degrees C / 118 degrees F |
| SFB 3 IntakeA-Zone0  | OK     | 52 degrees C / 125 degrees F |
| SFB 3 IntakeB-Zone1  | OK     | 41 degrees C / 105 degrees F |
| SFB 3 Exhaust-Zone0  | OK     | 53 degrees C / 127 degrees F |
| SFB 3 SFB-XF2-Zone1  | OK     | 66 degrees C / 150 degrees F |
| SFB 3 SFB-XF1-Zone0  | OK     | 69 degrees C / 156 degrees F |
| SFB 3 SFB-XF0-Zone0  | OK     | 71 degrees C / 159 degrees F |

|                     |    |                              |
|---------------------|----|------------------------------|
| SFB 4 Intake-Zone0  | OK | 58 degrees C / 136 degrees F |
| SFB 4 Exhaust-Zone1 | OK | 49 degrees C / 120 degrees F |
| SFB 4 IntakeA-Zone0 | OK | 54 degrees C / 129 degrees F |
| SFB 4 IntakeB-Zone1 | OK | 42 degrees C / 107 degrees F |
| SFB 4 Exhaust-Zone0 | OK | 53 degrees C / 127 degrees F |
| SFB 4 SFB-XF2-Zone1 | OK | 64 degrees C / 147 degrees F |
| SFB 4 SFB-XF1-Zone0 | OK | 68 degrees C / 154 degrees F |
| SFB 4 SFB-XF0-Zone0 | OK | 71 degrees C / 159 degrees F |
| SFB 5 Intake-Zone0  | OK | 58 degrees C / 136 degrees F |
| SFB 5 Exhaust-Zone1 | OK | 50 degrees C / 122 degrees F |
| SFB 5 IntakeA-Zone0 | OK | 53 degrees C / 127 degrees F |
| SFB 5 IntakeB-Zone1 | OK | 43 degrees C / 109 degrees F |
| SFB 5 Exhaust-Zone0 | OK | 54 degrees C / 129 degrees F |
| SFB 5 SFB-XF2-Zone1 | OK | 66 degrees C / 150 degrees F |
| SFB 5 SFB-XF1-Zone0 | OK | 69 degrees C / 156 degrees F |
| SFB 5 SFB-XF0-Zone0 | OK | 74 degrees C / 165 degrees F |
| SFB 6 Intake-Zone0  | OK | 58 degrees C / 136 degrees F |
| SFB 6 Exhaust-Zone1 | OK | 49 degrees C / 120 degrees F |
| SFB 6 IntakeA-Zone0 | OK | 53 degrees C / 127 degrees F |
| SFB 6 IntakeB-Zone1 | OK | 43 degrees C / 109 degrees F |
| SFB 6 Exhaust-Zone0 | OK | 53 degrees C / 127 degrees F |
| SFB 6 SFB-XF2-Zone1 | OK | 65 degrees C / 149 degrees F |
| SFB 6 SFB-XF1-Zone0 | OK | 68 degrees C / 154 degrees F |
| SFB 6 SFB-XF0-Zone0 | OK | 72 degrees C / 161 degrees F |
| SFB 7 Intake-Zone0  | OK | 57 degrees C / 134 degrees F |
| SFB 7 Exhaust-Zone1 | OK | 50 degrees C / 122 degrees F |
| SFB 7 IntakeA-Zone0 | OK | 53 degrees C / 127 degrees F |
| SFB 7 IntakeB-Zone1 | OK | 43 degrees C / 109 degrees F |
| SFB 7 Exhaust-Zone0 | OK | 54 degrees C / 129 degrees F |
| SFB 7 SFB-XF2-Zone1 | OK | 68 degrees C / 154 degrees F |
| SFB 7 SFB-XF1-Zone0 | OK | 69 degrees C / 156 degrees F |
| SFB 7 SFB-XF0-Zone0 | OK | 73 degrees C / 163 degrees F |
| FPC 0 Intake        | OK | 41 degrees C / 105 degrees F |
| FPC 0 Exhaust A     | OK | 48 degrees C / 118 degrees F |
| FPC 0 Exhaust B     | OK | 62 degrees C / 143 degrees F |
| FPC 0 LU 0 TSen     | OK | 59 degrees C / 138 degrees F |
| FPC 0 LU 0 Chip     | OK | 62 degrees C / 143 degrees F |
| FPC 0 LU 1 TSen     | OK | 59 degrees C / 138 degrees F |
| FPC 0 LU 1 Chip     | OK | 64 degrees C / 147 degrees F |
| FPC 0 LU 2 TSen     | OK | 59 degrees C / 138 degrees F |
| FPC 0 LU 2 Chip     | OK | 53 degrees C / 127 degrees F |
| FPC 0 LU 3 TSen     | OK | 59 degrees C / 138 degrees F |
| FPC 0 LU 3 Chip     | OK | 53 degrees C / 127 degrees F |
| FPC 0 MQ 0 TSen     | OK | 47 degrees C / 116 degrees F |
| FPC 0 MQ 0 Chip     | OK | 49 degrees C / 120 degrees F |
| FPC 0 MQ 1 TSen     | OK | 47 degrees C / 116 degrees F |
| FPC 0 MQ 1 Chip     | OK | 51 degrees C / 123 degrees F |
| FPC 0 MQ 2 TSen     | OK | 47 degrees C / 116 degrees F |
| FPC 0 MQ 2 Chip     | OK | 44 degrees C / 111 degrees F |
| FPC 0 MQ 3 TSen     | OK | 47 degrees C / 116 degrees F |
| FPC 0 MQ 3 Chip     | OK | 45 degrees C / 113 degrees F |
| FPC 1 Intake        | OK | 40 degrees C / 104 degrees F |
| FPC 1 Exhaust A     | OK | 49 degrees C / 120 degrees F |
| FPC 1 Exhaust B     | OK | 58 degrees C / 136 degrees F |
| FPC 1 LU 0 TSen     | OK | 55 degrees C / 131 degrees F |
| FPC 1 LU 0 Chip     | OK | 56 degrees C / 132 degrees F |
| FPC 1 LU 1 TSen     | OK | 55 degrees C / 131 degrees F |
| FPC 1 LU 1 Chip     | OK | 58 degrees C / 136 degrees F |
| FPC 1 LU 2 TSen     | OK | 55 degrees C / 131 degrees F |
| FPC 1 LU 2 Chip     | OK | 49 degrees C / 120 degrees F |
| FPC 1 LU 3 TSen     | OK | 55 degrees C / 131 degrees F |

|                 |    |                              |
|-----------------|----|------------------------------|
| FPC 1 LU 3 Chip | OK | 51 degrees C / 123 degrees F |
| FPC 1 MQ 0 TSen | OK | 47 degrees C / 116 degrees F |
| FPC 1 MQ 0 Chip | OK | 48 degrees C / 118 degrees F |
| FPC 1 MQ 1 TSen | OK | 47 degrees C / 116 degrees F |
| FPC 1 MQ 1 Chip | OK | 50 degrees C / 122 degrees F |
| FPC 1 MQ 2 TSen | OK | 47 degrees C / 116 degrees F |
| FPC 1 MQ 2 Chip | OK | 44 degrees C / 111 degrees F |
| FPC 1 MQ 3 TSen | OK | 47 degrees C / 116 degrees F |
| FPC 1 MQ 3 Chip | OK | 44 degrees C / 111 degrees F |
| FPC 2 Intake    | OK | 39 degrees C / 102 degrees F |
| FPC 2 Exhaust A | OK | 49 degrees C / 120 degrees F |
| FPC 2 Exhaust B | OK | 61 degrees C / 141 degrees F |
| FPC 2 LU 0 TSen | OK | 58 degrees C / 136 degrees F |
| FPC 2 LU 0 Chip | OK | 60 degrees C / 140 degrees F |
| FPC 2 LU 1 TSen | OK | 58 degrees C / 136 degrees F |
| FPC 2 LU 1 Chip | OK | 65 degrees C / 149 degrees F |
| FPC 2 LU 2 TSen | OK | 58 degrees C / 136 degrees F |
| FPC 2 LU 2 Chip | OK | 51 degrees C / 123 degrees F |
| FPC 2 LU 3 TSen | OK | 58 degrees C / 136 degrees F |
| FPC 2 LU 3 Chip | OK | 53 degrees C / 127 degrees F |
| FPC 2 MQ 0 TSen | OK | 47 degrees C / 116 degrees F |
| FPC 2 MQ 0 Chip | OK | 50 degrees C / 122 degrees F |
| FPC 2 MQ 1 TSen | OK | 47 degrees C / 116 degrees F |
| FPC 2 MQ 1 Chip | OK | 52 degrees C / 125 degrees F |
| FPC 2 MQ 2 TSen | OK | 47 degrees C / 116 degrees F |
| FPC 2 MQ 2 Chip | OK | 45 degrees C / 113 degrees F |
| FPC 2 MQ 3 TSen | OK | 47 degrees C / 116 degrees F |
| FPC 2 MQ 3 Chip | OK | 46 degrees C / 114 degrees F |
| FPC 3 Intake    | OK | 40 degrees C / 104 degrees F |
| FPC 3 Exhaust A | OK | 49 degrees C / 120 degrees F |
| FPC 3 Exhaust B | OK | 61 degrees C / 141 degrees F |
| FPC 3 LU 0 TSen | OK | 58 degrees C / 136 degrees F |
| FPC 3 LU 0 Chip | OK | 61 degrees C / 141 degrees F |
| FPC 3 LU 1 TSen | OK | 58 degrees C / 136 degrees F |
| FPC 3 LU 1 Chip | OK | 62 degrees C / 143 degrees F |
| FPC 3 LU 2 TSen | OK | 58 degrees C / 136 degrees F |
| FPC 3 LU 2 Chip | OK | 51 degrees C / 123 degrees F |
| FPC 3 LU 3 TSen | OK | 58 degrees C / 136 degrees F |
| FPC 3 LU 3 Chip | OK | 53 degrees C / 127 degrees F |
| FPC 3 MQ 0 TSen | OK | 48 degrees C / 118 degrees F |
| FPC 3 MQ 0 Chip | OK | 50 degrees C / 122 degrees F |
| FPC 3 MQ 1 TSen | OK | 48 degrees C / 118 degrees F |
| FPC 3 MQ 1 Chip | OK | 54 degrees C / 129 degrees F |
| FPC 3 MQ 2 TSen | OK | 48 degrees C / 118 degrees F |
| FPC 3 MQ 2 Chip | OK | 45 degrees C / 113 degrees F |
| FPC 3 MQ 3 TSen | OK | 48 degrees C / 118 degrees F |
| FPC 3 MQ 3 Chip | OK | 48 degrees C / 118 degrees F |
| FPC 4 Intake    | OK | 40 degrees C / 104 degrees F |
| FPC 4 Exhaust A | OK | 49 degrees C / 120 degrees F |
| FPC 4 Exhaust B | OK | 62 degrees C / 143 degrees F |
| FPC 4 LU 0 TSen | OK | 59 degrees C / 138 degrees F |
| FPC 4 LU 0 Chip | OK | 62 degrees C / 143 degrees F |
| FPC 4 LU 1 TSen | OK | 59 degrees C / 138 degrees F |
| FPC 4 LU 1 Chip | OK | 65 degrees C / 149 degrees F |
| FPC 4 LU 2 TSen | OK | 59 degrees C / 138 degrees F |
| FPC 4 LU 2 Chip | OK | 51 degrees C / 123 degrees F |
| FPC 4 LU 3 TSen | OK | 59 degrees C / 138 degrees F |
| FPC 4 LU 3 Chip | OK | 53 degrees C / 127 degrees F |
| FPC 4 MQ 0 TSen | OK | 48 degrees C / 118 degrees F |
| FPC 4 MQ 0 Chip | OK | 52 degrees C / 125 degrees F |
| FPC 4 MQ 1 TSen | OK | 48 degrees C / 118 degrees F |

|                 |    |                              |
|-----------------|----|------------------------------|
| FPC 4 MQ 1 Chip | OK | 53 degrees C / 127 degrees F |
| FPC 4 MQ 2 TSen | OK | 48 degrees C / 118 degrees F |
| FPC 4 MQ 2 Chip | OK | 46 degrees C / 114 degrees F |
| FPC 4 MQ 3 TSen | OK | 48 degrees C / 118 degrees F |
| FPC 4 MQ 3 Chip | OK | 47 degrees C / 116 degrees F |
| FPC 5 Intake    | OK | 41 degrees C / 105 degrees F |
| FPC 5 Exhaust A | OK | 50 degrees C / 122 degrees F |
| FPC 5 Exhaust B | OK | 63 degrees C / 145 degrees F |
| FPC 5 LU 0 TSen | OK | 60 degrees C / 140 degrees F |
| FPC 5 LU 0 Chip | OK | 63 degrees C / 145 degrees F |
| FPC 5 LU 1 TSen | OK | 60 degrees C / 140 degrees F |
| FPC 5 LU 1 Chip | OK | 66 degrees C / 150 degrees F |
| FPC 5 LU 2 TSen | OK | 60 degrees C / 140 degrees F |
| FPC 5 LU 2 Chip | OK | 56 degrees C / 132 degrees F |
| FPC 5 LU 3 TSen | OK | 60 degrees C / 140 degrees F |
| FPC 5 LU 3 Chip | OK | 54 degrees C / 129 degrees F |
| FPC 5 MQ 0 TSen | OK | 49 degrees C / 120 degrees F |
| FPC 5 MQ 0 Chip | OK | 52 degrees C / 125 degrees F |
| FPC 5 MQ 1 TSen | OK | 49 degrees C / 120 degrees F |
| FPC 5 MQ 1 Chip | OK | 53 degrees C / 127 degrees F |
| FPC 5 MQ 2 TSen | OK | 49 degrees C / 120 degrees F |
| FPC 5 MQ 2 Chip | OK | 48 degrees C / 118 degrees F |
| FPC 5 MQ 3 TSen | OK | 49 degrees C / 120 degrees F |
| FPC 5 MQ 3 Chip | OK | 47 degrees C / 116 degrees F |
| FPC 6 Intake    | OK | 42 degrees C / 107 degrees F |
| FPC 6 Exhaust A | OK | 51 degrees C / 123 degrees F |
| FPC 6 Exhaust B | OK | 63 degrees C / 145 degrees F |
| FPC 6 LU 0 TSen | OK | 61 degrees C / 141 degrees F |
| FPC 6 LU 0 Chip | OK | 64 degrees C / 147 degrees F |
| FPC 6 LU 1 TSen | OK | 61 degrees C / 141 degrees F |
| FPC 6 LU 1 Chip | OK | 66 degrees C / 150 degrees F |
| FPC 6 LU 2 TSen | OK | 61 degrees C / 141 degrees F |
| FPC 6 LU 2 Chip | OK | 56 degrees C / 132 degrees F |
| FPC 6 LU 3 TSen | OK | 61 degrees C / 141 degrees F |
| FPC 6 LU 3 Chip | OK | 56 degrees C / 132 degrees F |
| FPC 6 MQ 0 TSen | OK | 50 degrees C / 122 degrees F |
| FPC 6 MQ 0 Chip | OK | 56 degrees C / 132 degrees F |
| FPC 6 MQ 1 TSen | OK | 50 degrees C / 122 degrees F |
| FPC 6 MQ 1 Chip | OK | 59 degrees C / 138 degrees F |
| FPC 6 MQ 2 TSen | OK | 50 degrees C / 122 degrees F |
| FPC 6 MQ 2 Chip | OK | 49 degrees C / 120 degrees F |
| FPC 6 MQ 3 TSen | OK | 50 degrees C / 122 degrees F |
| FPC 6 MQ 3 Chip | OK | 49 degrees C / 120 degrees F |
| FPC 7 Intake    | OK | 41 degrees C / 105 degrees F |
| FPC 7 Exhaust A | OK | 51 degrees C / 123 degrees F |
| FPC 7 Exhaust B | OK | 63 degrees C / 145 degrees F |
| FPC 7 LU 0 TSen | OK | 60 degrees C / 140 degrees F |
| FPC 7 LU 0 Chip | OK | 61 degrees C / 141 degrees F |
| FPC 7 LU 1 TSen | OK | 60 degrees C / 140 degrees F |
| FPC 7 LU 1 Chip | OK | 65 degrees C / 149 degrees F |
| FPC 7 LU 2 TSen | OK | 60 degrees C / 140 degrees F |
| FPC 7 LU 2 Chip | OK | 54 degrees C / 129 degrees F |
| FPC 7 LU 3 TSen | OK | 60 degrees C / 140 degrees F |
| FPC 7 LU 3 Chip | OK | 53 degrees C / 127 degrees F |
| FPC 7 MQ 0 TSen | OK | 50 degrees C / 122 degrees F |
| FPC 7 MQ 0 Chip | OK | 53 degrees C / 127 degrees F |
| FPC 7 MQ 1 TSen | OK | 50 degrees C / 122 degrees F |
| FPC 7 MQ 1 Chip | OK | 54 degrees C / 129 degrees F |
| FPC 7 MQ 2 TSen | OK | 50 degrees C / 122 degrees F |
| FPC 7 MQ 2 Chip | OK | 47 degrees C / 116 degrees F |
| FPC 7 MQ 3 TSen | OK | 50 degrees C / 122 degrees F |

|                  |    |                              |
|------------------|----|------------------------------|
| FPC 7 MQ 3 Chip  | OK | 47 degrees C / 116 degrees F |
| FPC 8 Intake     | OK | 41 degrees C / 105 degrees F |
| FPC 8 Exhaust A  | OK | 50 degrees C / 122 degrees F |
| FPC 8 Exhaust B  | OK | 62 degrees C / 143 degrees F |
| FPC 8 LU 0 TSen  | OK | 59 degrees C / 138 degrees F |
| FPC 8 LU 0 Chip  | OK | 62 degrees C / 143 degrees F |
| FPC 8 LU 1 TSen  | OK | 59 degrees C / 138 degrees F |
| FPC 8 LU 1 Chip  | OK | 64 degrees C / 147 degrees F |
| FPC 8 LU 2 TSen  | OK | 59 degrees C / 138 degrees F |
| FPC 8 LU 2 Chip  | OK | 55 degrees C / 131 degrees F |
| FPC 8 LU 3 TSen  | OK | 59 degrees C / 138 degrees F |
| FPC 8 LU 3 Chip  | OK | 54 degrees C / 129 degrees F |
| FPC 8 MQ 0 TSen  | OK | 49 degrees C / 120 degrees F |
| FPC 8 MQ 0 Chip  | OK | 51 degrees C / 123 degrees F |
| FPC 8 MQ 1 TSen  | OK | 49 degrees C / 120 degrees F |
| FPC 8 MQ 1 Chip  | OK | 52 degrees C / 125 degrees F |
| FPC 8 MQ 2 TSen  | OK | 49 degrees C / 120 degrees F |
| FPC 8 MQ 2 Chip  | OK | 46 degrees C / 114 degrees F |
| FPC 8 MQ 3 TSen  | OK | 49 degrees C / 120 degrees F |
| FPC 8 MQ 3 Chip  | OK | 47 degrees C / 116 degrees F |
| FPC 9 Intake     | OK | 42 degrees C / 107 degrees F |
| FPC 9 Exhaust A  | OK | 51 degrees C / 123 degrees F |
| FPC 9 Exhaust B  | OK | 63 degrees C / 145 degrees F |
| FPC 9 LU 0 TSen  | OK | 60 degrees C / 140 degrees F |
| FPC 9 LU 0 Chip  | OK | 65 degrees C / 149 degrees F |
| FPC 9 LU 1 TSen  | OK | 60 degrees C / 140 degrees F |
| FPC 9 LU 1 Chip  | OK | 67 degrees C / 152 degrees F |
| FPC 9 LU 2 TSen  | OK | 60 degrees C / 140 degrees F |
| FPC 9 LU 2 Chip  | OK | 54 degrees C / 129 degrees F |
| FPC 9 LU 3 TSen  | OK | 60 degrees C / 140 degrees F |
| FPC 9 LU 3 Chip  | OK | 54 degrees C / 129 degrees F |
| FPC 9 MQ 0 TSen  | OK | 51 degrees C / 123 degrees F |
| FPC 9 MQ 0 Chip  | OK | 55 degrees C / 131 degrees F |
| FPC 9 MQ 1 TSen  | OK | 51 degrees C / 123 degrees F |
| FPC 9 MQ 1 Chip  | OK | 59 degrees C / 138 degrees F |
| FPC 9 MQ 2 TSen  | OK | 51 degrees C / 123 degrees F |
| FPC 9 MQ 2 Chip  | OK | 49 degrees C / 120 degrees F |
| FPC 9 MQ 3 TSen  | OK | 51 degrees C / 123 degrees F |
| FPC 9 MQ 3 Chip  | OK | 49 degrees C / 120 degrees F |
| FPC 10 Intake    | OK | 44 degrees C / 111 degrees F |
| FPC 10 Exhaust A | OK | 49 degrees C / 120 degrees F |
| FPC 10 Exhaust B | OK | 55 degrees C / 131 degrees F |
| FPC 10 LU 0 TSen | OK | 54 degrees C / 129 degrees F |
| FPC 10 LU 0 Chip | OK | 55 degrees C / 131 degrees F |
| FPC 10 LU 1 TSen | OK | 54 degrees C / 129 degrees F |
| FPC 10 LU 1 Chip | OK | 59 degrees C / 138 degrees F |
| FPC 10 LU 2 TSen | OK | 54 degrees C / 129 degrees F |
| FPC 10 LU 2 Chip | OK | 52 degrees C / 125 degrees F |
| FPC 10 LU 3 TSen | OK | 54 degrees C / 129 degrees F |
| FPC 10 LU 3 Chip | OK | 51 degrees C / 123 degrees F |
| FPC 10 MQ 0 TSen | OK | 48 degrees C / 118 degrees F |
| FPC 10 MQ 0 Chip | OK | 49 degrees C / 120 degrees F |
| FPC 10 MQ 1 TSen | OK | 48 degrees C / 118 degrees F |
| FPC 10 MQ 1 Chip | OK | 52 degrees C / 125 degrees F |
| FPC 10 MQ 2 TSen | OK | 48 degrees C / 118 degrees F |
| FPC 10 MQ 2 Chip | OK | 47 degrees C / 116 degrees F |
| FPC 10 MQ 3 TSen | OK | 48 degrees C / 118 degrees F |
| FPC 10 MQ 3 Chip | OK | 47 degrees C / 116 degrees F |
| FPC 11 Intake    | OK | 30 degrees C / 86 degrees F  |
| FPC 11 Exhaust A | OK | 35 degrees C / 95 degrees F  |
| FPC 11 Exhaust B | OK | 30 degrees C / 86 degrees F  |

|                  |    |                              |
|------------------|----|------------------------------|
| FPC 11 LU 0 TSen | OK | 57 degrees C / 134 degrees F |
| FPC 11 LU 0 Chip | OK | 58 degrees C / 136 degrees F |
| FPC 11 LU 1 TSen | OK | 57 degrees C / 134 degrees F |
| FPC 11 LU 1 Chip | OK | 62 degrees C / 143 degrees F |
| FPC 11 LU 2 TSen | OK | 57 degrees C / 134 degrees F |
| FPC 11 LU 2 Chip | OK | 53 degrees C / 127 degrees F |
| FPC 11 LU 3 TSen | OK | 57 degrees C / 134 degrees F |
| FPC 11 LU 3 Chip | OK | 54 degrees C / 129 degrees F |
| FPC 11 MQ 0 TSen | OK | 52 degrees C / 125 degrees F |
| FPC 11 MQ 0 Chip | OK | 52 degrees C / 125 degrees F |
| FPC 11 MQ 1 TSen | OK | 52 degrees C / 125 degrees F |
| FPC 11 MQ 1 Chip | OK | 57 degrees C / 134 degrees F |
| FPC 11 MQ 2 TSen | OK | 52 degrees C / 125 degrees F |
| FPC 11 MQ 2 Chip | OK | 48 degrees C / 118 degrees F |
| FPC 11 MQ 3 TSen | OK | 52 degrees C / 125 degrees F |
| FPC 11 MQ 3 Chip | OK | 52 degrees C / 125 degrees F |
| FPC 12 Intake    | OK | 40 degrees C / 104 degrees F |
| FPC 12 Exhaust A | OK | 47 degrees C / 116 degrees F |
| FPC 12 Exhaust B | OK | 52 degrees C / 125 degrees F |
| FPC 12 LU 0 TSen | OK | 51 degrees C / 123 degrees F |
| FPC 12 LU 0 Chip | OK | 52 degrees C / 125 degrees F |
| FPC 12 LU 1 TSen | OK | 51 degrees C / 123 degrees F |
| FPC 12 LU 1 Chip | OK | 55 degrees C / 131 degrees F |
| FPC 12 LU 2 TSen | OK | 51 degrees C / 123 degrees F |
| FPC 12 LU 2 Chip | OK | 47 degrees C / 116 degrees F |
| FPC 12 LU 3 TSen | OK | 51 degrees C / 123 degrees F |
| FPC 12 LU 3 Chip | OK | 50 degrees C / 122 degrees F |
| FPC 12 MQ 0 TSen | OK | 46 degrees C / 114 degrees F |
| FPC 12 MQ 0 Chip | OK | 46 degrees C / 114 degrees F |
| FPC 12 MQ 1 TSen | OK | 46 degrees C / 114 degrees F |
| FPC 12 MQ 1 Chip | OK | 50 degrees C / 122 degrees F |
| FPC 12 MQ 2 TSen | OK | 46 degrees C / 114 degrees F |
| FPC 12 MQ 2 Chip | OK | 44 degrees C / 111 degrees F |
| FPC 12 MQ 3 TSen | OK | 46 degrees C / 114 degrees F |
| FPC 12 MQ 3 Chip | OK | 46 degrees C / 114 degrees F |
| FPC 13 Intake    | OK | 40 degrees C / 104 degrees F |
| FPC 13 Exhaust A | OK | 48 degrees C / 118 degrees F |
| FPC 13 Exhaust B | OK | 52 degrees C / 125 degrees F |
| FPC 13 LU 0 TSen | OK | 51 degrees C / 123 degrees F |
| FPC 13 LU 0 Chip | OK | 52 degrees C / 125 degrees F |
| FPC 13 LU 1 TSen | OK | 51 degrees C / 123 degrees F |
| FPC 13 LU 1 Chip | OK | 55 degrees C / 131 degrees F |
| FPC 13 LU 2 TSen | OK | 51 degrees C / 123 degrees F |
| FPC 13 LU 2 Chip | OK | 48 degrees C / 118 degrees F |
| FPC 13 LU 3 TSen | OK | 51 degrees C / 123 degrees F |
| FPC 13 LU 3 Chip | OK | 48 degrees C / 118 degrees F |
| FPC 13 MQ 0 TSen | OK | 46 degrees C / 114 degrees F |
| FPC 13 MQ 0 Chip | OK | 46 degrees C / 114 degrees F |
| FPC 13 MQ 1 TSen | OK | 46 degrees C / 114 degrees F |
| FPC 13 MQ 1 Chip | OK | 50 degrees C / 122 degrees F |
| FPC 13 MQ 2 TSen | OK | 46 degrees C / 114 degrees F |
| FPC 13 MQ 2 Chip | OK | 44 degrees C / 111 degrees F |
| FPC 13 MQ 3 TSen | OK | 46 degrees C / 114 degrees F |
| FPC 13 MQ 3 Chip | OK | 46 degrees C / 114 degrees F |
| FPC 14 Intake    | OK | 40 degrees C / 104 degrees F |
| FPC 14 Exhaust A | OK | 50 degrees C / 122 degrees F |
| FPC 14 Exhaust B | OK | 51 degrees C / 123 degrees F |
| FPC 14 LU 0 TSen | OK | 50 degrees C / 122 degrees F |
| FPC 14 LU 0 Chip | OK | 50 degrees C / 122 degrees F |
| FPC 14 LU 1 TSen | OK | 50 degrees C / 122 degrees F |
| FPC 14 LU 1 Chip | OK | 54 degrees C / 129 degrees F |

|                        |    |                              |
|------------------------|----|------------------------------|
| FPC 14 LU 2 TSen       | OK | 50 degrees C / 122 degrees F |
| FPC 14 LU 2 Chip       | OK | 47 degrees C / 116 degrees F |
| FPC 14 LU 3 TSen       | OK | 50 degrees C / 122 degrees F |
| FPC 14 LU 3 Chip       | OK | 49 degrees C / 120 degrees F |
| FPC 14 MQ 0 TSen       | OK | 47 degrees C / 116 degrees F |
| FPC 14 MQ 0 Chip       | OK | 46 degrees C / 114 degrees F |
| FPC 14 MQ 1 TSen       | OK | 47 degrees C / 116 degrees F |
| FPC 14 MQ 1 Chip       | OK | 51 degrees C / 123 degrees F |
| FPC 14 MQ 2 TSen       | OK | 47 degrees C / 116 degrees F |
| FPC 14 MQ 2 Chip       | OK | 45 degrees C / 113 degrees F |
| FPC 14 MQ 3 TSen       | OK | 47 degrees C / 116 degrees F |
| FPC 14 MQ 3 Chip       | OK | 48 degrees C / 118 degrees F |
| FPC 15 Intake          | OK | 44 degrees C / 111 degrees F |
| FPC 15 Exhaust A       | OK | 49 degrees C / 120 degrees F |
| FPC 15 Exhaust B       | OK | 60 degrees C / 140 degrees F |
| FPC 15 LU 0 TSen       | OK | 50 degrees C / 122 degrees F |
| FPC 15 LU 0 Chip       | OK | 56 degrees C / 132 degrees F |
| FPC 15 LU 1 TSen       | OK | 50 degrees C / 122 degrees F |
| FPC 15 LU 1 Chip       | OK | 50 degrees C / 122 degrees F |
| FPC 15 LU 2 TSen       | OK | 50 degrees C / 122 degrees F |
| FPC 15 LU 2 Chip       | OK | 58 degrees C / 136 degrees F |
| FPC 15 LU 3 TSen       | OK | 50 degrees C / 122 degrees F |
| FPC 15 LU 3 Chip       | OK | 63 degrees C / 145 degrees F |
| FPC 15 XM 0 TSen       | OK | 50 degrees C / 122 degrees F |
| FPC 15 XM 0 Chip       | OK | 56 degrees C / 132 degrees F |
| FPC 15 XF 0 TSen       | OK | 50 degrees C / 122 degrees F |
| FPC 15 XF 0 Chip       | OK | 68 degrees C / 154 degrees F |
| FPC 15 PLX Switch TSen | OK | 50 degrees C / 122 degrees F |
| FPC 15 PLX Switch Chip | OK | 56 degrees C / 132 degrees F |
| FPC 16 Intake          | OK | 42 degrees C / 107 degrees F |
| FPC 16 Exhaust A       | OK | 51 degrees C / 123 degrees F |
| FPC 16 Exhaust B       | OK | 53 degrees C / 127 degrees F |
| FPC 16 LU 0 TSen       | OK | 51 degrees C / 123 degrees F |
| FPC 16 LU 0 Chip       | OK | 52 degrees C / 125 degrees F |
| FPC 16 LU 1 TSen       | OK | 51 degrees C / 123 degrees F |
| FPC 16 LU 1 Chip       | OK | 55 degrees C / 131 degrees F |
| FPC 16 LU 2 TSen       | OK | 51 degrees C / 123 degrees F |
| FPC 16 LU 2 Chip       | OK | 48 degrees C / 118 degrees F |
| FPC 16 LU 3 TSen       | OK | 51 degrees C / 123 degrees F |
| FPC 16 LU 3 Chip       | OK | 49 degrees C / 120 degrees F |
| FPC 16 MQ 0 TSen       | OK | 49 degrees C / 120 degrees F |
| FPC 16 MQ 0 Chip       | OK | 48 degrees C / 118 degrees F |
| FPC 16 MQ 1 TSen       | OK | 49 degrees C / 120 degrees F |
| FPC 16 MQ 1 Chip       | OK | 53 degrees C / 127 degrees F |
| FPC 16 MQ 2 TSen       | OK | 49 degrees C / 120 degrees F |
| FPC 16 MQ 2 Chip       | OK | 46 degrees C / 114 degrees F |
| FPC 16 MQ 3 TSen       | OK | 49 degrees C / 120 degrees F |
| FPC 16 MQ 3 Chip       | OK | 49 degrees C / 120 degrees F |
| FPC 17 Intake          | OK | 43 degrees C / 109 degrees F |
| FPC 17 Exhaust A       | OK | 51 degrees C / 123 degrees F |
| FPC 17 Exhaust B       | OK | 55 degrees C / 131 degrees F |
| FPC 17 LU 0 TSen       | OK | 54 degrees C / 129 degrees F |
| FPC 17 LU 0 Chip       | OK | 57 degrees C / 134 degrees F |
| FPC 17 LU 1 TSen       | OK | 54 degrees C / 129 degrees F |
| FPC 17 LU 1 Chip       | OK | 60 degrees C / 140 degrees F |
| FPC 17 LU 2 TSen       | OK | 54 degrees C / 129 degrees F |
| FPC 17 LU 2 Chip       | OK | 53 degrees C / 127 degrees F |
| FPC 17 LU 3 TSen       | OK | 54 degrees C / 129 degrees F |
| FPC 17 LU 3 Chip       | OK | 53 degrees C / 127 degrees F |
| FPC 17 MQ 0 TSen       | OK | 49 degrees C / 120 degrees F |
| FPC 17 MQ 0 Chip       | OK | 50 degrees C / 122 degrees F |

|                  |    |                              |
|------------------|----|------------------------------|
| FPC 17 MQ 1 TSen | OK | 49 degrees C / 120 degrees F |
| FPC 17 MQ 1 Chip | OK | 54 degrees C / 129 degrees F |
| FPC 17 MQ 2 TSen | OK | 49 degrees C / 120 degrees F |
| FPC 17 MQ 2 Chip | OK | 47 degrees C / 116 degrees F |
| FPC 17 MQ 3 TSen | OK | 49 degrees C / 120 degrees F |
| FPC 17 MQ 3 Chip | OK | 51 degrees C / 123 degrees F |
| FPC 18 Intake    | OK | 44 degrees C / 111 degrees F |
| FPC 18 Exhaust A | OK | 53 degrees C / 127 degrees F |
| FPC 18 Exhaust B | OK | 57 degrees C / 134 degrees F |
| FPC 18 LU 0 TSen | OK | 56 degrees C / 132 degrees F |
| FPC 18 LU 0 Chip | OK | 57 degrees C / 134 degrees F |
| FPC 18 LU 1 TSen | OK | 56 degrees C / 132 degrees F |
| FPC 18 LU 1 Chip | OK | 62 degrees C / 143 degrees F |
| FPC 18 LU 2 TSen | OK | 56 degrees C / 132 degrees F |
| FPC 18 LU 2 Chip | OK | 53 degrees C / 127 degrees F |
| FPC 18 LU 3 TSen | OK | 56 degrees C / 132 degrees F |
| FPC 18 LU 3 Chip | OK | 55 degrees C / 131 degrees F |
| FPC 18 MQ 0 TSen | OK | 51 degrees C / 123 degrees F |
| FPC 18 MQ 0 Chip | OK | 54 degrees C / 129 degrees F |
| FPC 18 MQ 1 TSen | OK | 51 degrees C / 123 degrees F |
| FPC 18 MQ 1 Chip | OK | 58 degrees C / 136 degrees F |
| FPC 18 MQ 2 TSen | OK | 51 degrees C / 123 degrees F |
| FPC 18 MQ 2 Chip | OK | 50 degrees C / 122 degrees F |
| FPC 18 MQ 3 TSen | OK | 51 degrees C / 123 degrees F |
| FPC 18 MQ 3 Chip | OK | 53 degrees C / 127 degrees F |
| FPC 19 Intake    | OK | 48 degrees C / 118 degrees F |
| FPC 19 Exhaust A | OK | 56 degrees C / 132 degrees F |
| FPC 19 Exhaust B | OK | 64 degrees C / 147 degrees F |
| FPC 19 LU 0 TSen | OK | 63 degrees C / 145 degrees F |
| FPC 19 LU 0 Chip | OK | 64 degrees C / 147 degrees F |
| FPC 19 LU 1 TSen | OK | 63 degrees C / 145 degrees F |
| FPC 19 LU 1 Chip | OK | 70 degrees C / 158 degrees F |
| FPC 19 LU 2 TSen | OK | 63 degrees C / 145 degrees F |
| FPC 19 LU 2 Chip | OK | 61 degrees C / 141 degrees F |
| FPC 19 LU 3 TSen | OK | 63 degrees C / 145 degrees F |
| FPC 19 LU 3 Chip | OK | 62 degrees C / 143 degrees F |
| FPC 19 MQ 0 TSen | OK | 56 degrees C / 132 degrees F |
| FPC 19 MQ 0 Chip | OK | 60 degrees C / 140 degrees F |
| FPC 19 MQ 1 TSen | OK | 56 degrees C / 132 degrees F |
| FPC 19 MQ 1 Chip | OK | 62 degrees C / 143 degrees F |
| FPC 19 MQ 2 TSen | OK | 56 degrees C / 132 degrees F |
| FPC 19 MQ 2 Chip | OK | 56 degrees C / 132 degrees F |
| FPC 19 MQ 3 TSen | OK | 56 degrees C / 132 degrees F |
| FPC 19 MQ 3 Chip | OK | 57 degrees C / 134 degrees F |
| ADC 0 Intake     | OK | 40 degrees C / 104 degrees F |
| ADC 0 Exhaust    | OK | 52 degrees C / 125 degrees F |
| ADC 0 ADC-XF1    | OK | 59 degrees C / 138 degrees F |
| ADC 0 ADC-XF0    | OK | 66 degrees C / 150 degrees F |
| ADC 1 Intake     | OK | 38 degrees C / 100 degrees F |
| ADC 1 Exhaust    | OK | 50 degrees C / 122 degrees F |
| ADC 1 ADC-XF1    | OK | 59 degrees C / 138 degrees F |
| ADC 1 ADC-XF0    | OK | 63 degrees C / 145 degrees F |
| ADC 2 Intake     | OK | 37 degrees C / 98 degrees F  |
| ADC 2 Exhaust    | OK | 52 degrees C / 125 degrees F |
| ADC 2 ADC-XF1    | OK | 53 degrees C / 127 degrees F |
| ADC 2 ADC-XF0    | OK | 61 degrees C / 141 degrees F |
| ADC 3 Intake     | OK | 40 degrees C / 104 degrees F |
| ADC 3 Exhaust    | OK | 51 degrees C / 123 degrees F |
| ADC 3 ADC-XF1    | OK | 61 degrees C / 141 degrees F |
| ADC 3 ADC-XF0    | OK | 64 degrees C / 147 degrees F |
| ADC 4 Intake     | OK | 39 degrees C / 102 degrees F |



|                       |    |                              |
|-----------------------|----|------------------------------|
| ADC 4 Exhaust         | OK | 51 degrees C / 123 degrees F |
| ADC 4 ADC-XF1         | OK | 60 degrees C / 140 degrees F |
| ADC 4 ADC-XF0         | OK | 63 degrees C / 145 degrees F |
| ADC 5 Intake          | OK | 38 degrees C / 100 degrees F |
| ADC 5 Exhaust         | OK | 54 degrees C / 129 degrees F |
| ADC 5 ADC-XF1         | OK | 56 degrees C / 132 degrees F |
| ADC 5 ADC-XF0         | OK | 67 degrees C / 152 degrees F |
| ADC 6 Intake          | OK | 39 degrees C / 102 degrees F |
| ADC 6 Exhaust         | OK | 52 degrees C / 125 degrees F |
| ADC 6 ADC-XF1         | OK | 59 degrees C / 138 degrees F |
| ADC 6 ADC-XF0         | OK | 66 degrees C / 150 degrees F |
| ADC 7 Intake          | OK | 39 degrees C / 102 degrees F |
| ADC 7 Exhaust         | OK | 54 degrees C / 129 degrees F |
| ADC 7 ADC-XF1         | OK | 62 degrees C / 143 degrees F |
| ADC 7 ADC-XF0         | OK | 70 degrees C / 158 degrees F |
| ADC 8 Intake          | OK | 39 degrees C / 102 degrees F |
| ADC 8 Exhaust         | OK | 52 degrees C / 125 degrees F |
| ADC 8 ADC-XF1         | OK | 61 degrees C / 141 degrees F |
| ADC 8 ADC-XF0         | OK | 65 degrees C / 149 degrees F |
| ADC 9 Intake          | OK | 41 degrees C / 105 degrees F |
| ADC 9 Exhaust         | OK | 51 degrees C / 123 degrees F |
| ADC 9 ADC-XF1         | OK | 63 degrees C / 145 degrees F |
| ADC 9 ADC-XF0         | OK | 63 degrees C / 145 degrees F |
| ADC 10 Intake         | OK | 48 degrees C / 118 degrees F |
| ADC 10 Exhaust        | OK | 53 degrees C / 127 degrees F |
| ADC 10 ADC-XF1        | OK | 67 degrees C / 152 degrees F |
| ADC 10 ADC-XF0        | OK | 66 degrees C / 150 degrees F |
| ADC 12 Intake         | OK | 49 degrees C / 120 degrees F |
| ADC 12 Exhaust        | OK | 54 degrees C / 129 degrees F |
| ADC 12 ADC-XF1        | OK | 67 degrees C / 152 degrees F |
| ADC 12 ADC-XF0        | OK | 67 degrees C / 152 degrees F |
| ADC 13 Intake         | OK | 49 degrees C / 120 degrees F |
| ADC 13 Exhaust        | OK | 57 degrees C / 134 degrees F |
| ADC 13 ADC-XF1        | OK | 66 degrees C / 150 degrees F |
| ADC 13 ADC-XF0        | OK | 69 degrees C / 156 degrees F |
| ADC 14 Intake         | OK | 51 degrees C / 123 degrees F |
| ADC 14 Exhaust        | OK | 59 degrees C / 138 degrees F |
| ADC 14 ADC-XF1        | OK | 69 degrees C / 156 degrees F |
| ADC 14 ADC-XF0        | OK | 74 degrees C / 165 degrees F |
| ADC 15 Intake         | OK | 50 degrees C / 122 degrees F |
| ADC 15 Exhaust        | OK | 59 degrees C / 138 degrees F |
| ADC 15 ADC-XF1        | OK | 68 degrees C / 154 degrees F |
| ADC 15 ADC-XF0        | OK | 69 degrees C / 156 degrees F |
| ADC 16 Intake         | OK | 52 degrees C / 125 degrees F |
| ADC 16 Exhaust        | OK | 58 degrees C / 136 degrees F |
| ADC 16 ADC-XF1        | OK | 68 degrees C / 154 degrees F |
| ADC 16 ADC-XF0        | OK | 70 degrees C / 158 degrees F |
| ADC 17 Intake         | OK | 52 degrees C / 125 degrees F |
| ADC 17 Exhaust        | OK | 59 degrees C / 138 degrees F |
| ADC 17 ADC-XF1        | OK | 69 degrees C / 156 degrees F |
| ADC 17 ADC-XF0        | OK | 71 degrees C / 159 degrees F |
| ADC 18 Intake         | OK | 53 degrees C / 127 degrees F |
| ADC 18 Exhaust        | OK | 59 degrees C / 138 degrees F |
| ADC 18 ADC-XF1        | OK | 68 degrees C / 154 degrees F |
| ADC 18 ADC-XF0        | OK | 73 degrees C / 163 degrees F |
| ADC 19 Intake         | OK | 50 degrees C / 122 degrees F |
| ADC 19 Exhaust        | OK | 59 degrees C / 138 degrees F |
| ADC 19 ADC-XF1        | OK | 68 degrees C / 154 degrees F |
| ADC 19 ADC-XF0        | OK | 72 degrees C / 161 degrees F |
| Fans Fan Tray 0 Fan 1 | OK | 7440 RPM                     |
| Fans Fan Tray 0 Fan 2 | OK | 7200 RPM                     |

|                  |    |          |
|------------------|----|----------|
| Fan Tray 0 Fan 3 | OK | 6960 RPM |
| Fan Tray 0 Fan 4 | OK | 7200 RPM |
| Fan Tray 0 Fan 5 | OK | 7080 RPM |
| Fan Tray 0 Fan 6 | OK | 6840 RPM |
| Fan Tray 1 Fan 1 | OK | 6840 RPM |
| Fan Tray 1 Fan 2 | OK | 6960 RPM |
| Fan Tray 1 Fan 3 | OK | 6960 RPM |
| Fan Tray 1 Fan 4 | OK | 7080 RPM |
| Fan Tray 1 Fan 5 | OK | 6960 RPM |
| Fan Tray 1 Fan 6 | OK | 6960 RPM |
| Fan Tray 2 Fan 1 | OK | 8640 RPM |
| Fan Tray 2 Fan 2 | OK | 8640 RPM |
| Fan Tray 2 Fan 3 | OK | 8760 RPM |
| Fan Tray 2 Fan 4 | OK | 8760 RPM |
| Fan Tray 2 Fan 5 | OK | 8640 RPM |
| Fan Tray 2 Fan 6 | OK | 8640 RPM |
| Fan Tray 3 Fan 1 | OK | 8520 RPM |
| Fan Tray 3 Fan 2 | OK | 8520 RPM |
| Fan Tray 3 Fan 3 | OK | 8640 RPM |
| Fan Tray 3 Fan 4 | OK | 8640 RPM |
| Fan Tray 3 Fan 5 | OK | 8520 RPM |
| Fan Tray 3 Fan 6 | OK | 8520 RPM |

#### show chassis environment (MX2010 Router)

user@host> show chassis environment

| Class | Item                 | Status | Measurement                 |
|-------|----------------------|--------|-----------------------------|
| Temp  | PSM 0                | OK     | 7 degrees C / 44 degrees F  |
|       | PSM 1                | OK     | 7 degrees C / 44 degrees F  |
|       | PSM 2                | OK     | 7 degrees C / 44 degrees F  |
|       | PSM 3                | OK     | 6 degrees C / 42 degrees F  |
|       | PSM 4                | OK     | 6 degrees C / 42 degrees F  |
|       | PSM 5                | OK     | 6 degrees C / 42 degrees F  |
|       | PSM 6                | OK     | 6 degrees C / 42 degrees F  |
|       | PSM 7                | OK     | 7 degrees C / 44 degrees F  |
|       | PSM 8                | OK     | 7 degrees C / 44 degrees F  |
|       | PDM 0                | OK     |                             |
|       | PDM 1                | Absent |                             |
|       | CB 0 IntakeA-Zone0   | OK     | 14 degrees C / 57 degrees F |
|       | CB 0 IntakeB-Zone1   | OK     | 7 degrees C / 44 degrees F  |
|       | CB 0 IntakeC-Zone0   | OK     | 22 degrees C / 71 degrees F |
|       | CB 0 ExhaustA-Zone0  | OK     | 14 degrees C / 57 degrees F |
|       | CB 0 ExhaustB-Zone1  | OK     | 9 degrees C / 48 degrees F  |
|       | CB 0 TCBC-Zone0      | OK     | 11 degrees C / 51 degrees F |
|       | CB 1 IntakeA-Zone0   | OK     | 9 degrees C / 48 degrees F  |
|       | CB 1 IntakeB-Zone1   | OK     | 5 degrees C / 41 degrees F  |
|       | CB 1 IntakeC-Zone0   | OK     | 20 degrees C / 68 degrees F |
|       | CB 1 ExhaustA-Zone0  | OK     | 12 degrees C / 53 degrees F |
|       | CB 1 ExhaustB-Zone1  | OK     | 7 degrees C / 44 degrees F  |
|       | CB 1 TCBC-Zone0      | OK     | 10 degrees C / 50 degrees F |
|       | SPMB 0 Intake        | OK     | 5 degrees C / 41 degrees F  |
|       | SPMB 1 Intake        | OK     | 4 degrees C / 39 degrees F  |
|       | Routing Engine 0     | OK     | 9 degrees C / 48 degrees F  |
|       | Routing Engine 0 CPU | OK     | 9 degrees C / 48 degrees F  |
|       | Routing Engine 1     | OK     | 6 degrees C / 42 degrees F  |
|       | Routing Engine 1 CPU | OK     | 6 degrees C / 42 degrees F  |
|       | SFB 0 Intake-Zone0   | OK     | 26 degrees C / 78 degrees F |
|       | SFB 0 Exhaust-Zone1  | OK     | 17 degrees C / 62 degrees F |
|       | SFB 0 IntakeA-Zone0  | OK     | 16 degrees C / 60 degrees F |
|       | SFB 0 IntakeB-Zone1  | OK     | 11 degrees C / 51 degrees F |
|       | SFB 0 Exhaust-Zone0  | OK     | 18 degrees C / 64 degrees F |

|                     |    |                             |
|---------------------|----|-----------------------------|
| SFB 0 SFB-XF2-Zone1 | OK | 25 degrees C / 77 degrees F |
| SFB 0 SFB-XF1-Zone0 | OK | 23 degrees C / 73 degrees F |
| SFB 0 SFB-XF0-Zone0 | OK | 33 degrees C / 91 degrees F |
| SFB 1 Intake-Zone0  | OK | 27 degrees C / 80 degrees F |
| SFB 1 Exhaust-Zone1 | OK | 15 degrees C / 59 degrees F |
| SFB 1 IntakeA-Zone0 | OK | 20 degrees C / 68 degrees F |
| SFB 1 IntakeB-Zone1 | OK | 10 degrees C / 50 degrees F |
| SFB 1 Exhaust-Zone0 | OK | 19 degrees C / 66 degrees F |
| SFB 1 SFB-XF2-Zone1 | OK | 26 degrees C / 78 degrees F |
| SFB 1 SFB-XF1-Zone0 | OK | 27 degrees C / 80 degrees F |
| SFB 1 SFB-XF0-Zone0 | OK | 32 degrees C / 89 degrees F |
| SFB 2 Intake-Zone0  | OK | 21 degrees C / 69 degrees F |
| SFB 2 Exhaust-Zone1 | OK | 13 degrees C / 55 degrees F |
| SFB 2 IntakeA-Zone0 | OK | 18 degrees C / 64 degrees F |
| SFB 2 IntakeB-Zone1 | OK | 9 degrees C / 48 degrees F  |
| SFB 2 Exhaust-Zone0 | OK | 16 degrees C / 60 degrees F |
| SFB 2 SFB-XF2-Zone1 | OK | 24 degrees C / 75 degrees F |
| SFB 2 SFB-XF1-Zone0 | OK | 21 degrees C / 69 degrees F |
| SFB 2 SFB-XF0-Zone0 | OK | 26 degrees C / 78 degrees F |
| SFB 4 Intake-Zone0  | OK | 28 degrees C / 82 degrees F |
| SFB 4 Exhaust-Zone1 | OK | 16 degrees C / 60 degrees F |
| SFB 4 IntakeA-Zone0 | OK | 18 degrees C / 64 degrees F |
| SFB 4 IntakeB-Zone1 | OK | 11 degrees C / 51 degrees F |
| SFB 4 Exhaust-Zone0 | OK | 19 degrees C / 66 degrees F |
| SFB 4 SFB-XF2-Zone1 | OK | 27 degrees C / 80 degrees F |
| SFB 4 SFB-XF1-Zone0 | OK | 27 degrees C / 80 degrees F |
| SFB 4 SFB-XF0-Zone0 | OK | 32 degrees C / 89 degrees F |
| SFB 5 Intake-Zone0  | OK | 22 degrees C / 71 degrees F |
| SFB 5 Exhaust-Zone1 | OK | 14 degrees C / 57 degrees F |
| SFB 5 IntakeA-Zone0 | OK | 18 degrees C / 64 degrees F |
| SFB 5 IntakeB-Zone1 | OK | 10 degrees C / 50 degrees F |
| SFB 5 Exhaust-Zone0 | OK | 17 degrees C / 62 degrees F |
| SFB 5 SFB-XF2-Zone1 | OK | 22 degrees C / 71 degrees F |
| SFB 5 SFB-XF1-Zone0 | OK | 29 degrees C / 84 degrees F |
| SFB 5 SFB-XF0-Zone0 | OK | 27 degrees C / 80 degrees F |
| SFB 6 Intake-Zone0  | OK | 27 degrees C / 80 degrees F |
| SFB 6 Exhaust-Zone1 | OK | 13 degrees C / 55 degrees F |
| SFB 6 IntakeA-Zone0 | OK | 19 degrees C / 66 degrees F |
| SFB 6 IntakeB-Zone1 | OK | 10 degrees C / 50 degrees F |
| SFB 6 Exhaust-Zone0 | OK | 20 degrees C / 68 degrees F |
| SFB 6 SFB-XF2-Zone1 | OK | 24 degrees C / 75 degrees F |
| SFB 6 SFB-XF1-Zone0 | OK | 32 degrees C / 89 degrees F |
| SFB 6 SFB-XF0-Zone0 | OK | 33 degrees C / 91 degrees F |
| SFB 7 Intake-Zone0  | OK | 25 degrees C / 77 degrees F |
| SFB 7 Exhaust-Zone1 | OK | 13 degrees C / 55 degrees F |
| SFB 7 IntakeA-Zone0 | OK | 14 degrees C / 57 degrees F |
| SFB 7 IntakeB-Zone1 | OK | 8 degrees C / 46 degrees F  |
| SFB 7 Exhaust-Zone0 | OK | 17 degrees C / 62 degrees F |
| SFB 7 SFB-XF2-Zone1 | OK | 21 degrees C / 69 degrees F |
| SFB 7 SFB-XF1-Zone0 | OK | 21 degrees C / 69 degrees F |
| SFB 7 SFB-XF0-Zone0 | OK | 33 degrees C / 91 degrees F |
| FPC 0 Intake        | OK | 13 degrees C / 55 degrees F |
| FPC 0 Exhaust A     | OK | 13 degrees C / 55 degrees F |
| FPC 0 Exhaust B     | OK | 14 degrees C / 57 degrees F |
| FPC 0 LU 0 TSen     | OK | 28 degrees C / 82 degrees F |
| FPC 0 LU 0 Chip     | OK | 25 degrees C / 77 degrees F |
| FPC 0 LU 1 TSen     | OK | 28 degrees C / 82 degrees F |
| FPC 0 LU 1 Chip     | OK | 27 degrees C / 80 degrees F |
| FPC 0 LU 2 TSen     | OK | 28 degrees C / 82 degrees F |
| FPC 0 LU 2 Chip     | OK | 19 degrees C / 66 degrees F |
| FPC 0 LU 3 TSen     | OK | 28 degrees C / 82 degrees F |

|                       |    |                             |
|-----------------------|----|-----------------------------|
| FPC 0 LU 3 Chip       | OK | 23 degrees C / 73 degrees F |
| FPC 0 XM 0 TSen       | OK | 28 degrees C / 82 degrees F |
| FPC 0 XM 0 Chip       | OK | 33 degrees C / 91 degrees F |
| FPC 0 XM 1 TSen       | OK | 28 degrees C / 82 degrees F |
| FPC 0 XM 1 Chip       | OK | 26 degrees C / 78 degrees F |
| FPC 0 PLX Switch TSen | OK | 28 degrees C / 82 degrees F |
| FPC 0 PLX Switch Chip | OK | 26 degrees C / 78 degrees F |
| FPC 1 Intake          | OK | 10 degrees C / 50 degrees F |
| FPC 1 Exhaust A       | OK | 24 degrees C / 75 degrees F |
| FPC 1 Exhaust B       | OK | 28 degrees C / 82 degrees F |
| FPC 1 LU 0 TSen       | OK | 22 degrees C / 71 degrees F |
| FPC 1 LU 0 Chip       | OK | 31 degrees C / 87 degrees F |
| FPC 1 LU 1 TSen       | OK | 22 degrees C / 71 degrees F |
| FPC 1 LU 1 Chip       | OK | 21 degrees C / 69 degrees F |
| FPC 1 LU 2 TSen       | OK | 22 degrees C / 71 degrees F |
| FPC 1 LU 2 Chip       | OK | 25 degrees C / 77 degrees F |
| FPC 1 LU 3 TSen       | OK | 22 degrees C / 71 degrees F |
| FPC 1 LU 3 Chip       | OK | 33 degrees C / 91 degrees F |
| FPC 1 XM 0 TSen       | OK | 22 degrees C / 71 degrees F |
| FPC 1 XM 0 Chip       | OK | 30 degrees C / 86 degrees F |
| FPC 1 XF 0 TSen       | OK | 22 degrees C / 71 degrees F |
| FPC 1 XF 0 Chip       | OK | 37 degrees C / 98 degrees F |
| FPC 1 PLX Switch TSen | OK | 22 degrees C / 71 degrees F |
| FPC 1 PLX Switch Chip | OK | 22 degrees C / 71 degrees F |
| FPC 2 Intake          | OK | 9 degrees C / 48 degrees F  |
| FPC 2 Exhaust A       | OK | 10 degrees C / 50 degrees F |
| FPC 2 Exhaust B       | OK | 10 degrees C / 50 degrees F |
| FPC 2 LU 0 TSen       | OK | 26 degrees C / 78 degrees F |
| FPC 2 LU 0 Chip       | OK | 25 degrees C / 77 degrees F |
| FPC 2 LU 1 TSen       | OK | 26 degrees C / 78 degrees F |
| FPC 2 LU 1 Chip       | OK | 26 degrees C / 78 degrees F |
| FPC 2 LU 2 TSen       | OK | 26 degrees C / 78 degrees F |
| FPC 2 LU 2 Chip       | OK | 17 degrees C / 62 degrees F |
| FPC 2 LU 3 TSen       | OK | 26 degrees C / 78 degrees F |
| FPC 2 LU 3 Chip       | OK | 22 degrees C / 71 degrees F |
| FPC 2 XM 0 TSen       | OK | 26 degrees C / 78 degrees F |
| FPC 2 XM 0 Chip       | OK | 34 degrees C / 93 degrees F |
| FPC 2 XM 1 TSen       | OK | 26 degrees C / 78 degrees F |
| FPC 2 XM 1 Chip       | OK | 26 degrees C / 78 degrees F |
| FPC 2 PLX Switch TSen | OK | 26 degrees C / 78 degrees F |
| FPC 2 PLX Switch Chip | OK | 20 degrees C / 68 degrees F |
| FPC 3 Intake          | OK | 12 degrees C / 53 degrees F |
| FPC 3 Exhaust A       | OK | 16 degrees C / 60 degrees F |
| FPC 3 Exhaust B       | OK | 26 degrees C / 78 degrees F |
| FPC 3 LU 0 TSen       | OK | 23 degrees C / 73 degrees F |
| FPC 3 LU 0 Chip       | OK | 26 degrees C / 78 degrees F |
| FPC 3 LU 1 TSen       | OK | 23 degrees C / 73 degrees F |
| FPC 3 LU 1 Chip       | OK | 27 degrees C / 80 degrees F |
| FPC 3 LU 2 TSen       | OK | 23 degrees C / 73 degrees F |
| FPC 3 LU 2 Chip       | OK | 22 degrees C / 71 degrees F |
| FPC 3 LU 3 TSen       | OK | 23 degrees C / 73 degrees F |
| FPC 3 LU 3 Chip       | OK | 21 degrees C / 69 degrees F |
| FPC 3 MQ 0 TSen       | OK | 15 degrees C / 59 degrees F |
| FPC 3 MQ 0 Chip       | OK | 18 degrees C / 64 degrees F |
| FPC 3 MQ 1 TSen       | OK | 15 degrees C / 59 degrees F |
| FPC 3 MQ 1 Chip       | OK | 20 degrees C / 68 degrees F |
| FPC 3 MQ 2 TSen       | OK | 15 degrees C / 59 degrees F |
| FPC 3 MQ 2 Chip       | OK | 17 degrees C / 62 degrees F |
| FPC 3 MQ 3 TSen       | OK | 15 degrees C / 59 degrees F |
| FPC 3 MQ 3 Chip       | OK | 16 degrees C / 60 degrees F |
| FPC 4 Intake          | OK | 11 degrees C / 51 degrees F |

|                       |    |                             |
|-----------------------|----|-----------------------------|
| FPC 4 Exhaust A       | OK | 22 degrees C / 71 degrees F |
| FPC 4 Exhaust B       | OK | 28 degrees C / 82 degrees F |
| FPC 4 LU 0 TSen       | OK | 22 degrees C / 71 degrees F |
| FPC 4 LU 0 Chip       | OK | 33 degrees C / 91 degrees F |
| FPC 4 LU 1 TSen       | OK | 22 degrees C / 71 degrees F |
| FPC 4 LU 1 Chip       | OK | 21 degrees C / 69 degrees F |
| FPC 4 LU 2 TSen       | OK | 22 degrees C / 71 degrees F |
| FPC 4 LU 2 Chip       | OK | 26 degrees C / 78 degrees F |
| FPC 4 LU 3 TSen       | OK | 22 degrees C / 71 degrees F |
| FPC 4 LU 3 Chip       | OK | 33 degrees C / 91 degrees F |
| FPC 4 XM 0 TSen       | OK | 22 degrees C / 71 degrees F |
| FPC 4 XM 0 Chip       | OK | 30 degrees C / 86 degrees F |
| FPC 4 XF 0 TSen       | OK | 22 degrees C / 71 degrees F |
| FPC 4 XF 0 Chip       | OK | 37 degrees C / 98 degrees F |
| FPC 4 PLX Switch TSen | OK | 22 degrees C / 71 degrees F |
| FPC 4 PLX Switch Chip | OK | 23 degrees C / 73 degrees F |
| FPC 5 Intake          | OK | 12 degrees C / 53 degrees F |
| FPC 5 Exhaust A       | OK | 12 degrees C / 53 degrees F |
| FPC 5 Exhaust B       | OK | 12 degrees C / 53 degrees F |
| FPC 5 LU 0 TSen       | OK | 27 degrees C / 80 degrees F |
| FPC 5 LU 0 Chip       | OK | 28 degrees C / 82 degrees F |
| FPC 5 LU 1 TSen       | OK | 27 degrees C / 80 degrees F |
| FPC 5 LU 1 Chip       | OK | 27 degrees C / 80 degrees F |
| FPC 5 LU 2 TSen       | OK | 27 degrees C / 80 degrees F |
| FPC 5 LU 2 Chip       | OK | 19 degrees C / 66 degrees F |
| FPC 5 LU 3 TSen       | OK | 27 degrees C / 80 degrees F |
| FPC 5 LU 3 Chip       | OK | 22 degrees C / 71 degrees F |
| FPC 5 XM 0 TSen       | OK | 27 degrees C / 80 degrees F |
| FPC 5 XM 0 Chip       | OK | 36 degrees C / 96 degrees F |
| FPC 5 XM 1 TSen       | OK | 27 degrees C / 80 degrees F |
| FPC 5 XM 1 Chip       | OK | 26 degrees C / 78 degrees F |
| FPC 5 PLX Switch TSen | OK | 27 degrees C / 80 degrees F |
| FPC 5 PLX Switch Chip | OK | 24 degrees C / 75 degrees F |
| FPC 6 Intake          | OK | 12 degrees C / 53 degrees F |
| FPC 6 Exhaust A       | OK | 17 degrees C / 62 degrees F |
| FPC 6 Exhaust B       | OK | 28 degrees C / 82 degrees F |
| FPC 6 LU 0 TSen       | OK | 24 degrees C / 75 degrees F |
| FPC 6 LU 0 Chip       | OK | 29 degrees C / 84 degrees F |
| FPC 6 LU 1 TSen       | OK | 24 degrees C / 75 degrees F |
| FPC 6 LU 1 Chip       | OK | 30 degrees C / 86 degrees F |
| FPC 6 LU 2 TSen       | OK | 24 degrees C / 75 degrees F |
| FPC 6 LU 2 Chip       | OK | 24 degrees C / 75 degrees F |
| FPC 6 LU 3 TSen       | OK | 24 degrees C / 75 degrees F |
| FPC 6 LU 3 Chip       | OK | 22 degrees C / 71 degrees F |
| FPC 6 MQ 0 TSen       | OK | 16 degrees C / 60 degrees F |
| FPC 6 MQ 0 Chip       | OK | 19 degrees C / 66 degrees F |
| FPC 6 MQ 1 TSen       | OK | 16 degrees C / 60 degrees F |
| FPC 6 MQ 1 Chip       | OK | 20 degrees C / 68 degrees F |
| FPC 6 MQ 2 TSen       | OK | 16 degrees C / 60 degrees F |
| FPC 6 MQ 2 Chip       | OK | 17 degrees C / 62 degrees F |
| FPC 6 MQ 3 TSen       | OK | 16 degrees C / 60 degrees F |
| FPC 6 MQ 3 Chip       | OK | 16 degrees C / 60 degrees F |
| FPC 7 Intake          | OK | 10 degrees C / 50 degrees F |
| FPC 7 Exhaust A       | OK | 10 degrees C / 50 degrees F |
| FPC 7 Exhaust B       | OK | 11 degrees C / 51 degrees F |
| FPC 7 LU 0 TSen       | OK | 26 degrees C / 78 degrees F |
| FPC 7 LU 0 Chip       | OK | 26 degrees C / 78 degrees F |
| FPC 7 LU 1 TSen       | OK | 26 degrees C / 78 degrees F |
| FPC 7 LU 1 Chip       | OK | 29 degrees C / 84 degrees F |
| FPC 7 LU 2 TSen       | OK | 26 degrees C / 78 degrees F |
| FPC 7 LU 2 Chip       | OK | 19 degrees C / 66 degrees F |

|                       |    |                              |
|-----------------------|----|------------------------------|
| FPC 7 LU 3 TSen       | OK | 26 degrees C / 78 degrees F  |
| FPC 7 LU 3 Chip       | OK | 24 degrees C / 75 degrees F  |
| FPC 7 XM 0 TSen       | OK | 26 degrees C / 78 degrees F  |
| FPC 7 XM 0 Chip       | OK | 34 degrees C / 93 degrees F  |
| FPC 7 XM 1 TSen       | OK | 26 degrees C / 78 degrees F  |
| FPC 7 XM 1 Chip       | OK | 32 degrees C / 89 degrees F  |
| FPC 7 PLX Switch TSen | OK | 26 degrees C / 78 degrees F  |
| FPC 7 PLX Switch Chip | OK | 22 degrees C / 71 degrees F  |
| FPC 8 Intake          | OK | 10 degrees C / 50 degrees F  |
| FPC 8 Exhaust A       | OK | 22 degrees C / 71 degrees F  |
| FPC 8 Exhaust B       | OK | 28 degrees C / 82 degrees F  |
| FPC 8 LU 0 TSen       | OK | 20 degrees C / 68 degrees F  |
| FPC 8 LU 0 Chip       | OK | 33 degrees C / 91 degrees F  |
| FPC 8 LU 1 TSen       | OK | 20 degrees C / 68 degrees F  |
| FPC 8 LU 1 Chip       | OK | 23 degrees C / 73 degrees F  |
| FPC 8 LU 2 TSen       | OK | 20 degrees C / 68 degrees F  |
| FPC 8 LU 2 Chip       | OK | 26 degrees C / 78 degrees F  |
| FPC 8 LU 3 TSen       | OK | 20 degrees C / 68 degrees F  |
| FPC 8 LU 3 Chip       | OK | 33 degrees C / 91 degrees F  |
| FPC 8 XM 0 TSen       | OK | 20 degrees C / 68 degrees F  |
| FPC 8 XM 0 Chip       | OK | 29 degrees C / 84 degrees F  |
| FPC 8 XF 0 TSen       | OK | 20 degrees C / 68 degrees F  |
| FPC 8 XF 0 Chip       | OK | 38 degrees C / 100 degrees F |
| FPC 8 PLX Switch TSen | OK | 20 degrees C / 68 degrees F  |
| FPC 8 PLX Switch Chip | OK | 24 degrees C / 75 degrees F  |
| FPC 9 Intake          | OK | 11 degrees C / 51 degrees F  |
| FPC 9 Exhaust A       | OK | 11 degrees C / 51 degrees F  |
| FPC 9 Exhaust B       | OK | 11 degrees C / 51 degrees F  |
| FPC 9 LU 0 TSen       | OK | 25 degrees C / 77 degrees F  |
| FPC 9 LU 0 Chip       | OK | 24 degrees C / 75 degrees F  |
| FPC 9 LU 1 TSen       | OK | 25 degrees C / 77 degrees F  |
| FPC 9 LU 1 Chip       | OK | 26 degrees C / 78 degrees F  |
| FPC 9 LU 2 TSen       | OK | 25 degrees C / 77 degrees F  |
| FPC 9 LU 2 Chip       | OK | 16 degrees C / 60 degrees F  |
| FPC 9 LU 3 TSen       | OK | 25 degrees C / 77 degrees F  |
| FPC 9 LU 3 Chip       | OK | 21 degrees C / 69 degrees F  |
| FPC 9 XM 0 TSen       | OK | 25 degrees C / 77 degrees F  |
| FPC 9 XM 0 Chip       | OK | 32 degrees C / 89 degrees F  |
| FPC 9 XM 1 TSen       | OK | 25 degrees C / 77 degrees F  |
| FPC 9 XM 1 Chip       | OK | 25 degrees C / 77 degrees F  |
| FPC 9 PLX Switch TSen | OK | 25 degrees C / 77 degrees F  |
| FPC 9 PLX Switch Chip | OK | 21 degrees C / 69 degrees F  |
| ADC 0 Intake          | OK | 12 degrees C / 53 degrees F  |
| ADC 0 Exhaust         | OK | 20 degrees C / 68 degrees F  |
| ADC 0 ADC-XF1         | OK | 26 degrees C / 78 degrees F  |
| ADC 0 ADC-XF0         | OK | 32 degrees C / 89 degrees F  |
| ADC 1 Intake          | OK | 11 degrees C / 51 degrees F  |
| ADC 1 Exhaust         | OK | 21 degrees C / 69 degrees F  |
| ADC 1 ADC-XF1         | OK | 24 degrees C / 75 degrees F  |
| ADC 1 ADC-XF0         | OK | 31 degrees C / 87 degrees F  |
| ADC 2 Intake          | OK | 14 degrees C / 57 degrees F  |
| ADC 2 Exhaust         | OK | 21 degrees C / 69 degrees F  |
| ADC 2 ADC-XF1         | OK | 28 degrees C / 82 degrees F  |
| ADC 2 ADC-XF0         | OK | 34 degrees C / 93 degrees F  |
| ADC 3 Intake          | OK | 13 degrees C / 55 degrees F  |
| ADC 3 Exhaust         | OK | 19 degrees C / 66 degrees F  |
| ADC 3 ADC-XF1         | OK | 24 degrees C / 75 degrees F  |
| ADC 3 ADC-XF0         | OK | 31 degrees C / 87 degrees F  |
| ADC 4 Intake          | OK | 9 degrees C / 48 degrees F   |
| ADC 4 Exhaust         | OK | 22 degrees C / 71 degrees F  |
| ADC 4 ADC-XF1         | OK | 28 degrees C / 82 degrees F  |

|                       |    |                             |
|-----------------------|----|-----------------------------|
| ADC 4 ADC-XF0         | OK | 35 degrees C / 95 degrees F |
| ADC 5 Intake          | OK | 12 degrees C / 53 degrees F |
| ADC 5 Exhaust         | OK | 22 degrees C / 71 degrees F |
| ADC 5 ADC-XF1         | OK | 28 degrees C / 82 degrees F |
| ADC 5 ADC-XF0         | OK | 34 degrees C / 93 degrees F |
| ADC 6 Intake          | OK | 11 degrees C / 51 degrees F |
| ADC 6 Exhaust         | OK | 21 degrees C / 69 degrees F |
| ADC 6 ADC-XF1         | OK | 26 degrees C / 78 degrees F |
| ADC 6 ADC-XF0         | OK | 35 degrees C / 95 degrees F |
| ADC 7 Intake          | OK | 14 degrees C / 57 degrees F |
| ADC 7 Exhaust         | OK | 22 degrees C / 71 degrees F |
| ADC 7 ADC-XF1         | OK | 26 degrees C / 78 degrees F |
| ADC 7 ADC-XF0         | OK | 34 degrees C / 93 degrees F |
| ADC 8 Intake          | OK | 14 degrees C / 57 degrees F |
| ADC 8 Exhaust         | OK | 21 degrees C / 69 degrees F |
| ADC 8 ADC-XF1         | OK | 24 degrees C / 75 degrees F |
| ADC 8 ADC-XF0         | OK | 31 degrees C / 87 degrees F |
| ADC 9 Intake          | OK | 10 degrees C / 50 degrees F |
| ADC 9 Exhaust         | OK | 22 degrees C / 71 degrees F |
| ADC 9 ADC-XF1         | OK | 28 degrees C / 82 degrees F |
| ADC 9 ADC-XF0         | OK | 36 degrees C / 96 degrees F |
| Fans Fan Tray 0 Fan 1 | OK | 3480 RPM                    |
| Fan Tray 0 Fan 2      | OK | 3480 RPM                    |
| Fan Tray 0 Fan 3      | OK | 3480 RPM                    |
| Fan Tray 0 Fan 4      | OK | 3360 RPM                    |
| Fan Tray 0 Fan 5      | OK | 3360 RPM                    |
| Fan Tray 0 Fan 6      | OK | 3480 RPM                    |
| Fan Tray 1 Fan 1      | OK | 3360 RPM                    |
| Fan Tray 1 Fan 2      | OK | 3360 RPM                    |
| Fan Tray 1 Fan 3      | OK | 3360 RPM                    |
| Fan Tray 1 Fan 4      | OK | 3480 RPM                    |
| Fan Tray 1 Fan 5      | OK | 3480 RPM                    |
| Fan Tray 1 Fan 6      | OK | 3480 RPM                    |
| Fan Tray 2 Fan 1      | OK | 3360 RPM                    |
| Fan Tray 2 Fan 2      | OK | 3360 RPM                    |
| Fan Tray 2 Fan 3      | OK | 3480 RPM                    |
| Fan Tray 2 Fan 4      | OK | 3480 RPM                    |
| Fan Tray 2 Fan 5      | OK | 3360 RPM                    |
| Fan Tray 2 Fan 6      | OK | 3480 RPM                    |
| Fan Tray 3 Fan 1      | OK | 3360 RPM                    |
| Fan Tray 3 Fan 2      | OK | 3360 RPM                    |
| Fan Tray 3 Fan 3      | OK | 3480 RPM                    |
| Fan Tray 3 Fan 4      | OK | 3480 RPM                    |
| Fan Tray 3 Fan 5      | OK | 3480 RPM                    |
| Fan Tray 3 Fan 6      | OK | 3360 RPM                    |

### show chassis environment (T320 Router)

```

user@host> show chassis environment
Class Item                Status      Measurement
Power PEM 0                OK
      PEM 1                Absent
Temp  SCG 0                OK          28 degrees C / 82 degrees F
      SCG 1                OK          28 degrees C / 82 degrees F
      Routing Engine 0     OK          31 degrees C / 87 degrees F
      Routing Engine 1     OK          30 degrees C / 86 degrees F
      CB 0                 OK          32 degrees C / 89 degrees F
      CB 1                 OK          32 degrees C / 89 degrees F
      SIB 0                OK          33 degrees C / 91 degrees F
      SIB 1                OK          33 degrees C / 91 degrees F
      SIB 2                OK          34 degrees C / 93 degrees F

```

|      |                         |    |                              |
|------|-------------------------|----|------------------------------|
|      | FPC 0 Top               | OK | 38 degrees C / 100 degrees F |
|      | FPC 0 Bottom            | OK | 32 degrees C / 89 degrees F  |
|      | FPC 1 Top               | OK | 38 degrees C / 100 degrees F |
|      | FPC 1 Bottom            | OK | 33 degrees C / 91 degrees F  |
|      | FPC 2 Top               | OK | 36 degrees C / 96 degrees F  |
|      | FPC 2 Bottom            | OK | 31 degrees C / 87 degrees F  |
|      | FPM GBUS                | OK | 26 degrees C / 78 degrees F  |
|      | FPM Display             | OK | 29 degrees C / 84 degrees F  |
| Fans | Top Left Front fan      | OK | Spinning at normal speed     |
|      | Top Left Middle fan     | OK | Spinning at normal speed     |
|      | Top Left Rear fan       | OK | Spinning at normal speed     |
|      | Top Right Front fan     | OK | Spinning at normal speed     |
|      | Top Right Middle fan    | OK | Spinning at normal speed     |
|      | Top Right Rear fan      | OK | Spinning at normal speed     |
|      | Bottom Left Front fan   | OK | Spinning at normal speed     |
|      | Bottom Left Middle fan  | OK | Spinning at normal speed     |
|      | Bottom Left Rear fan    | OK | Spinning at normal speed     |
|      | Bottom Right Front fan  | OK | Spinning at normal speed     |
|      | Bottom Right Middle fan | OK | Spinning at normal speed     |
|      | Bottom Right Rear fan   | OK | Spinning at normal speed     |
|      | Rear Tray Top fan       | OK | Spinning at normal speed     |
|      | Rear Tray Second fan    | OK | Spinning at normal speed     |
|      | Rear Tray Middle fan    | OK | Spinning at normal speed     |
|      | Rear Tray Fourth fan    | OK | Spinning at normal speed     |
| Misc | Rear Tray Bottom fan    | OK | Spinning at normal speed     |
|      | CIP                     | OK |                              |
|      | SPMB 0                  | OK |                              |
|      | SPMB 1                  | OK |                              |

### show chassis environment (T640 Router)

|                                     |                      |         |                             |
|-------------------------------------|----------------------|---------|-----------------------------|
| user@host> show chassis environment |                      |         |                             |
| Class                               | Item                 | Status  | Measurement                 |
| Temp                                | PEM 0                | Absent  |                             |
|                                     | PEM 1                | OK      | 22 degrees C / 71 degrees F |
|                                     | SCG 0                | OK      | 30 degrees C / 86 degrees F |
|                                     | SCG 1                | OK      | 30 degrees C / 86 degrees F |
|                                     | Routing Engine 0     | Present |                             |
|                                     | Routing Engine 1     | OK      | 27 degrees C / 80 degrees F |
|                                     | CB 0                 | Present |                             |
|                                     | CB 1                 | OK      | 33 degrees C / 91 degrees F |
|                                     | SIB 0                | Absent  |                             |
|                                     | SIB 1                | Absent  |                             |
| Fans                                | SIB 2                | Absent  |                             |
|                                     | SIB 3                | Absent  |                             |
|                                     | SIB 4                | Absent  |                             |
|                                     | FPC 4 Top            | Testing |                             |
|                                     | FPC 4 Bottom         | Testing |                             |
|                                     | FPC 5 Top            | Testing |                             |
|                                     | FPC 5 Bottom         | Testing |                             |
|                                     | FPC 6 Top            | Testing |                             |
|                                     | FPC 6 Bottom         | Testing |                             |
|                                     | FPM GBUS             | OK      | 23 degrees C / 73 degrees F |
|                                     | FPM Display          | Absent  |                             |
|                                     | Top Left Front fan   | OK      | Spinning at normal speed    |
|                                     | Top Left Middle fan  | OK      | Spinning at normal speed    |
|                                     | Top Left Rear fan    | OK      | Spinning at normal speed    |
|                                     | Top Right Front fan  | OK      | Spinning at normal speed    |
|                                     | Top Right Middle fan | OK      | Spinning at normal speed    |
|                                     | Top Right Rear fan   | OK      | Spinning at normal speed    |



|                         |    |                          |
|-------------------------|----|--------------------------|
| Bottom Left Front fan   | OK | Spinning at normal speed |
| Bottom Left Middle fan  | OK | Spinning at normal speed |
| Bottom Left Rear fan    | OK | Spinning at normal speed |
| Bottom Right Front fan  | OK | Spinning at normal speed |
| Bottom Right Middle fan | OK | Spinning at normal speed |
| Bottom Right Rear fan   | OK | Spinning at normal speed |
| Fourth Blower from top  | OK | Spinning at normal speed |
| Bottom Blower           | OK | Spinning at normal speed |
| Middle Blower           | OK | Spinning at normal speed |
| Top Blower              | OK | Spinning at normal speed |
| Second Blower from top  | OK | Spinning at normal speed |
| Misc CIP                | OK |                          |
| SPMB 0                  | OK |                          |
| SPMB 1                  | OK |                          |

### show chassis environment (T4000 Router)

```
user@host> show chassis environment
```

| Class | Item                 | Status | Measurement                  |
|-------|----------------------|--------|------------------------------|
| Temp  | PEM 0                | OK     | 33 degrees C / 91 degrees F  |
|       | PEM 1                | Absent |                              |
|       | SCG 0                | OK     | 33 degrees C / 91 degrees F  |
|       | SCG 1                | OK     | 33 degrees C / 91 degrees F  |
|       | Routing Engine 0     | OK     | 33 degrees C / 91 degrees F  |
|       | Routing Engine 0 CPU | OK     | 50 degrees C / 122 degrees F |
|       | Routing Engine 1     | OK     | 32 degrees C / 89 degrees F  |
|       | Routing Engine 1 CPU | OK     | 46 degrees C / 114 degrees F |
|       | CB 0                 | OK     | 32 degrees C / 89 degrees F  |
|       | CB 1                 | OK     | 33 degrees C / 91 degrees F  |
|       | SIB 0                | OK     | 42 degrees C / 107 degrees F |
|       | SIB 1                | OK     | 42 degrees C / 107 degrees F |
|       | SIB 2                | OK     | 42 degrees C / 107 degrees F |
|       | SIB 3                | OK     | 43 degrees C / 109 degrees F |
|       | SIB 4                | OK     | 45 degrees C / 113 degrees F |
|       | FPC 0 Fan Intake     | OK     | 34 degrees C / 93 degrees F  |
|       | FPC 0 Fan Exhaust    | OK     | 48 degrees C / 118 degrees F |
|       | FPC 0 PMB            | OK     | 47 degrees C / 116 degrees F |
|       | FPC 0 LMB0           | OK     | 50 degrees C / 122 degrees F |
|       | FPC 0 LMB1           | OK     | 41 degrees C / 105 degrees F |
|       | FPC 0 LMB2           | OK     | 35 degrees C / 95 degrees F  |
|       | FPC 0 PFE1 LU2       | OK     | 46 degrees C / 114 degrees F |
|       | FPC 0 PFE1 LU0       | OK     | 41 degrees C / 105 degrees F |
|       | FPC 0 PFE0 LU0       | OK     | 57 degrees C / 134 degrees F |
|       | FPC 0 XF1            | OK     | 46 degrees C / 114 degrees F |
|       | FPC 0 XF0            | OK     | 52 degrees C / 125 degrees F |
|       | FPC 0 XM1            | OK     | 41 degrees C / 105 degrees F |
|       | FPC 0 XM0            | OK     | 50 degrees C / 122 degrees F |
|       | FPC 0 PFE0 LU1       | OK     | 56 degrees C / 132 degrees F |
|       | FPC 0 PFE0 LU2       | OK     | 45 degrees C / 113 degrees F |
|       | FPC 0 PFE1 LU1       | OK     | 37 degrees C / 98 degrees F  |
|       | FPC 3 Fan Intake     | OK     | 36 degrees C / 96 degrees F  |
|       | FPC 3 Fan Exhaust    | OK     | 51 degrees C / 123 degrees F |
|       | FPC 3 PMB            | OK     | 43 degrees C / 109 degrees F |
|       | FPC 3 LMB0           | OK     | 57 degrees C / 134 degrees F |
|       | FPC 3 LMB1           | OK     | 54 degrees C / 129 degrees F |
|       | FPC 3 LMB2           | OK     | 38 degrees C / 100 degrees F |
|       | FPC 3 PFE1 LU2       | OK     | 63 degrees C / 145 degrees F |
|       | FPC 3 PFE1 LU0       | OK     | 45 degrees C / 113 degrees F |
|       | FPC 3 PFE0 LU0       | OK     | 69 degrees C / 156 degrees F |
|       | FPC 3 XF1            | OK     | 62 degrees C / 143 degrees F |

|      |                         |    |                              |
|------|-------------------------|----|------------------------------|
|      | FPC 3 XF0               | OK | 63 degrees C / 145 degrees F |
|      | FPC 3 XM1               | OK | 43 degrees C / 109 degrees F |
|      | FPC 3 XM0               | OK | 67 degrees C / 152 degrees F |
|      | FPC 3 PFE0 LU1          | OK | 63 degrees C / 145 degrees F |
|      | FPC 3 PFE0 LU2          | OK | 66 degrees C / 150 degrees F |
|      | FPC 3 PFE1 LU1          | OK | 41 degrees C / 105 degrees F |
|      | FPC 5 Top               | OK | 39 degrees C / 102 degrees F |
|      | FPC 5 Bottom            | OK | 38 degrees C / 100 degrees F |
|      | FPC 6 Fan Intake        | OK | 33 degrees C / 91 degrees F  |
|      | FPC 6 Fan Exhaust       | OK | 49 degrees C / 120 degrees F |
|      | FPC 6 PMB               | OK | 40 degrees C / 104 degrees F |
|      | FPC 6 LMB0              | OK | 60 degrees C / 140 degrees F |
|      | FPC 6 LMB1              | OK | 58 degrees C / 136 degrees F |
|      | FPC 6 LMB2              | OK | 40 degrees C / 104 degrees F |
|      | FPC 6 PFE1 LU2          | OK | 69 degrees C / 156 degrees F |
|      | FPC 6 PFE1 LU0          | OK | 45 degrees C / 113 degrees F |
|      | FPC 6 PFE0 LU0          | OK | 71 degrees C / 159 degrees F |
|      | FPC 6 XF1               | OK | 58 degrees C / 136 degrees F |
|      | FPC 6 XF0               | OK | 65 degrees C / 149 degrees F |
|      | FPC 6 XM1               | OK | 39 degrees C / 102 degrees F |
|      | FPC 6 XM0               | OK | 66 degrees C / 150 degrees F |
|      | FPC 6 PFE0 LU1          | OK | 69 degrees C / 156 degrees F |
|      | FPC 6 PFE0 LU2          | OK | 69 degrees C / 156 degrees F |
|      | FPC 6 PFE1 LU1          | OK | 42 degrees C / 107 degrees F |
|      | FPM GBUS                | OK | 24 degrees C / 75 degrees F  |
|      | FPM Display             | OK | 27 degrees C / 80 degrees F  |
| Fans | Top Left Front fan      | OK | Spinning at high speed       |
|      | Top Left Middle fan     | OK | Spinning at high speed       |
|      | Top Left Rear fan       | OK | Spinning at high speed       |
|      | Top Right Front fan     | OK | Spinning at high speed       |
|      | Top Right Middle fan    | OK | Spinning at high speed       |
|      | Top Right Rear fan      | OK | Spinning at high speed       |
|      | Bottom Left Front fan   | OK | Spinning at high speed       |
|      | Bottom Left Middle fan  | OK | Spinning at high speed       |
|      | Bottom Left Rear fan    | OK | Spinning at high speed       |
|      | Bottom Right Front fan  | OK | Spinning at high speed       |
|      | Bottom Right Middle fan | OK | Spinning at high speed       |
|      | Bottom Right Rear fan   | OK | Spinning at high speed       |
|      | Rear Tray Top fan       | OK | Spinning at high speed       |
|      | Rear Tray Second fan    | OK | Spinning at high speed       |
|      | Rear Tray Third fan     | OK | Spinning at high speed       |
|      | Rear Tray Fourth fan    | OK | Spinning at high speed       |
|      | Rear Tray Fifth fan     | OK | Spinning at high speed       |
|      | Rear Tray Sixth fan     | OK | Spinning at high speed       |
|      | Rear Tray Seventh fan   | OK | Spinning at high speed       |
| Misc | CIP                     | OK |                              |
|      | SPMB 0                  | OK |                              |
|      | SPMB 1                  | OK |                              |

### show chassis environment (TX Matrix Router)

```
user@host> show chassis environment
scc-re0:
```

| Class | Item             | Status | Measurement                 |
|-------|------------------|--------|-----------------------------|
| Temp  | PEM 0            | Absent |                             |
|       | PEM 1            | OK     | 29 degrees C / 84 degrees F |
|       | Routing Engine 0 | OK     | 34 degrees C / 93 degrees F |
|       | Routing Engine 1 | OK     | 34 degrees C / 93 degrees F |
|       | CB 0             | OK     | 32 degrees C / 89 degrees F |

|      |                         |    |                              |
|------|-------------------------|----|------------------------------|
|      | CB 1                    | OK | 32 degrees C / 89 degrees F  |
|      | SIB 0                   | OK | 44 degrees C / 111 degrees F |
|      | SIB 0 (B)               | OK | 44 degrees C / 111 degrees F |
|      | FPM GBUS                | OK | 27 degrees C / 80 degrees F  |
|      | FPM Display             | OK | 32 degrees C / 89 degrees F  |
| Fans | Top Left Front fan      | OK | Spinning at normal speed     |
|      | Top Left Middle fan     | OK | Spinning at normal speed     |
|      | Top Left Rear fan       | OK | Spinning at normal speed     |
|      | Top Right Front fan     | OK | Spinning at normal speed     |
|      | Top Right Middle fan    | OK | Spinning at normal speed     |
|      | Top Right Rear fan      | OK | Spinning at normal speed     |
|      | Bottom Left Front fan   | OK | Spinning at normal speed     |
|      | Bottom Left Middle fan  | OK | Spinning at normal speed     |
|      | Bottom Left Rear fan    | OK | Spinning at normal speed     |
|      | Bottom Right Front fan  | OK | Spinning at normal speed     |
|      | Bottom Right Middle fan | OK | Spinning at normal speed     |
|      | Bottom Right Rear fan   | OK | Spinning at normal speed     |
|      | Rear Tray Top fan       | OK | Spinning at normal speed     |
|      | Rear Tray Second fan    | OK | Spinning at normal speed     |
|      | Rear Tray Third fan     | OK | Spinning at normal speed     |
|      | Rear Tray Fourth fan    | OK | Spinning at normal speed     |
|      | Rear Tray Fifth fan     | OK | Spinning at normal speed     |
|      | Rear Tray Sixth fan     | OK | Spinning at normal speed     |
|      | Rear Tray Seventh fan   | OK | Spinning at normal speed     |
|      | Rear Tray Bottom fan    | OK | Spinning at normal speed     |
| Misc | CIP 0                   | OK |                              |
|      | CIP 1                   | OK |                              |
|      | SPMB 0                  | OK |                              |
|      | SPMB 1                  | OK |                              |

lcc0-re0:

| Class | Item                    | Status | Measurement                  |
|-------|-------------------------|--------|------------------------------|
| Temp  | PEM 0                   | OK     | 29 degrees C / 84 degrees F  |
|       | PEM 1                   | Absent |                              |
|       | SCG 0                   | OK     | 35 degrees C / 95 degrees F  |
|       | SCG 1                   | Absent |                              |
|       | Routing Engine 0        | OK     | 39 degrees C / 102 degrees F |
|       | Routing Engine 1        | OK     | 36 degrees C / 96 degrees F  |
|       | CB 0                    | OK     | 32 degrees C / 89 degrees F  |
|       | CB 1                    | OK     | 32 degrees C / 89 degrees F  |
|       | SIB 0                   | OK     | 40 degrees C / 104 degrees F |
|       | SIB 0 (B)               | OK     | 51 degrees C / 123 degrees F |
|       | FPC 0 Top               | OK     | 45 degrees C / 113 degrees F |
|       | FPC 0 Bottom            | OK     | 31 degrees C / 87 degrees F  |
|       | FPC 1 Top               | OK     | 34 degrees C / 93 degrees F  |
|       | FPC 1 Bottom            | OK     | 31 degrees C / 87 degrees F  |
|       | FPM GBUS                | OK     | 30 degrees C / 86 degrees F  |
|       | FPM Display             | OK     | 34 degrees C / 93 degrees F  |
| Fans  | Top Left Front fan      | OK     | Spinning at normal speed     |
|       | Top Left Middle fan     | OK     | Spinning at normal speed     |
|       | Top Left Rear fan       | OK     | Spinning at normal speed     |
|       | Top Right Front fan     | OK     | Spinning at normal speed     |
|       | Top Right Middle fan    | OK     | Spinning at normal speed     |
|       | Top Right Rear fan      | OK     | Spinning at normal speed     |
|       | Bottom Left Front fan   | OK     | Spinning at normal speed     |
|       | Bottom Left Middle fan  | OK     | Spinning at normal speed     |
|       | Bottom Left Rear fan    | OK     | Spinning at normal speed     |
|       | Bottom Right Front fan  | OK     | Spinning at normal speed     |
|       | Bottom Right Middle fan | OK     | Spinning at normal speed     |
|       | Bottom Right Rear fan   | OK     | Spinning at normal speed     |

|      |                       |    |                          |
|------|-----------------------|----|--------------------------|
|      | Rear Tray Top fan     | OK | Spinning at normal speed |
|      | Rear Tray Second fan  | OK | Spinning at normal speed |
|      | Rear Tray Third fan   | OK | Spinning at normal speed |
|      | Rear Tray Fourth fan  | OK | Spinning at normal speed |
|      | Rear Tray Fifth fan   | OK | Spinning at normal speed |
|      | Rear Tray Sixth fan   | OK | Spinning at normal speed |
|      | Rear Tray Seventh fan | OK | Spinning at normal speed |
|      | Rear Tray Bottom fan  | OK | Spinning at normal speed |
| Misc | CIP                   | OK |                          |
|      | SPMB 0                | OK |                          |
|      | SPMB 1                | OK |                          |

```
lcc2-re0:
```

| Class | Item                | Status | Measurement                  |
|-------|---------------------|--------|------------------------------|
| Temp  | PEM 0               | OK     | 29 degrees C / 84 degrees F  |
|       | PEM 1               | Absent |                              |
|       | SCG 0               | OK     | 32 degrees C / 89 degrees F  |
|       | SCG 1               | Absent |                              |
|       | Routing Engine 0    | OK     | 31 degrees C / 87 degrees F  |
|       | Routing Engine 1    | OK     | 32 degrees C / 89 degrees F  |
|       | CB 0                | OK     | 30 degrees C / 86 degrees F  |
|       | SIB 0               | OK     | 38 degrees C / 100 degrees F |
|       | SIB 0 (B)           | OK     | 49 degrees C / 120 degrees F |
|       | FPC 0 Top           | OK     | 45 degrees C / 113 degrees F |
|       | FPC 0 Bottom        | OK     | 33 degrees C / 91 degrees F  |
|       | FPC 1 Top           | OK     | 37 degrees C / 98 degrees F  |
|       | FPC 1 Bottom        | OK     | 33 degrees C / 91 degrees F  |
|       | FPM GBUS            | OK     | 30 degrees C / 86 degrees F  |
|       | FPM Display         | OK     | 34 degrees C / 93 degrees F  |
| Fans  | Top Left Front fan  | OK     | Spinning at normal speed     |
|       | Top Left Middle fan | OK     | Spinning at normal speed     |
| ...   |                     |        |                              |

### show chassis environment (T1600 Router)

```
user@host> show chassis environment
```

| Class | Item             | Status | Measurement                  |
|-------|------------------|--------|------------------------------|
| Temp  | PEM 0            | OK     | 27 degrees C / 80 degrees F  |
|       | PEM 1            | Absent |                              |
|       | SCG 0            | OK     | 31 degrees C / 87 degrees F  |
|       | SCG 1            | OK     | 35 degrees C / 95 degrees F  |
|       | Routing Engine 0 | OK     | 30 degrees C / 86 degrees F  |
|       | Routing Engine 1 | OK     | 30 degrees C / 86 degrees F  |
|       | CB 0             | OK     | 31 degrees C / 87 degrees F  |
|       | CB 1             | OK     | 31 degrees C / 87 degrees F  |
|       | SIB 0            | OK     | 41 degrees C / 105 degrees F |
|       | SIB 0 (B)        | OK     | 34 degrees C / 93 degrees F  |
|       | SIB 1            | OK     | 0 degrees C / 32 degrees F   |
|       | SIB 1 (B)        | OK     | 0 degrees C / 32 degrees F   |
|       | SIB 2            | OK     | 0 degrees C / 32 degrees F   |
|       | SIB 2 (B)        | OK     | 0 degrees C / 32 degrees F   |
|       | SIB 3            | OK     | 0 degrees C / 32 degrees F   |
|       | SIB 3 (B)        | OK     | 0 degrees C / 32 degrees F   |
|       | SIB 4            | OK     | 0 degrees C / 32 degrees F   |
|       | SIB 4 (B)        | OK     | 0 degrees C / 32 degrees F   |
|       | FPC 0 Top        | OK     | 49 degrees C / 120 degrees F |
|       | FPC 0 Bottom     | OK     | 50 degrees C / 122 degrees F |
|       | FPC 1 Top        | OK     | 48 degrees C / 118 degrees F |
|       | FPC 1 Bottom     | OK     | 49 degrees C / 120 degrees F |
|       | FPM GBUS         | OK     | 27 degrees C / 80 degrees F  |

|      |                         |    |                             |
|------|-------------------------|----|-----------------------------|
|      | FPM Display             | OK | 30 degrees C / 86 degrees F |
| Fans | Top Left Front fan      | OK | Spinning at normal speed    |
|      | Top Left Middle fan     | OK | Spinning at normal speed    |
|      | Top Left Rear fan       | OK | Spinning at normal speed    |
|      | Top Right Front fan     | OK | Spinning at normal speed    |
|      | Top Right Middle fan    | OK | Spinning at normal speed    |
|      | Top Right Rear fan      | OK | Spinning at normal speed    |
|      | Bottom Left Front fan   | OK | Spinning at normal speed    |
|      | Bottom Left Middle fan  | OK | Spinning at normal speed    |
|      | Bottom Left Rear fan    | OK | Spinning at normal speed    |
|      | Bottom Right Front fan  | OK | Spinning at normal speed    |
|      | Bottom Right Middle fan | OK | Spinning at normal speed    |
|      | Bottom Right Rear fan   | OK | Spinning at normal speed    |
|      | Rear Tray Top fan       | OK | Spinning at normal speed    |
|      | Rear Tray Second fan    | OK | Spinning at normal speed    |
|      | Rear Tray Third fan     | OK | Spinning at normal speed    |
|      | Rear Tray Fourth fan    | OK | Spinning at normal speed    |
|      | Rear Tray Fifth fan     | OK | Spinning at normal speed    |
|      | Rear Tray Sixth fan     | OK | Spinning at normal speed    |
|      | Rear Tray Seventh fan   | OK | Spinning at normal speed    |
|      | Rear Tray Bottom fan    | OK | Spinning at normal speed    |
| Misc | CIP                     | OK |                             |
|      | SPMB 0                  | OK |                             |
|      | SPMB 1                  | OK |                             |

#### show chassis environment (TX Matrix Plus Router)

```
user@host> show chassis environment
sfc0-re0:
```

| Class | Item             | Status | Measurement                  |
|-------|------------------|--------|------------------------------|
| Temp  | PEM 0            | OK     | 28 degrees C / 82 degrees F  |
|       | PEM 1            | Absent |                              |
|       | Routing Engine 0 | OK     | 27 degrees C / 80 degrees F  |
|       | Routing Engine 1 | OK     | 29 degrees C / 84 degrees F  |
|       | CB 0 Intake      | OK     | 26 degrees C / 78 degrees F  |
|       | CB 0 Exhaust A   | OK     | 25 degrees C / 77 degrees F  |
|       | CB 0 Exhaust B   | OK     | 25 degrees C / 77 degrees F  |
|       | CB 1 Intake      | OK     | 26 degrees C / 78 degrees F  |
|       | CB 1 Exhaust A   | OK     | 26 degrees C / 78 degrees F  |
|       | CB 1 Exhaust B   | OK     | 26 degrees C / 78 degrees F  |
|       | SIB F13 0        | OK     | 47 degrees C / 116 degrees F |
|       | SIB F13 0 (B)    | OK     | 48 degrees C / 118 degrees F |
|       | SIB F13 1        | OK     | 38 degrees C / 100 degrees F |
|       | SIB F13 1 (B)    | OK     | 37 degrees C / 98 degrees F  |
|       | SIB F2S 0/0      | OK     | 27 degrees C / 80 degrees F  |
|       | SIB F2S 0/2      | OK     | 28 degrees C / 82 degrees F  |
|       | SIB F2S 0/4      | OK     | 27 degrees C / 80 degrees F  |
|       | SIB F2S 0/6      | OK     | 28 degrees C / 82 degrees F  |
|       | SIB F2S 1/0      | OK     | 26 degrees C / 78 degrees F  |
|       | SIB F2S 1/2      | OK     | 26 degrees C / 78 degrees F  |
|       | SIB F2S 1/4      | OK     | 26 degrees C / 78 degrees F  |
|       | SIB F2S 1/6      | OK     | 26 degrees C / 78 degrees F  |
|       | SIB F2S 2/0      | OK     | 25 degrees C / 77 degrees F  |
|       | SIB F2S 2/2      | OK     | 25 degrees C / 77 degrees F  |
|       | SIB F2S 2/4      | OK     | 23 degrees C / 73 degrees F  |
|       | CIP 0 Intake     | OK     | 23 degrees C / 73 degrees F  |
|       | CIP 0 Exhaust A  | OK     | 24 degrees C / 75 degrees F  |
|       | CIP 0 Exhaust B  | OK     | 24 degrees C / 75 degrees F  |
|       | CIP 1 Intake     | OK     | 24 degrees C / 75 degrees F  |
|       | CIP 1 Exhaust A  | OK     | 25 degrees C / 77 degrees F  |

|      |                  |    |                             |
|------|------------------|----|-----------------------------|
|      | CIP 1 Exhaust B  | OK | 25 degrees C / 77 degrees F |
| Fans | Fan Tray 0 Fan 1 | OK | Spinning at normal speed    |
|      | Fan Tray 0 Fan 2 | OK | Spinning at normal speed    |
|      | Fan Tray 0 Fan 3 | OK | Spinning at normal speed    |
|      | Fan Tray 0 Fan 4 | OK | Spinning at normal speed    |
|      | Fan Tray 0 Fan 5 | OK | Spinning at normal speed    |
|      | Fan Tray 0 Fan 6 | OK | Spinning at normal speed    |
|      | Fan Tray 1 Fan 1 | OK | Spinning at normal speed    |
|      | Fan Tray 1 Fan 2 | OK | Spinning at normal speed    |
|      | Fan Tray 1 Fan 3 | OK | Spinning at normal speed    |
|      | Fan Tray 1 Fan 4 | OK | Spinning at normal speed    |
|      | Fan Tray 1 Fan 5 | OK | Spinning at normal speed    |
|      | Fan Tray 1 Fan 6 | OK | Spinning at normal speed    |
|      | Fan Tray 2 Fan 1 | OK | Spinning at normal speed    |
|      | Fan Tray 2 Fan 2 | OK | Spinning at normal speed    |
|      | Fan Tray 2 Fan 3 | OK | Spinning at normal speed    |
|      | Fan Tray 2 Fan 4 | OK | Spinning at normal speed    |
|      | Fan Tray 2 Fan 5 | OK | Spinning at normal speed    |
|      | Fan Tray 2 Fan 6 | OK | Spinning at normal speed    |
|      | Fan Tray 2 Fan 7 | OK | Spinning at normal speed    |
|      | Fan Tray 2 Fan 8 | OK | Spinning at normal speed    |
|      | Fan Tray 2 Fan 9 | OK | Spinning at normal speed    |
|      | Fan Tray 3 Fan 1 | OK | Spinning at normal speed    |
|      | Fan Tray 3 Fan 2 | OK | Spinning at normal speed    |
|      | Fan Tray 3 Fan 3 | OK | Spinning at normal speed    |
|      | Fan Tray 3 Fan 4 | OK | Spinning at normal speed    |
|      | Fan Tray 3 Fan 5 | OK | Spinning at normal speed    |
|      | Fan Tray 3 Fan 6 | OK | Spinning at normal speed    |
|      | Fan Tray 3 Fan 7 | OK | Spinning at normal speed    |
|      | Fan Tray 3 Fan 8 | OK | Spinning at normal speed    |
|      | Fan Tray 3 Fan 9 | OK | Spinning at normal speed    |
|      | Fan Tray 4 Fan 1 | OK | Spinning at normal speed    |
|      | Fan Tray 4 Fan 2 | OK | Spinning at normal speed    |
|      | Fan Tray 4 Fan 3 | OK | Spinning at normal speed    |
|      | Fan Tray 4 Fan 4 | OK | Spinning at normal speed    |
|      | Fan Tray 4 Fan 5 | OK | Spinning at normal speed    |
|      | Fan Tray 4 Fan 6 | OK | Spinning at normal speed    |
|      | Fan Tray 4 Fan 7 | OK | Spinning at normal speed    |
|      | Fan Tray 4 Fan 8 | OK | Spinning at normal speed    |
|      | Fan Tray 4 Fan 9 | OK | Spinning at normal speed    |
|      | Fan Tray 5 Fan 1 | OK | Spinning at normal speed    |
|      | Fan Tray 5 Fan 2 | OK | Spinning at normal speed    |
|      | Fan Tray 5 Fan 3 | OK | Spinning at normal speed    |
|      | Fan Tray 5 Fan 4 | OK | Spinning at normal speed    |
|      | Fan Tray 5 Fan 5 | OK | Spinning at normal speed    |
|      | Fan Tray 5 Fan 6 | OK | Spinning at normal speed    |
|      | Fan Tray 5 Fan 7 | OK | Spinning at normal speed    |
|      | Fan Tray 5 Fan 8 | OK | Spinning at normal speed    |
|      | Fan Tray 5 Fan 9 | OK | Spinning at normal speed    |
| Misc | SPMB 0           | OK |                             |
|      | SPMB 1           | OK |                             |

1cc0-re0:

| Class | Item             | Status | Measurement                 |
|-------|------------------|--------|-----------------------------|
| Temp  | PEM 0            | OK     | 27 degrees C / 80 degrees F |
|       | PEM 1            | Absent |                             |
|       | SCG 0            | OK     | 31 degrees C / 87 degrees F |
|       | SCG 1            | OK     | 35 degrees C / 95 degrees F |
|       | Routing Engine 0 | OK     | 30 degrees C / 86 degrees F |
|       | Routing Engine 1 | OK     | 30 degrees C / 86 degrees F |

|      |                         |    |                              |
|------|-------------------------|----|------------------------------|
|      | CB 0                    | OK | 31 degrees C / 87 degrees F  |
|      | CB 1                    | OK | 31 degrees C / 87 degrees F  |
|      | SIB 0                   | OK | 41 degrees C / 105 degrees F |
|      | SIB 0 (B)               | OK | 34 degrees C / 93 degrees F  |
|      | SIB 1                   | OK | 0 degrees C / 32 degrees F   |
|      | SIB 1 (B)               | OK | 0 degrees C / 32 degrees F   |
|      | SIB 2                   | OK | 0 degrees C / 32 degrees F   |
|      | SIB 2 (B)               | OK | 0 degrees C / 32 degrees F   |
|      | SIB 3                   | OK | 0 degrees C / 32 degrees F   |
|      | SIB 3 (B)               | OK | 0 degrees C / 32 degrees F   |
|      | SIB 4                   | OK | 0 degrees C / 32 degrees F   |
|      | SIB 4 (B)               | OK | 0 degrees C / 32 degrees F   |
|      | FPC 0 Top               | OK | 49 degrees C / 120 degrees F |
|      | FPC 0 Bottom            | OK | 50 degrees C / 122 degrees F |
|      | FPC 1 Top               | OK | 48 degrees C / 118 degrees F |
|      | FPC 1 Bottom            | OK | 49 degrees C / 120 degrees F |
|      | FPM GBUS                | OK | 27 degrees C / 80 degrees F  |
|      | FPM Display             | OK | 30 degrees C / 86 degrees F  |
| Fans | Top Left Front fan      | OK | Spinning at normal speed     |
|      | Top Left Middle fan     | OK | Spinning at normal speed     |
|      | Top Left Rear fan       | OK | Spinning at normal speed     |
|      | Top Right Front fan     | OK | Spinning at normal speed     |
|      | Top Right Middle fan    | OK | Spinning at normal speed     |
|      | Top Right Rear fan      | OK | Spinning at normal speed     |
|      | Bottom Left Front fan   | OK | Spinning at normal speed     |
|      | Bottom Left Middle fan  | OK | Spinning at normal speed     |
|      | Bottom Left Rear fan    | OK | Spinning at normal speed     |
|      | Bottom Right Front fan  | OK | Spinning at normal speed     |
|      | Bottom Right Middle fan | OK | Spinning at normal speed     |
|      | Bottom Right Rear fan   | OK | Spinning at normal speed     |
|      | Rear Tray Top fan       | OK | Spinning at normal speed     |
|      | Rear Tray Second fan    | OK | Spinning at normal speed     |
|      | Rear Tray Third fan     | OK | Spinning at normal speed     |
|      | Rear Tray Fourth fan    | OK | Spinning at normal speed     |
|      | Rear Tray Fifth fan     | OK | Spinning at normal speed     |
|      | Rear Tray Sixth fan     | OK | Spinning at normal speed     |
|      | Rear Tray Seventh fan   | OK | Spinning at normal speed     |
|      | Rear Tray Bottom fan    | OK | Spinning at normal speed     |
| Misc | CIP                     | OK |                              |
|      | SPMB 0                  | OK |                              |
|      | SPMB 1                  | OK |                              |

### show chassis environment (TX Matrix Plus router with 3D SIBs)

```
user@host> show chassis environment
sfc0-re0:
```

| ----- |                      |        |                              |
|-------|----------------------|--------|------------------------------|
| Class | Item                 | Status | Measurement                  |
| Temp  | PEM 0                | Check  | 30 degrees C / 86 degrees F  |
|       | PEM 1                | OK     | 33 degrees C / 91 degrees F  |
|       | Routing Engine 0     | OK     | 28 degrees C / 82 degrees F  |
|       | Routing Engine 0 CPU | OK     | 42 degrees C / 107 degrees F |
|       | Routing Engine 1     | OK     | 29 degrees C / 84 degrees F  |
|       | Routing Engine 1 CPU | OK     | 44 degrees C / 111 degrees F |
|       | CB 0 Intake          | OK     | 30 degrees C / 86 degrees F  |
|       | CB 0 Exhaust A       | OK     | 28 degrees C / 82 degrees F  |
|       | CB 0 Exhaust B       | OK     | 30 degrees C / 86 degrees F  |
|       | CB 1 Intake          | OK     | 31 degrees C / 87 degrees F  |
|       | CB 1 Exhaust A       | OK     | 27 degrees C / 80 degrees F  |
|       | CB 1 Exhaust B       | OK     | 31 degrees C / 87 degrees F  |
|       | SIB F13 0 Board      | OK     | 44 degrees C / 111 degrees F |

|      |                         |    |                              |
|------|-------------------------|----|------------------------------|
|      | SIB F13 0 XF Junction   | OK | 62 degrees C / 143 degrees F |
|      | SIB F13 3 Board         | OK | 45 degrees C / 113 degrees F |
|      | SIB F13 3 XF Junction   | OK | 60 degrees C / 140 degrees F |
|      | SIB F13 6 Board         | OK | 47 degrees C / 116 degrees F |
|      | SIB F13 6 XF Junction   | OK | 62 degrees C / 143 degrees F |
|      | SIB F2S 0/0 Board       | OK | 32 degrees C / 89 degrees F  |
|      | SIB F2S 0/0 XF Junction | OK | 42 degrees C / 107 degrees F |
|      | SIB F2S 0/2 Board       | OK | 31 degrees C / 87 degrees F  |
|      | SIB F2S 0/2 XF Junction | OK | 41 degrees C / 105 degrees F |
|      | SIB F2S 0/4 Board       | OK | 31 degrees C / 87 degrees F  |
|      | SIB F2S 0/4 XF Junction | OK | 42 degrees C / 107 degrees F |
|      | SIB F2S 0/6 Board       | OK | 31 degrees C / 87 degrees F  |
|      | SIB F2S 0/6 XF Junction | OK | 41 degrees C / 105 degrees F |
|      | SIB F2S 1/0 Board       | OK | 31 degrees C / 87 degrees F  |
|      | SIB F2S 1/0 XF Junction | OK | 41 degrees C / 105 degrees F |
|      | SIB F2S 1/2 Board       | OK | 29 degrees C / 84 degrees F  |
|      | SIB F2S 1/2 XF Junction | OK | 39 degrees C / 102 degrees F |
|      | SIB F2S 1/4 Board       | OK | 29 degrees C / 84 degrees F  |
|      | SIB F2S 1/4 XF Junction | OK | 35 degrees C / 95 degrees F  |
|      | SIB F2S 1/6 Board       | OK | 30 degrees C / 86 degrees F  |
|      | SIB F2S 1/6 XF Junction | OK | 41 degrees C / 105 degrees F |
|      | SIB F2S 2/0 Board       | OK | 30 degrees C / 86 degrees F  |
|      | SIB F2S 2/0 XF Junction | OK | 42 degrees C / 107 degrees F |
|      | SIB F2S 2/2 Board       | OK | 28 degrees C / 82 degrees F  |
|      | SIB F2S 2/2 XF Junction | OK | 39 degrees C / 102 degrees F |
|      | SIB F2S 2/4 Board       | OK | 29 degrees C / 84 degrees F  |
|      | SIB F2S 2/4 XF Junction | OK | 42 degrees C / 107 degrees F |
|      | SIB F2S 2/6 Board       | OK | 29 degrees C / 84 degrees F  |
|      | SIB F2S 2/6 XF Junction | OK | 41 degrees C / 105 degrees F |
|      | CIP 0 Intake            | OK | 25 degrees C / 77 degrees F  |
|      | CIP 0 Exhaust A         | OK | 26 degrees C / 78 degrees F  |
|      | CIP 0 Exhaust B         | OK | 26 degrees C / 78 degrees F  |
|      | CIP 1 Intake            | OK | 26 degrees C / 78 degrees F  |
|      | CIP 1 Exhaust A         | OK | 27 degrees C / 80 degrees F  |
|      | CIP 1 Exhaust B         | OK | 27 degrees C / 80 degrees F  |
| Fans | Fan Tray 0 Fan 1        | OK | Spinning at normal speed     |
|      | Fan Tray 0 Fan 2        | OK | Spinning at normal speed     |
|      | Fan Tray 0 Fan 3        | OK | Spinning at normal speed     |
|      | Fan Tray 0 Fan 4        | OK | Spinning at normal speed     |
|      | Fan Tray 0 Fan 5        | OK | Spinning at normal speed     |
|      | Fan Tray 0 Fan 6        | OK | Spinning at normal speed     |
|      | Fan Tray 1 Fan 1        | OK | Spinning at normal speed     |
|      | Fan Tray 1 Fan 2        | OK | Spinning at normal speed     |
|      | Fan Tray 1 Fan 3        | OK | Spinning at normal speed     |
|      | Fan Tray 1 Fan 4        | OK | Spinning at normal speed     |
|      | Fan Tray 1 Fan 5        | OK | Spinning at normal speed     |
|      | Fan Tray 1 Fan 6        | OK | Spinning at normal speed     |
|      | Fan Tray 2 Fan 1        | OK | Spinning at normal speed     |
|      | Fan Tray 2 Fan 2        | OK | Spinning at normal speed     |
|      | Fan Tray 2 Fan 3        | OK | Spinning at normal speed     |
|      | Fan Tray 2 Fan 4        | OK | Spinning at normal speed     |
|      | Fan Tray 2 Fan 5        | OK | Spinning at normal speed     |
|      | Fan Tray 2 Fan 6        | OK | Spinning at normal speed     |
|      | Fan Tray 2 Fan 7        | OK | Spinning at normal speed     |
|      | Fan Tray 2 Fan 8        | OK | Spinning at normal speed     |
|      | Fan Tray 2 Fan 9        | OK | Spinning at normal speed     |
|      | Fan Tray 3 Fan 1        | OK | Spinning at normal speed     |
|      | Fan Tray 3 Fan 2        | OK | Spinning at normal speed     |
|      | Fan Tray 3 Fan 3        | OK | Spinning at normal speed     |
|      | Fan Tray 3 Fan 4        | OK | Spinning at normal speed     |
|      | Fan Tray 3 Fan 5        | OK | Spinning at normal speed     |



|                  |       |                          |
|------------------|-------|--------------------------|
| Fan Tray 3 Fan 6 | OK    | Spinning at normal speed |
| Fan Tray 3 Fan 7 | OK    | Spinning at normal speed |
| Fan Tray 3 Fan 8 | OK    | Spinning at normal speed |
| Fan Tray 3 Fan 9 | OK    | Spinning at normal speed |
| Fan Tray 4 Fan 1 | OK    | Spinning at normal speed |
| Fan Tray 4 Fan 2 | OK    | Spinning at normal speed |
| Fan Tray 4 Fan 3 | OK    | Spinning at normal speed |
| Fan Tray 4 Fan 4 | OK    | Spinning at normal speed |
| Fan Tray 4 Fan 5 | OK    | Spinning at normal speed |
| Fan Tray 4 Fan 6 | OK    | Spinning at normal speed |
| Fan Tray 4 Fan 7 | OK    | Spinning at normal speed |
| Fan Tray 4 Fan 8 | OK    | Spinning at normal speed |
| Fan Tray 4 Fan 9 | OK    | Spinning at normal speed |
| Fan Tray 5 Fan 1 | OK    | Spinning at normal speed |
| Fan Tray 5 Fan 2 | OK    | Spinning at normal speed |
| Fan Tray 5 Fan 3 | OK    | Spinning at normal speed |
| Fan Tray 5 Fan 4 | OK    | Spinning at normal speed |
| Fan Tray 5 Fan 5 | OK    | Spinning at normal speed |
| Fan Tray 5 Fan 6 | OK    | Spinning at normal speed |
| Fan Tray 5 Fan 7 | OK    | Spinning at normal speed |
| Fan Tray 5 Fan 8 | OK    | Spinning at normal speed |
| Fan Tray 5 Fan 9 | Check |                          |
| Misc SPMB 0      | OK    |                          |
| SPMB 1           | OK    |                          |

1cc0-re0:

| Class | Item                 | Status | Measurement                  |
|-------|----------------------|--------|------------------------------|
| Temp  | PEM 0                | OK     | 29 degrees C / 84 degrees F  |
|       | PEM 1                | Check  | 29 degrees C / 84 degrees F  |
|       | SCG 0                | OK     | 32 degrees C / 89 degrees F  |
|       | SCG 1                | OK     | 33 degrees C / 91 degrees F  |
|       | Routing Engine 0     | OK     | 32 degrees C / 89 degrees F  |
|       | Routing Engine 0 CPU | OK     | 51 degrees C / 123 degrees F |
|       | Routing Engine 1     | OK     | 32 degrees C / 89 degrees F  |
|       | Routing Engine 1 CPU | OK     | 49 degrees C / 120 degrees F |
|       | CB 0                 | OK     | 34 degrees C / 93 degrees F  |
|       | CB 1                 | OK     | 34 degrees C / 93 degrees F  |
|       | SIB 0                | OK     | 39 degrees C / 102 degrees F |
|       | SIB 0 (B)            | Absent |                              |
|       | SIB 1                | OK     | 39 degrees C / 102 degrees F |
|       | SIB 1 (B)            | Absent |                              |
|       | SIB 2                | OK     | 39 degrees C / 102 degrees F |
|       | SIB 2 (B)            | Absent |                              |
|       | FPC 4 Top            | OK     | 43 degrees C / 109 degrees F |
|       | FPC 4 Bottom         | OK     | 43 degrees C / 109 degrees F |
|       | FPC 7 Fan Intake     | OK     | 35 degrees C / 95 degrees F  |
|       | FPC 7 Fan Exhaust    | OK     | 50 degrees C / 122 degrees F |
|       | FPC 7 PMB            | OK     | 50 degrees C / 122 degrees F |
|       | FPC 7 LMB0           | OK     | 55 degrees C / 131 degrees F |
|       | FPC 7 LMB1           | OK     | 49 degrees C / 120 degrees F |
|       | FPC 7 LMB2           | OK     | 39 degrees C / 102 degrees F |
|       | FPC 7 PFE1 LU2       | OK     | 55 degrees C / 131 degrees F |
|       | FPC 7 PFE1 LU0       | OK     | 45 degrees C / 113 degrees F |
|       | FPC 7 PFE0 LU0       | OK     | 62 degrees C / 143 degrees F |
|       | FPC 7 XF1            | OK     | 52 degrees C / 125 degrees F |
|       | FPC 7 XF0            | OK     | 61 degrees C / 141 degrees F |
|       | FPC 7 XM1            | OK     | 39 degrees C / 102 degrees F |
|       | FPC 7 XM0            | OK     | 56 degrees C / 132 degrees F |
|       | FPC 7 PFE0 LU1       | OK     | 60 degrees C / 140 degrees F |
|       | FPC 7 PFE0 LU2       | OK     | 55 degrees C / 131 degrees F |

|      |                           |    |                              |
|------|---------------------------|----|------------------------------|
|      | FPC 7 PFE1 LU1            | OK | 41 degrees C / 105 degrees F |
|      | FPM GBUS                  | OK | 24 degrees C / 75 degrees F  |
|      | FPM Display               | OK | 28 degrees C / 82 degrees F  |
| Fans | Top Left Front fan        | OK | Spinning at normal speed     |
|      | Top Left Middle fan       | OK | Spinning at normal speed     |
|      | Top Left Rear fan         | OK | Spinning at normal speed     |
|      | Top Right Front fan       | OK | Spinning at normal speed     |
|      | Top Right Middle fan      | OK | Spinning at normal speed     |
|      | Top Right Rear fan        | OK | Spinning at normal speed     |
|      | Bottom Left Front fan     | OK | Spinning at normal speed     |
|      | Bottom Left Middle fan    | OK | Spinning at normal speed     |
|      | Bottom Left Rear fan      | OK | Spinning at normal speed     |
|      | Bottom Right Front fan    | OK | Spinning at normal speed     |
|      | Bottom Right Middle fan   | OK | Spinning at normal speed     |
|      | Bottom Right Rear fan     | OK | Spinning at normal speed     |
|      | Rear Tray fan 1 (Top)     | OK | Spinning at normal speed     |
|      | Rear Tray fan 2           | OK | Spinning at normal speed     |
|      | Rear Tray fan 3           | OK | Spinning at normal speed     |
|      | Rear Tray fan 4           | OK | Spinning at normal speed     |
|      | Rear Tray fan 5           | OK | Spinning at normal speed     |
| Misc | Rear Tray fan 6           | OK | Spinning at normal speed     |
|      | Rear Tray fan 7           | OK | Spinning at normal speed     |
|      | Rear Tray fan 8           | OK | Spinning at normal speed     |
|      | Rear Tray fan 9           | OK | Spinning at normal speed     |
|      | Rear Tray fan 10          | OK | Spinning at normal speed     |
|      | Rear Tray fan 11          | OK | Spinning at normal speed     |
|      | Rear Tray fan 12          | OK | Spinning at normal speed     |
|      | Rear Tray fan 13          | OK | Spinning at normal speed     |
|      | Rear Tray fan 14          | OK | Spinning at normal speed     |
|      | Rear Tray fan 15          | OK | Spinning at normal speed     |
|      | Rear Tray fan 16 (Bottom) | OK | Spinning at normal speed     |
|      | CIP                       | OK |                              |
|      | SPMB 0                    | OK |                              |
|      | SPMB 1                    | OK |                              |

#### show chassis environment (EX4200 Standalone Switch)

```
user@switch> show chassis environment
```

| Class | Item                    | Status | Measurement                  |
|-------|-------------------------|--------|------------------------------|
| Power | FPC 0 Power Supply 0    | OK     |                              |
|       | FPC 0 Power Supply 1    | Absent |                              |
| Temp  | FPC 0 CPU               | OK     | 41 degrees C / 105 degrees F |
|       | FPC 0 EX-PFE1           | OK     | 42 degrees C / 107 degrees F |
|       | FPC 0 EX-PFE2           | OK     | 46 degrees C / 114 degrees F |
|       | FPC 0 GEPHY Front Left  | OK     | 25 degrees C / 77 degrees F  |
|       | FPC 0 GEPHY Front Right | OK     | 27 degrees C / 80 degrees F  |
|       | FPC 0 Uplink Conn       | OK     | 29 degrees C / 84 degrees F  |
| Fans  | FPC 0 Fan 1             | OK     | Spinning at normal speed     |
|       | FPC 0 Fan 2             | OK     | Spinning at normal speed     |
|       | FPC 0 Fan 3             | OK     | Spinning at normal speed     |

#### show chassis environment (EX8216 Switch)

```
user@switch> show chassis environment
```

| Class | Item  | Status | Measurement |
|-------|-------|--------|-------------|
| Power | PSU 0 | OK     |             |
|       | PSU 1 | OK     |             |
|       | PSU 2 | OK     |             |
|       | PSU 3 | Check  |             |
|       | PSU 4 | Absent |             |
|       | PSU 5 | Absent |             |

|      |               |    |                              |
|------|---------------|----|------------------------------|
| Temp | CB 0 Intake   | OK | 23 degrees C / 73 degrees F  |
|      | CB 0 Exhaust  | OK | 26 degrees C / 78 degrees F  |
|      | CB 1 Intake   | OK | 22 degrees C / 71 degrees F  |
|      | CB 1 Exhaust  | OK | 25 degrees C / 77 degrees F  |
|      | FPC 4 Intake  | OK | 49 degrees C / 120 degrees F |
|      | FPC 4 Exhaust | OK | 59 degrees C / 138 degrees F |
|      | SIB 5 Intake  | OK | 25 degrees C / 77 degrees F  |
|      | SIB 5 Exhaust | OK | 35 degrees C / 95 degrees F  |
|      | SIB 6 Intake  | OK | 25 degrees C / 77 degrees F  |
|      | SIB 6 Exhaust | OK | 38 degrees C / 100 degrees F |
| Fans | Top Fan 1     | OK | Spinning at normal speed     |
|      | Top Fan 2     | OK | Spinning at normal speed     |
|      | Top Fan 3     | OK | Spinning at normal speed     |
|      | Top Fan 4     | OK | Spinning at normal speed     |
|      | Top Fan 5     | OK | Spinning at normal speed     |
|      | Top Fan 6     | OK | Spinning at normal speed     |
|      | Top Fan 7     | OK | Spinning at normal speed     |
|      | Top Fan 8     | OK | Spinning at normal speed     |
|      | Top Fan 9     | OK | Spinning at normal speed     |
|      | Bottom Fan 1  | OK | Spinning at normal speed     |
|      | Bottom Fan 2  | OK | Spinning at normal speed     |
|      | Bottom Fan 3  | OK | Spinning at normal speed     |
|      | Bottom Fan 4  | OK | Spinning at normal speed     |
|      | Bottom Fan 5  | OK | Spinning at normal speed     |
|      | Bottom Fan 6  | OK | Spinning at normal speed     |
|      | Bottom Fan 7  | OK | Spinning at normal speed     |
|      | Bottom Fan 8  | OK | Spinning at normal speed     |
|      | Bottom Fan 9  | OK | Spinning at normal speed     |

### show chassis environment (QFX Series)

```
user@switch> show chassis environment
```

| Class | Item                     | Status | Measurement                  |
|-------|--------------------------|--------|------------------------------|
| Power | FPC 0 Power Supply 0     | OK     |                              |
|       | FPC 0 Power Supply 1     | OK     |                              |
| Temp  | FPC 0 Sensor TopLeft I   | OK     | 26 degrees C / 78 degrees F  |
|       | FPC 0 Sensor TopRight I  | OK     | 24 degrees C / 75 degrees F  |
|       | FPC 0 Sensor TopLeft E   | OK     | 30 degrees C / 86 degrees F  |
|       | FPC 0 Sensor TopRight E  | OK     | 30 degrees C / 86 degrees F  |
|       | FPC 0 Sensor TopMiddle I | OK     | 30 degrees C / 86 degrees F  |
|       | FPC 0 Sensor TopMiddle E | OK     | 38 degrees C / 100 degrees F |
|       | FPC 0 Sensor Bottom I    | OK     | 34 degrees C / 93 degrees F  |
|       | FPC 0 Sensor Bottom E    | OK     | 38 degrees C / 100 degrees F |
|       | FPC 0 Sensor Die Temp    | OK     | 38 degrees C / 100 degrees F |
|       | FPC 0 Sensor Mgmt Brd I  | OK     | 24 degrees C / 75 degrees F  |
| Fans  | FPC 0 Sensor Switch I    | OK     | 28 degrees C / 82 degrees F  |
|       | FPC 0 Fan 1 (left)       | Failed |                              |
|       | FPC 0 Fan 2 (right)      | OK     | Spinning at normal speed     |
|       | FPC 0 Fan 3 (middle)     | OK     | Spinning at normal speed     |

### show chassis environment interconnect-device (QFabric System)

```
user@switch> show chassis environment interconnect-device IC-A0004
```

| Class                     | Item           | Status | Measurement                  |
|---------------------------|----------------|--------|------------------------------|
| CB 0                      | CB 0           |        |                              |
|                           | CB 0 L Intake  | OK     | 30 degrees C / 86 degrees F  |
|                           | CB 0 R Intake  | OK     | 31 degrees C / 87 degrees F  |
|                           | CB 0 L Exhaust | OK     | 32 degrees C / 89 degrees F  |
|                           | CB 0 R Exhaust | OK     | 33 degrees C / 91 degrees F  |
| Routing Engine 0 CPU temp |                | OK     | 51 degrees C / 123 degrees F |
| CB 1                      |                |        |                              |

|                           |       |                              |
|---------------------------|-------|------------------------------|
| CB 1 L Intake             | OK    | 27 degrees C / 80 degrees F  |
| CB 1 R Intake             | OK    | 29 degrees C / 84 degrees F  |
| CB 1 L Exhaust            | OK    | 31 degrees C / 87 degrees F  |
| CB 1 R Exhaust            | OK    | 32 degrees C / 89 degrees F  |
| Routing Engine 1 CPU temp | OK    | 40 degrees C / 104 degrees F |
| FC 0 FPC 0                |       |                              |
| FPC 0 L Intake            | OK    | 25 degrees C / 77 degrees F  |
| FPC 0 R Intake            | OK    | 28 degrees C / 82 degrees F  |
| FPC 0 L Exhaust           | OK    | 28 degrees C / 82 degrees F  |
| FPC 0 R Exhaust           | OK    | 29 degrees C / 84 degrees F  |
| FC 7 FPC 7                |       |                              |
| FPC 7 L Intake            | OK    | 25 degrees C / 77 degrees F  |
| FPC 7 R Intake            | OK    | 26 degrees C / 78 degrees F  |
| FPC 7 L Exhaust           | OK    | 28 degrees C / 82 degrees F  |
| FPC 7 R Exhaust           | OK    | 29 degrees C / 84 degrees F  |
| RC 0 FPC 8                |       |                              |
| FPC 8 L Intake            | OK    | 25 degrees C / 77 degrees F  |
| FPC 8 R Intake            | OK    | 26 degrees C / 78 degrees F  |
| FPC 8 L Exhaust           | OK    | 32 degrees C / 89 degrees F  |
| FPC 8 R Exhaust           | OK    | 30 degrees C / 86 degrees F  |
| RC 7 FPC 15               |       |                              |
| FPC 15 L Intake           | OK    | 24 degrees C / 75 degrees F  |
| FPC 15 R Intake           | OK    | 25 degrees C / 77 degrees F  |
| FPC 15 L Exhaust          | OK    | 33 degrees C / 91 degrees F  |
| FPC 15 R Exhaust          | OK    | 31 degrees C / 87 degrees F  |
| Fans TFT 0 Fan 0          | OK    | Spinning at normal speed     |
| Fans TFT 0 Fan 1          | OK    | Spinning at normal speed     |
| Fans TFT 0 Fan 2          | OK    | Spinning at normal speed     |
| Fans TFT 0 Fan 3          | OK    | Spinning at normal speed     |
| Fans TFT 0 Fan 4          | OK    | Spinning at normal speed     |
| Fans TFT 0 Fan 5          | OK    | Spinning at normal speed     |
| Fans BFT 1 Fan 0          | OK    | Spinning at normal speed     |
| Fans BFT 1 Fan 1          | OK    | Spinning at normal speed     |
| Fans BFT 1 Fan 2          | OK    | Spinning at normal speed     |
| Fans BFT 1 Fan 3          | Check |                              |
| Fans BFT 1 Fan 4          | OK    | Spinning at normal speed     |
| Fans BFT 1 Fan 5          | OK    | Spinning at normal speed     |
| Fans SFT 0 Fan 0 Rotor 0  | OK    | Spinning at normal speed     |
| Fans SFT 0 Fan 0 Rotor 1  | OK    | Spinning at normal speed     |
| Fans SFT 0 Fan 1 Rotor 0  | OK    | Spinning at normal speed     |
| Fans SFT 0 Fan 1 Rotor 1  | OK    | Spinning at normal speed     |
| Fans SFT 0 Fan 2 Rotor 0  | OK    | Spinning at normal speed     |
| Fans SFT 0 Fan 2 Rotor 1  | OK    | Spinning at normal speed     |
| Fans SFT 0 Fan 3 Rotor 0  | OK    | Spinning at normal speed     |
| Fans SFT 0 Fan 3 Rotor 1  | OK    | Spinning at normal speed     |
| Fans SFT 1 Fan 0 Rotor 0  | OK    | Spinning at normal speed     |
| Fans SFT 1 Fan 0 Rotor 1  | OK    | Spinning at normal speed     |
| Fans SFT 1 Fan 1 Rotor 0  | OK    | Spinning at normal speed     |
| Fans SFT 1 Fan 1 Rotor 1  | OK    | Spinning at normal speed     |
| Fans SFT 1 Fan 2 Rotor 0  | OK    | Spinning at normal speed     |
| Fans SFT 1 Fan 2 Rotor 1  | OK    | Spinning at normal speed     |
| Fans SFT 1 Fan 3 Rotor 0  | OK    | Spinning at normal speed     |
| Fans SFT 1 Fan 3 Rotor 1  | OK    | Spinning at normal speed     |
| Fans SFT 2 Fan 0 Rotor 0  | OK    | Spinning at normal speed     |
| Fans SFT 2 Fan 0 Rotor 1  | OK    | Spinning at normal speed     |
| Fans SFT 2 Fan 1 Rotor 0  | OK    | Spinning at normal speed     |
| Fans SFT 2 Fan 1 Rotor 1  | OK    | Spinning at normal speed     |
| Fans SFT 2 Fan 2 Rotor 0  | OK    | Spinning at normal speed     |
| Fans SFT 2 Fan 2 Rotor 1  | OK    | Spinning at normal speed     |
| Fans SFT 2 Fan 3 Rotor 0  | OK    | Spinning at normal speed     |
| Fans SFT 2 Fan 3 Rotor 1  | OK    | Spinning at normal speed     |

|       |       |       |         |        |                             |
|-------|-------|-------|---------|--------|-----------------------------|
| Fans  | SFT 3 | Fan 0 | Rotor 0 | OK     | Spinning at normal speed    |
| Fans  | SFT 3 | Fan 0 | Rotor 1 | OK     | Spinning at normal speed    |
| Fans  | SFT 3 | Fan 1 | Rotor 0 | OK     | Spinning at normal speed    |
| Fans  | SFT 3 | Fan 1 | Rotor 1 | OK     | Spinning at normal speed    |
| Fans  | SFT 3 | Fan 2 | Rotor 0 | OK     | Spinning at normal speed    |
| Fans  | SFT 3 | Fan 2 | Rotor 1 | OK     | Spinning at normal speed    |
| Fans  | SFT 3 | Fan 3 | Rotor 0 | OK     | Spinning at normal speed    |
| Fans  | SFT 3 | Fan 3 | Rotor 1 | OK     | Spinning at normal speed    |
| Fans  | SFT 4 | Fan 0 | Rotor 0 | OK     | Spinning at normal speed    |
| Fans  | SFT 4 | Fan 0 | Rotor 1 | OK     | Spinning at normal speed    |
| Fans  | SFT 4 | Fan 1 | Rotor 0 | OK     | Spinning at normal speed    |
| Fans  | SFT 4 | Fan 1 | Rotor 1 | OK     | Spinning at normal speed    |
| Fans  | SFT 4 | Fan 2 | Rotor 0 | OK     | Spinning at normal speed    |
| Fans  | SFT 4 | Fan 2 | Rotor 1 | OK     | Spinning at normal speed    |
| Fans  | SFT 4 | Fan 3 | Rotor 0 | OK     | Spinning at normal speed    |
| Fans  | SFT 4 | Fan 3 | Rotor 1 | OK     | Spinning at normal speed    |
| Fans  | SFT 5 | Fan 0 | Rotor 0 | OK     | Spinning at normal speed    |
| Fans  | SFT 5 | Fan 0 | Rotor 1 | OK     | Spinning at normal speed    |
| Fans  | SFT 5 | Fan 1 | Rotor 0 | OK     | Spinning at normal speed    |
| Fans  | SFT 5 | Fan 1 | Rotor 1 | OK     | Spinning at normal speed    |
| Fans  | SFT 5 | Fan 2 | Rotor 0 | OK     | Spinning at normal speed    |
| Fans  | SFT 5 | Fan 2 | Rotor 1 | OK     | Spinning at normal speed    |
| Fans  | SFT 5 | Fan 3 | Rotor 0 | OK     | Spinning at normal speed    |
| Fans  | SFT 5 | Fan 3 | Rotor 1 | OK     | Spinning at normal speed    |
| Fans  | SFT 6 | Fan 0 | Rotor 0 | OK     | Spinning at normal speed    |
| Fans  | SFT 6 | Fan 0 | Rotor 1 | OK     | Spinning at normal speed    |
| Fans  | SFT 6 | Fan 1 | Rotor 0 | OK     | Spinning at normal speed    |
| Fans  | SFT 6 | Fan 1 | Rotor 1 | OK     | Spinning at normal speed    |
| Fans  | SFT 6 | Fan 2 | Rotor 0 | OK     | Spinning at normal speed    |
| Fans  | SFT 6 | Fan 2 | Rotor 1 | OK     | Spinning at normal speed    |
| Fans  | SFT 6 | Fan 3 | Rotor 0 | OK     | Spinning at normal speed    |
| Fans  | SFT 6 | Fan 3 | Rotor 1 | OK     | Spinning at normal speed    |
| Fans  | SFT 7 | Fan 0 | Rotor 0 | OK     | Spinning at normal speed    |
| Fans  | SFT 7 | Fan 0 | Rotor 1 | OK     | Spinning at normal speed    |
| Fans  | SFT 7 | Fan 1 | Rotor 0 | OK     | Spinning at normal speed    |
| Fans  | SFT 7 | Fan 1 | Rotor 1 | OK     | Spinning at normal speed    |
| Fans  | SFT 7 | Fan 2 | Rotor 0 | OK     | Spinning at normal speed    |
| Fans  | SFT 7 | Fan 2 | Rotor 1 | OK     | Spinning at normal speed    |
| Fans  | SFT 7 | Fan 3 | Rotor 0 | OK     | Spinning at normal speed    |
| Fans  | SFT 7 | Fan 3 | Rotor 1 | OK     | Spinning at normal speed    |
| Power | PEM 0 |       |         | OK     | 30 degrees C / 86 degrees F |
| Power | PEM 1 |       |         | OK     | 30 degrees C / 86 degrees F |
| Power | PEM 2 |       |         | OK     | 30 degrees C / 86 degrees F |
| Power | PEM 3 |       |         | Absent |                             |
| Power | PEM 4 |       |         | Absent |                             |
| Power | PEM 5 |       |         | Absent |                             |

#### show chassis environment node-device (QFabric System)

```

user@switch> show chassis environment node-device node1
Class Item                               Status Measurement
Power node1 Power Supply 0              Absent
      node1 Power Supply 1              Absent
Fans  node1 Fan Tray 0                  Testing
      node1 Fan Tray 1                  Testing
      node1 Fan Tray 2                  Testing

```

#### show chassis environment pem node-device (QFabric System)

```

user@switch> show chassis environment pem node-device node1

```

```

FPC 0 PEM 0 status:
  State           Check
  Airflow         Front to Back
  Temperature      OK
  AC Input:       OK
  DC Output        Voltage(V) Current(A) Power(W) Load(%)
                   12          10       120    18

FPC 0 PEM 1 status:
  State           Online
  Airflow         Back to Front
  Temperature      OK
  AC Input:       OK
  DC Output        Voltage(V) Current(A) Power(W) Load(%)
                   11          10       110    17

```

### show chassis environment (PTX5000 Packet Transport Router)

```

user@switch> show chassis environment
Class Item                               Status      Measurement
Temp  PDU 0                               OK
      PDU 0 PSM 0                         OK          36 degrees C / 96 degrees F
      PDU 0 PSM 1                         OK          38 degrees C / 100 degrees F
      PDU 0 PSM 2                         OK          38 degrees C / 100 degrees F
      PDU 0 PSM 3                         OK          37 degrees C / 98 degrees F
      PDU 1                               Absent
      CCG 0                               OK          44 degrees C / 111 degrees F
      CCG 1                               OK          44 degrees C / 111 degrees F
      Routing Engine 0                     OK          62 degrees C / 143 degrees F
      Routing Engine 0 CPU                 OK          75 degrees C / 167 degrees F
      Routing Engine 1                     OK          51 degrees C / 123 degrees F
      Routing Engine 1 CPU                 OK          64 degrees C / 147 degrees F
      CB 0 Intake                          OK          38 degrees C / 100 degrees F
      CB 0 Exhaust A                      OK          46 degrees C / 114 degrees F
      CB 0 Exhaust B                      OK          42 degrees C / 107 degrees F
      CB 1 Intake                          OK          35 degrees C / 95 degrees F
      CB 1 Exhaust A                      OK          39 degrees C / 102 degrees F
      CB 1 Exhaust B                      OK          36 degrees C / 96 degrees F
      SIB 0 Exhaust                       OK          47 degrees C / 116 degrees F
      SIB 0 Junction                      OK          45 degrees C / 113 degrees F
      SIB 1 Exhaust                       OK          44 degrees C / 111 degrees F
      SIB 1 Junction                      OK          43 degrees C / 109 degrees F
      SIB 2 Exhaust                       OK          47 degrees C / 116 degrees F
      SIB 2 Junction                      OK          42 degrees C / 107 degrees F
      SIB 3 Exhaust                       OK          43 degrees C / 109 degrees F
      SIB 3 Junction                      OK          43 degrees C / 109 degrees F
      SIB 4 Exhaust                       OK          47 degrees C / 116 degrees F
      SIB 4 Junction                      OK          42 degrees C / 107 degrees F
      SIB 5 Exhaust                       OK          42 degrees C / 107 degrees F
      SIB 5 Junction                      OK          40 degrees C / 104 degrees F
      SIB 6 Exhaust                       OK          46 degrees C / 114 degrees F
      SIB 6 Junction                      OK          42 degrees C / 107 degrees F
      SIB 7 Exhaust                       OK          43 degrees C / 109 degrees F
      SIB 7 Junction                      OK          39 degrees C / 102 degrees F
      SIB 8 Exhaust                       OK          44 degrees C / 111 degrees F
      SIB 8 Junction                      OK          41 degrees C / 105 degrees F
      FPC 0 PMB                           OK          35 degrees C / 95 degrees F
      FPC 0 Intake                        OK          33 degrees C / 91 degrees F
      FPC 0 Exhaust A                     OK          51 degrees C / 123 degrees F
      FPC 0 Exhaust B                     OK          43 degrees C / 109 degrees F
      FPC 0 TL0                           OK          48 degrees C / 118 degrees F
      FPC 0 TQ0                           OK          53 degrees C / 127 degrees F

```

|                   |        |                              |
|-------------------|--------|------------------------------|
| FPC 0 TL1         | OK     | 56 degrees C / 132 degrees F |
| FPC 0 TQ1         | OK     | 58 degrees C / 136 degrees F |
| FPC 0 TL2         | OK     | 55 degrees C / 131 degrees F |
| FPC 0 TQ2         | OK     | 56 degrees C / 132 degrees F |
| FPC 0 TL3         | OK     | 59 degrees C / 138 degrees F |
| FPC 0 TQ3         | OK     | 59 degrees C / 138 degrees F |
| FPC 2 PMB         | OK     | 35 degrees C / 95 degrees F  |
| FPC 2 Intake      | OK     | 34 degrees C / 93 degrees F  |
| FPC 2 Exhaust A   | OK     | 51 degrees C / 123 degrees F |
| FPC 2 Exhaust B   | OK     | 52 degrees C / 125 degrees F |
| FPC 2 TL0         | OK     | 53 degrees C / 127 degrees F |
| FPC 2 TQ0         | OK     | 53 degrees C / 127 degrees F |
| FPC 2 TL1         | OK     | 57 degrees C / 134 degrees F |
| FPC 2 TQ1         | OK     | 58 degrees C / 136 degrees F |
| FPC 2 TL2         | OK     | 54 degrees C / 129 degrees F |
| FPC 2 TQ2         | OK     | 59 degrees C / 138 degrees F |
| FPC 2 TL3         | OK     | 60 degrees C / 140 degrees F |
| FPC 2 TQ3         | OK     | 64 degrees C / 147 degrees F |
| PIC 2/0 Ambient   | OK     | 49 degrees C / 120 degrees F |
| FPC 3 PMB         | OK     | 34 degrees C / 93 degrees F  |
| FPC 3 Intake      | OK     | 35 degrees C / 95 degrees F  |
| FPC 3 Exhaust A   | OK     | 54 degrees C / 129 degrees F |
| FPC 3 Exhaust B   | OK     | 49 degrees C / 120 degrees F |
| FPC 3 TL0         | OK     | 49 degrees C / 120 degrees F |
| FPC 3 TQ0         | OK     | 55 degrees C / 131 degrees F |
| FPC 3 TL1         | OK     | 56 degrees C / 132 degrees F |
| FPC 3 TQ1         | OK     | 58 degrees C / 136 degrees F |
| FPC 3 TL2         | OK     | 56 degrees C / 132 degrees F |
| FPC 3 TQ2         | OK     | 59 degrees C / 138 degrees F |
| FPC 3 TL3         | OK     | 62 degrees C / 143 degrees F |
| FPC 3 TQ3         | OK     | 63 degrees C / 145 degrees F |
| PIC 3/1           | Absent |                              |
| FPC 5 PMB         | OK     | 35 degrees C / 95 degrees F  |
| FPC 5 Intake      | OK     | 34 degrees C / 93 degrees F  |
| FPC 5 Exhaust A   | OK     | 51 degrees C / 123 degrees F |
| FPC 5 Exhaust B   | OK     | 53 degrees C / 127 degrees F |
| FPC 5 TL0         | OK     | 54 degrees C / 129 degrees F |
| FPC 5 TQ0         | OK     | 52 degrees C / 125 degrees F |
| FPC 5 TL1         | OK     | 61 degrees C / 141 degrees F |
| FPC 5 TQ1         | OK     | 60 degrees C / 140 degrees F |
| FPC 5 TL2         | OK     | 55 degrees C / 131 degrees F |
| FPC 5 TQ2         | OK     | 55 degrees C / 131 degrees F |
| FPC 5 TL3         | OK     | 59 degrees C / 138 degrees F |
| FPC 5 TQ3         | OK     | 58 degrees C / 136 degrees F |
| PIC 5/0 Ambient   | OK     | 51 degrees C / 123 degrees F |
| PIC 5/1 Ambient   | OK     | 34 degrees C / 93 degrees F  |
| PIC 5/1 cfp-5/1/0 | OK     | 34 degrees C / 93 degrees F  |
| PIC 5/1 cfp-5/1/1 | OK     | 36 degrees C / 96 degrees F  |
| FPC 6 PMB         | OK     | 36 degrees C / 96 degrees F  |
| FPC 6 Intake      | OK     | 33 degrees C / 91 degrees F  |
| FPC 6 Exhaust A   | OK     | 51 degrees C / 123 degrees F |
| FPC 6 Exhaust B   | OK     | 39 degrees C / 102 degrees F |
| FPC 6 TL0         | OK     | 44 degrees C / 111 degrees F |
| FPC 6 TQ0         | OK     | 54 degrees C / 129 degrees F |
| FPC 6 TL1         | OK     | 59 degrees C / 138 degrees F |
| FPC 6 TQ1         | OK     | 58 degrees C / 136 degrees F |
| FPC 6 TL2         | OK     | 60 degrees C / 140 degrees F |
| FPC 6 TQ2         | OK     | 57 degrees C / 134 degrees F |
| FPC 6 TL3         | OK     | 65 degrees C / 149 degrees F |
| FPC 6 TQ3         | OK     | 60 degrees C / 140 degrees F |
| FPC 7 PMB         | OK     | 35 degrees C / 95 degrees F  |

|      |                   |    |                              |
|------|-------------------|----|------------------------------|
|      | FPC 7 Intake      | OK | 33 degrees C / 91 degrees F  |
|      | FPC 7 Exhaust A   | OK | 53 degrees C / 127 degrees F |
|      | FPC 7 Exhaust B   | OK | 40 degrees C / 104 degrees F |
|      | FPC 7 TL0         | OK | 46 degrees C / 114 degrees F |
|      | FPC 7 TQ0         | OK | 58 degrees C / 136 degrees F |
|      | FPC 7 TL1         | OK | 53 degrees C / 127 degrees F |
|      | FPC 7 TQ1         | OK | 59 degrees C / 138 degrees F |
|      | FPC 7 TL2         | OK | 56 degrees C / 132 degrees F |
|      | FPC 7 TQ2         | OK | 61 degrees C / 141 degrees F |
|      | FPC 7 TL3         | OK | 63 degrees C / 145 degrees F |
|      | FPC 7 TQ3         | OK | 63 degrees C / 145 degrees F |
|      | FPM I2CS          | OK | 37 degrees C / 98 degrees F  |
| Fans | Fan Tray 0 Fan 1  | OK | 3042 RPM                     |
|      | Fan Tray 0 Fan 2  | OK | 3042 RPM                     |
|      | Fan Tray 0 Fan 3  | OK | 3000 RPM                     |
|      | Fan Tray 0 Fan 4  | OK | 3042 RPM                     |
|      | Fan Tray 0 Fan 5  | OK | 3000 RPM                     |
|      | Fan Tray 0 Fan 6  | OK | 3042 RPM                     |
|      | Fan Tray 0 Fan 7  | OK | 3085 RPM                     |
|      | Fan Tray 0 Fan 8  | OK | 3042 RPM                     |
|      | Fan Tray 0 Fan 9  | OK | 3042 RPM                     |
|      | Fan Tray 0 Fan 10 | OK | 3085 RPM                     |
|      | Fan Tray 0 Fan 11 | OK | 3085 RPM                     |
|      | Fan Tray 0 Fan 12 | OK | 3128 RPM                     |
|      | Fan Tray 0 Fan 13 | OK | 3128 RPM                     |
|      | Fan Tray 0 Fan 14 | OK | 3042 RPM                     |
|      | Fan Tray 1 Fan 1  | OK | 2299 RPM                     |
|      | Fan Tray 1 Fan 2  | OK | 2399 RPM                     |
|      | Fan Tray 1 Fan 3  | OK | 2299 RPM                     |
|      | Fan Tray 1 Fan 4  | OK | 2266 RPM                     |
|      | Fan Tray 1 Fan 5  | OK | 2266 RPM                     |
|      | Fan Tray 1 Fan 6  | OK | 2366 RPM                     |
| Misc | Fan Tray 2 Fan 1  | OK | 2199 RPM                     |
|      | Fan Tray 2 Fan 2  | OK | 2133 RPM                     |
|      | Fan Tray 2 Fan 3  | OK | 2366 RPM                     |
|      | Fan Tray 2 Fan 4  | OK | 2233 RPM                     |
|      | Fan Tray 2 Fan 5  | OK | 2399 RPM                     |
|      | Fan Tray 2 Fan 6  | OK | 2233 RPM                     |
|      | SPMB 0 Intake     | OK | 50 degrees C / 122 degrees F |
|      | SPMB 1 Intake     | OK | 40 degrees C / 104 degrees F |

#### show chassis environment (ACX2000 Universal Access Router)

```
user@host> show chassis environment
```

| Class | Item           | Status | Measurement                  |
|-------|----------------|--------|------------------------------|
|       | PCB Left       | OK     | 44 degrees C / 111 degrees F |
|       | SFP+ Xcvr      | OK     | 50 degrees C / 122 degrees F |
|       | FEB            | OK     | 70 degrees C / 158 degrees F |
|       | PCB Up         | OK     | 63 degrees C / 145 degrees F |
|       | PCB Mid        | OK     | 66 degrees C / 150 degrees F |
|       | Telecom Mod    | OK     | 65 degrees C / 149 degrees F |
|       | Routing Engine | OK     | 54 degrees C / 129 degrees F |
|       | Heater off     |        |                              |

#### show chassis environment (ACX4000 Universal Access Router)

On the ACX4000 router, the MIC output of the **show chassis environment** command varies depending on the number of temperature channels present in the installed MIC.

```
user@host> show chassis environment
```



| Class | Item              | Status | Measurement                  |
|-------|-------------------|--------|------------------------------|
| Temp  | PEM 0             | OK     | 33 degrees C / 91 degrees F  |
|       | PEM 1             | Absent |                              |
|       | PCB Bottom        | OK     | 30 degrees C / 86 degrees F  |
|       | PCB Middle        | OK     | 34 degrees C / 93 degrees F  |
|       | BCM56445          | OK     | 33 degrees C / 91 degrees F  |
|       | SFP+ Xcvr         | OK     | 32 degrees C / 89 degrees F  |
|       | Fan tray inlet    | OK     | 39 degrees C / 102 degrees F |
|       | Exhaust           | OK     | 30 degrees C / 86 degrees F  |
|       | Routing Engine    | OK     | 32 degrees C / 89 degrees F  |
|       | Heater off        |        |                              |
| Pic   | PIC 0/0 Channel 0 | OK     | 28 degrees C / 82 degrees F  |
|       | PIC 0/0 Channel 1 | OK     | 29 degrees C / 84 degrees F  |
|       | PIC 0/0 Channel 2 | OK     | 0 degrees C / 32 degrees F   |
|       | PIC 0/0 Channel 3 | OK     | 0 degrees C / 32 degrees F   |
|       | PIC 0/0 Channel 4 | OK     | 0 degrees C / 32 degrees F   |
|       | PIC 0/0 Channel 5 | OK     | 0 degrees C / 32 degrees F   |
|       | PIC 0/0 Channel 6 | OK     | 0 degrees C / 32 degrees F   |
|       | PIC 0/0 Channel 7 | OK     | 0 degrees C / 32 degrees F   |
|       | PIC 0/0 Channel 8 | OK     | 0 degrees C / 32 degrees F   |
|       | PIC 0/0 Channel 9 | OK     | 0 degrees C / 32 degrees F   |
|       | PIC 1/0 Channel 0 | OK     | 33 degrees C / 91 degrees F  |
|       | PIC 1/0 Channel 1 | OK     | 31 degrees C / 87 degrees F  |
|       | PIC 1/0 Channel 2 | OK     | 30 degrees C / 86 degrees F  |
|       | PIC 1/0 Channel 3 | OK     | 0 degrees C / 32 degrees F   |
|       | PIC 1/0 Channel 4 | OK     | 0 degrees C / 32 degrees F   |
|       | PIC 1/0 Channel 5 | OK     | 0 degrees C / 32 degrees F   |
|       | PIC 1/0 Channel 6 | OK     | 0 degrees C / 32 degrees F   |
|       | PIC 1/0 Channel 7 | OK     | 0 degrees C / 32 degrees F   |
|       | PIC 1/0 Channel 8 | OK     | 0 degrees C / 32 degrees F   |
|       | PIC 1/1 Channel 0 | OK     | 31 degrees C / 87 degrees F  |
|       | PIC 1/1 Channel 1 | OK     | 29 degrees C / 84 degrees F  |
|       | PIC 1/1 Channel 2 | OK     | 28 degrees C / 82 degrees F  |
|       | PIC 1/1 Channel 3 | OK     | 0 degrees C / 32 degrees F   |
|       | PIC 1/1 Channel 4 | OK     | 0 degrees C / 32 degrees F   |
|       | PIC 1/1 Channel 5 | OK     | 0 degrees C / 32 degrees F   |
|       | PIC 1/1 Channel 6 | OK     | 0 degrees C / 32 degrees F   |
|       | PIC 1/1 Channel 7 | OK     | 0 degrees C / 32 degrees F   |
|       | PIC 1/1 Channel 8 | OK     | 0 degrees C / 32 degrees F   |
| Fans  | Fan 1             | OK     | Spinning at normal speed     |
|       | Fan 2             | OK     | Spinning at normal speed     |

## show chassis feb

|                                 |                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show chassis feb                                                                                                                                                                                                                                                                                                                                                               |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.                                                                                                                                                                                                                                    |
| <b>Description</b>              | (ACX Series routers, and M5, M10, and M120 routers only) Display Forwarding Engine Board (FEB) status information.                                                                                                                                                                                                                                                             |
| <b>Options</b>                  | This command has no options.                                                                                                                                                                                                                                                                                                                                                   |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">request chassis feb on page 288</a></li> <li>• <i>show chassis fabric feb</i></li> <li>• <i>show chassis fpc-feb-connectivity</i></li> <li>• <i>feb</i></li> <li>• <i>Switching Control Board Redundancy</i></li> </ul>                                                                                                   |
| <b>List of Sample Output</b>    | <a href="#">show chassis feb (M10 Router) on page 395</a><br><a href="#">show chassis feb (M120 Router) on page 395</a><br><a href="#">show chassis feb detail (M120 Router) on page 396</a><br><a href="#">show chassis feb detail (ACX2000 Universal Access Router) on page 397</a><br><a href="#">show chassis feb detail (ACX1000 Universal Access Router) on page 397</a> |
| <b>Output Fields</b>            | <a href="#">Table 34 on page 394</a> lists the output fields for the <b>show chassis feb</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                  |

Table 34: show chassis feb

| Field Name                            | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>State</b>                          | State of the FEB: <ul style="list-style-type: none"> <li>• <b>Offline</b>—FEB is powered down.</li> <li>• <b>Online</b>—FEB is operational and running.</li> <li>• <b>Check</b>—FEB is in alarmed state where the Switch Interface Board (SIB) plane is partially operational for the following reasons:               <ul style="list-style-type: none"> <li>• FEB is not inserted properly.</li> <li>• Two or more links between the FEB and Packet Forwarding Engine fail.</li> </ul> </li> </ul> |
| <b>Temp (C) or Intake temperature</b> | Temperature of the air passing by the FEB, in degrees Celsius or in both degrees Celsius and degrees Fahrenheit.                                                                                                                                                                                                                                                                                                                                                                                     |

Table 34: show chassis feb (continued)

| Field Name                      | Field Description                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CPU Utilization (%)             | Percentage of CPU being used: <ul style="list-style-type: none"> <li><b>Total</b>—Total percentage of CPU being used by the FEB processor.</li> <li><b>Interrupt</b>—Of the total CPU being used by the FEB processor, the percentage being used for interrupts.</li> </ul>                                                                                                             |
| Memory DRAM (MB)                | Total DRAM, in megabytes, available to the FEB processor.                                                                                                                                                                                                                                                                                                                               |
| Utilization (%)                 | Percentage of memory utilization: <ul style="list-style-type: none"> <li><b>Heap</b>—Percentage of heap space (dynamic memory) being used by the FEB processor. If this number exceeds 80 percent, you might experience a software problem (memory leak).</li> <li><b>Buffer</b>—Percentage of buffer space being used by the FPC processor for buffering internal messages.</li> </ul> |
| Exhaust A temperature           | Temperature of the air flowing past Exhaust A.                                                                                                                                                                                                                                                                                                                                          |
| Exhaust B temperature           | Temperature of the air flowing past Exhaust B.                                                                                                                                                                                                                                                                                                                                          |
| Total DDR DRAM                  | Amount of double data rate dynamic random access memory (DDR DRAM) available to the FEB CPU.                                                                                                                                                                                                                                                                                            |
| Total RLD RAM                   | Amount of reduced latency dynamic random access memory (RLDRAM) available to the FEB CPU.                                                                                                                                                                                                                                                                                               |
| Start time (Detail output only) | Time when the Routing Engine detected that the FEB was running.                                                                                                                                                                                                                                                                                                                         |
| Uptime (Detail output only)     | How long the Routing Engine has been connected to the FEB, and therefore, how long the Flexible PIC Concentrator (PIC) has been up and running.                                                                                                                                                                                                                                         |

## Sample Output

### show chassis feb (M10 Router)

```

user@host> show chassis feb
FEB status:
  Temperature                27 degrees C / 80 degrees F
  CPU utilization              3 percent
  Interrupt utilization        0 percent
  Heap utilization             26 percent
  Buffer utilization            50 percent
  Total CPU DRAM               64 MB
  Internet Processor II        Version 1, Foundry IBM, Part number 9
  Start time:                  2010-05-23 13:59:51 PDT
  Uptime:                      6 hours, 33 minutes, 11 seconds

```

### show chassis feb (M120 Router)

```

user@host> show chassis feb

```

| Slot | State  | Temp (C) | CPU Utilization (%) |           | Memory DRAM (MB) | Utilization (%) |        |
|------|--------|----------|---------------------|-----------|------------------|-----------------|--------|
|      |        |          | Total               | Interrupt |                  | Heap            | Buffer |
| 0    | Online | 47       | 4                   | 0         | 512              | 7               | 60     |
| 1    | Online | 54       | 3                   | 0         | 512              | 7               | 59     |
| 2    | Online | 50       | 4                   | 0         | 512              | 7               | 59     |
| 3    | Online | 49       | 4                   | 0         | 512              | 7               | 59     |

|   |        |    |   |   |     |   |    |
|---|--------|----|---|---|-----|---|----|
| 4 | Online | 46 | 3 | 0 | 512 | 7 | 59 |
| 5 | Online | 35 | 3 | 0 | 512 | 7 | 59 |

### show chassis feb detail (M120 Router)

```

user@host> show chassis feb detail
Slot 0 information:
  State                               Online
  Intake temperature                  48 degrees C / 118 degrees F
  Exhaust A temperature               51 degrees C / 123 degrees F
  Exhaust B temperature               52 degrees C / 125 degrees F
  Total DDR DRAM                      512 MB
  Total RLDRAM                        32 MB
  Start time:                        2006-06-28 15:00:40 PDT
  Uptime:                            10 minutes, 21 seconds
Slot 1 information:
  State                               Online
  Intake temperature                  55 degrees C / 131 degrees F
  Exhaust A temperature               46 degrees C / 114 degrees F
  Exhaust B temperature               45 degrees C / 113 degrees F
  Total DDR DRAM                      512 MB
  Total RLDRAM                        32 MB
  Start time:                        2006-06-28 15:00:33 PDT
  Uptime:                            10 minutes, 28 seconds
Slot 2 information:
  State                               Online
  Intake temperature                  50 degrees C / 122 degrees F
  Exhaust A temperature               47 degrees C / 116 degrees F
  Exhaust B temperature               47 degrees C / 116 degrees F
  Total DDR DRAM                      512 MB
  Total RLDRAM                        32 MB
  Start time:                        2006-06-28 15:00:35 PDT
  Uptime:                            10 minutes, 26 seconds
Slot 3 information:
  State                               Online
  Intake temperature                  49 degrees C / 120 degrees F
  Exhaust A temperature               47 degrees C / 116 degrees F
  Exhaust B temperature               49 degrees C / 120 degrees F
  Total DDR DRAM                      512 MB
  Total RLDRAM                        32 MB
  Start time:                        2006-06-28 15:00:43 PDT
  Uptime:                            10 minutes, 18 seconds
Slot 4 information:
  State                               Online
  Intake temperature                  45 degrees C / 113 degrees F
  Exhaust A temperature               42 degrees C / 107 degrees F
  Exhaust B temperature               42 degrees C / 107 degrees F
  Total DDR DRAM                      512 MB
  Total RLDRAM                        32 MB
  Start time:                        2006-06-28 15:00:29 PDT
  Uptime:                            10 minutes, 32 seconds
Slot 5 information:
  State                               Online
  Intake temperature                  35 degrees C / 95 degrees F
  Exhaust A temperature               33 degrees C / 91 degrees F
  Exhaust B temperature               40 degrees C / 104 degrees F
  Total DDR DRAM                      512 MB
  Total RLDRAM                        32 MB
  Start time:                        2006-06-28 15:00:27 PDT
  Uptime:                            10 minutes, 34 seconds

```

**show chassis feb detail (ACX2000 Universal Access Router)**

```
user@host> show chassis feb
FEB status:
Slot 0 information:
  State                               Online
  Temperature                         72 degrees C / 161 degrees F
  CPU utilization                     17 percent
  Interrupt utilization                7 percent
  Heap utilization                    20 percent
  Buffer utilization                   37 percent
  Total CPU DRAM                     512 MB
  Start time:                        2012-05-09 00:58:51 PDT
  Uptime:                            5 days, 21 hours, 6 minutes, 34 seconds
```

**show chassis feb detail (ACX1000 Universal Access Router)**

```
user@host> show chassis feb
FEB status:
Slot 0 information:
  State                               Online
  Temperature                         46 degrees C / 114 degrees F
  CPU utilization                     15 percent
  Interrupt utilization                5 percent
  Heap utilization                    45 percent
  Buffer utilization                   37 percent
  Total CPU DRAM                     256 MB
  Start time:                        2012-06-05 19:51:53 PDT
  Uptime:                            19 minutes, 6 seconds
```

## show chassis firmware

---

|                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                               | show chassis firmware                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Syntax (TX Matrix Routers)</b>                           | show chassis firmware<br><lcc <i>number</i>   scc>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Syntax (TX Matrix Plus Routers)</b>                      | show chassis firmware<br><lcc <i>number</i>   sfc <i>number</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Syntax (MX Series Routers)</b>                           | show chassis firmware<br><all-members><br><local><br><member <i>member-id</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Syntax (MX2010 and MX2020 3D Universal Edge Routers)</b> | show chassis firmware                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Syntax (QFX Series)</b>                                  | show chassis firmware<br>interconnect-device <i>name</i><br>node-device <i>name</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Syntax (ACX Series Universal Access Routers)</b>         | show chassis firmware                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Syntax (EX Series Switches)</b>                          | show chassis firmware<br><detail>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>                                  | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.4 for EX Series switches.</p> <p><b>sfc</b> option introduced for the TX Matrix Plus router in Junos OS Release 9.6.</p> <p>Command introduced for EX8200 switches in Junos OS Release 10.2 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.1 for QFX Series.</p> <p>Command introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.</p> <p>Command introduced in Junos OS Release 12.3 for MX2010 3D Universal Edge Routers.</p> <p>Command introduced in Junos OS Release 12.3 for MX2020 3D Universal Edge Routers.</p> <p>Command introduced in Junos OS Release 12.3 for ACX4000 Universal Access Routers.</p>                      |
| <b>Description</b>                                          | <p>On routers and switches, display the version levels of the firmware running on the System Control Board (SCB), Switching and Forwarding Module (SFM), System and Switch Board (SSB), Forwarding Engine Board (FEB), Flexible PIC Concentrators (FPCs), and Routing Engines. On a TX Matrix Plus router, display the version levels of the firmware running on the FPCs and the Switch Processor Mezzanine Board (SPMBs).</p> <p>On EX2200, EX3200, and EX4200 switches, and the QFX Series, display the version levels of the firmware running on the switch. On an EX8208 switch, display the version levels of the firmware running on the Switch Fabric and Routing Engine (SRE) modules and on the line cards (shown as FPCs). On an EX8216 switch, display the version levels</p> |

of the firmware running on the Routing Engine (RE) modules and on the line cards (shown as FPCs).

**Options** **none**—Display the version levels of the firmware running. For an EX4200 switch that is a member of a Virtual Chassis, display version levels for all members. For a TX Matrix router, display version levels for the firmware on the TX Matrix router and on all the T640 routers connected to the TX Matrix router. For a TX Matrix Plus router, display version levels for the firmware on the TX Matrix Plus router and on all the routers connected to the TX Matrix Plus router.

**all-members**—(MX Series routers only) (Optional) Display the version levels of the firmware running for all members of the Virtual Chassis configuration.

**interconnect-device *name***—(QFabric systems) (Optional) Display the version levels of the firmware running on the Interconnect device.

**lcc *number***—(TX Matrix and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display version levels for the firmware on a specified T640 router (line-card chassis) that is connected to the TX Matrix router. On a TX Matrix Plus router, display the version levels for the firmware on a specified router (line-card chassis) that is connected to the TX Matrix Plus router.

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

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**local**—(MX Series routers only) (Optional) Display the version levels of the firmware running for the local Virtual Chassis member.

**member *member-id***—(MX Series routers only) (Optional) Display the version levels of the firmware running for the specified member of the Virtual Chassis configuration. Replace *member-id* with a value of 0 or 1.

**node-device**—(QFabric systems only) (Optional) Display the version levels of the firmware running on the Node device.

**scc**—(TX Matrix router only) (Optional) Display version levels for the firmware on the TX Matrix router (switch-card chassis).

**sfc *number***—(TX Matrix Plus router only) (Optional) Display version levels for the firmware on the TX Matrix Plus router (or switch-fabric chassis). Replace *number* with 0.

**detail**—(EX3200, EX3300, EX4200, and EX4500 standalone and Virtual Chassis member switches only) (Optional) Display version levels of the firmware running on the switch for its programmable hardware components.

**Required Privilege Level** view

**Related Documentation**

- *Upgrading the HSM Firmware*

**List of Sample Output**

[show chassis firmware \(M10 Router\) on page 401](#)  
[show chassis firmware \(M20 Router\) on page 401](#)  
[show chassis firmware \(M40 Router\) on page 401](#)  
[show chassis firmware \(M120 Router\) on page 402](#)  
[show chassis firmware \(M160 Router\) on page 402](#)  
[show chassis firmware \(MX240 Router\) on page 402](#)  
[show chassis firmware \(MX480 Router\) on page 402](#)  
[show chassis firmware \(MX960 Router\) on page 402](#)  
[show chassis firmware \(MX2010 Router\) on page 402](#)  
[show chassis firmware \(MX2020 Router\) on page 403](#)  
[show chassis firmware \(MX240, MX480, MX960 Router with Application Services Modular Line Card\) on page 404](#)  
[show chassis firmware \(EX4200 Switch\) on page 404](#)  
[show chassis firmware \(EX8200 Switch\) on page 404](#)  
[show chassis firmware lcc \(TX Matrix Router\) on page 404](#)  
[show chassis firmware scc \(TX Matrix Router\) on page 405](#)  
[show chassis firmware \(TX Matrix Plus Router\) on page 405](#)  
[show chassis firmware lcc \(TX Matrix Plus Router\) on page 406](#)  
[show chassis firmware sfc \(TX Matrix Plus Router\) on page 407](#)  
[show chassis firmware \(QFX Series\) on page 407](#)  
[show chassis firmware interconnect-device \(QFabric System\) on page 407](#)  
[show chassis firmware \(ACX2000 Universal Access Router\) on page 407](#)  
[show chassis firmware detail \(EX3300 Switch\) on page 407](#)  
[show chassis firmware \(MX Routers with Media Services Blade \[MSB\]\) on page 408](#)

**Output Fields** [Table 35 on page 400](#) lists the output fields for the **show chassis firmware** command. Output fields are listed in the approximate order in which they appear.

**Table 35: show chassis firmware Output Fields**

| Field Name     | Field Description                                                                                                                             |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Part</b>    | (MX Series, MX2010, and MX2020 routers) Chassis part name.                                                                                    |
| <b>Type</b>    | (MX Series, MX2010, and MX2020 routers) Type of firmware: On routers: <b>ROM</b> or <b>O/S</b> . On switches: <b>uboot</b> or <b>loader</b> . |
| <b>Version</b> | (MX Series, MX2010, and MX2020 routers) Version of firmware running on the chassis part.                                                      |



Table 35: show chassis firmware Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                          |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>FPC</b>                | ( <i>detail</i> option only) Number of FPC.<br>For a standalone switch, the value is 0.<br>For a Virtual Chassis configuration, value in the range of 0-9; refers to the member ID assigned to the switch. |
| <b>Boot</b>               | ( <i>detail</i> option only) Version of the SYSPLD.                                                                                                                                                        |
| <b>PoE</b>                | ( <i>detail</i> option only) Version of the PoE firmware.                                                                                                                                                  |
| <b>PFE-&lt;number&gt;</b> | ( <i>detail</i> option only) Version of the PFE used in the switch.                                                                                                                                        |
| <b>PHY-</b>               | ( <i>detail</i> option only) Version of the physical layer device (PHY) used in the switch.                                                                                                                |
| <b>microcode</b>          | ( <i>detail</i> option only) Microcode of the physical layer devices (PHY) used in the switch.                                                                                                             |
| <b>uboot</b>              | ( <i>detail</i> option only) Version of the u-boot used in the switch.                                                                                                                                     |
| <b>loader</b>             | ( <i>detail</i> option only) Version of the loader used in the switch.                                                                                                                                     |

## Sample Output

### show chassis firmware (M10 Router)

```

user@host> show chassis firmware
Part      Type      Version
Forwarding engine board  ROM      Juniper ROM Monitor Version 4.1b2
                                O/S      Version 4.1I1 by tlim on 2000-04-24 11:27

```

### show chassis firmware (M20 Router)

```

user@host> show chassis firmware
Part      Type      Version
System switch board      ROM      Juniper ROM Monitor Version 3.4b26
                                O/S      Version 3.4I16 by smackie on 2000-02-29 2
FPC 1      ROM      Juniper ROM Monitor Version 3.0b1
                                O/S      Version 3.4I4 by smackie on 2000-02-25 21
FPC 2      ROM      Juniper ROM Monitor Version 3.0b1
                                O/S      Version 3.4I4 by smackie on 2000-02-25 21

```

### show chassis firmware (M40 Router)

```

user@host> show chassis firmware
Part      Type      Version
System control board      ROM      Juniper ROM Monitor Version 2.0i126Copyri
                                O/S      Version 2.0i1 by root on Thu Jul 23 00:51
FPC 5      ROM      Juniper ROM Monitor Version 2.0i49Copyrig
                                O/S      Version 2.0i1 by root on Thu Jul 23 00:59

```

### show chassis firmware (M120 Router)

```
user@host> show chassis firmware
FPC 2          ROM      Juniper ROM Monitor Version 8.0b29
                O/S      Version 8.2B1 by builder on 2006-10-18 16:2
FPC 3          ROM      Juniper ROM Monitor Version 8.0b29
                O/S      Version 8.2B1 by builder on 2006-10-18 16:2
FPC 4          ROM      Juniper ROM Monitor Version 8.0b29
                O/S      Version 8.2B1 by builder on 2006-10-18 16:2
FEB 3          ROM      Juniper ROM Monitor Version 8.0b29
                O/S      Version 8.2B1 by builder on 2006-10-18 16:1
FEB 4          ROM      Juniper ROM Monitor Version 8.0b29
                O/S      Version 8.2B1 by builder on 2006-10-18 16:1
```

### show chassis firmware (M160 Router)

```
user@host> show chassis firmware
Part          Type      Version
SFM 0         ROM      Juniper ROM Monitor Version 4.0b2
                O/S      Version 4.0I1 by tlim on 2000-02-29 11:50
SFM 1         ROM      Juniper ROM Monitor Version 4.0b2
                O/S      Version 4.0I1 by tlim on 2000-02-29 11:50
FPC 0         ROM      Juniper ROM Monitor Version 4.0b2
                O/S      Version 4.0I1 by tlim on 2000-02-29 11:56
FPC 1         ROM      Juniper ROM Monitor Version 4.0b2
                O/S      Version 4.0I1 by tlim on 2000-02-29 11:56
FPC 2         ROM      Juniper ROM Monitor Version 4.0b3
                O/S      Version 4.0I1 by tlim on 2000-02-29 11:56
```

### show chassis firmware (MX240 Router)

```
user@host> show chassis firmware
Part          Type      Version
FPC 1         ROM      Juniper ROM Monitor Version 8.3b1
                O/S      Version 9.0-20080103.0 by builder on 2008-0
FPC 2         ROM      Juniper ROM Monitor Version 8.3b1
                O/S      Version 9.0-20080103.0 by builder on 2008-0
```

### show chassis firmware (MX480 Router)

```
user@host> show chassis firmware
Part          Type      Version
FPC 1         ROM      Juniper ROM Monitor Version 8.3b1
                O/S      Version 9.0-20070916.3 by builder on 2007-0
```

### show chassis firmware (MX960 Router)

```
user@host> show chassis firmware
Part          Type      Version
FPC 4         ROM      Juniper ROM Monitor Version 8.0b8
                O/S      Version 8.2I59 by artem on 2006-10-31 19:22
FPC 7         ROM      Juniper ROM Monitor Version 8.2b1
                O/S      Version 8.2-20061026.1 by builder on 2006-1
```

### show chassis firmware (MX2010 Router)

```
user@host> show chassis firmware
Part          Type      Version
FPC 0         ROM      Juniper ROM Monitor Version 12.3b1
                O/S      Version 12.3-20121220.0 by builder on 2012-
FPC 1         ROM      Juniper ROM Monitor Version 10.1b3
```

|        |     |                                             |
|--------|-----|---------------------------------------------|
|        | O/S | Version 12.3-20121220.0 by builder on 2012- |
| FPC 2  | ROM | Juniper ROM Monitor Version 10.1b3          |
|        | O/S | Version 12.3-20121220.0 by builder on 2012- |
| FPC 3  | ROM | Juniper ROM Monitor Version 10.1b3          |
|        | O/S | Version 12.3-20121220.0 by builder on 2012- |
| FPC 4  | ROM | Juniper ROM Monitor Version 10.0b39         |
|        | O/S | Version 12.3-20121220.0 by builder on 2012- |
| FPC 5  | ROM | Juniper ROM Monitor Version 10.0b39         |
|        | O/S | Version 12.3-20121220.0 by builder on 2012- |
| FPC 6  | ROM | Juniper ROM Monitor Version 10.4b1          |
|        | O/S | Version 12.3-20121220.0 by builder on 2012- |
| FPC 7  | ROM | Juniper ROM Monitor Version 10.1b3          |
|        | O/S | Version 12.3-20121220.0 by builder on 2012- |
| FPC 8  | ROM | Juniper ROM Monitor Version 10.4b1          |
|        | O/S | Version 12.3-20121220.0 by builder on 2012- |
| FPC 9  | ROM | Juniper ROM Monitor Version 10.4b1          |
|        | O/S | Version 12.3-20121220.0 by builder on 2012- |
| SPMB 0 | ROM | Juniper ROM Monitor Version 12.1b1          |
|        | O/S | Version 12.3-20121220.0 by builder on 2012- |
| SPMB 1 | ROM | Juniper ROM Monitor Version 12.1b1          |
|        | O/S | Version 12.3-20121220.0 by builder on 2012- |

#### show chassis firmware (MX2020 Router)

```
user@host> show chassis firmware
```

| Part   | Type | Version                                     |
|--------|------|---------------------------------------------|
| FPC 0  | ROM  | Juniper ROM Monitor Version 10.0b39         |
|        | O/S  | Version 12.3-20130415.0 by builder on 2013- |
| FPC 1  | ROM  | Juniper ROM Monitor Version 10.0b39         |
|        | O/S  | Version 12.3-20130415.0 by builder on 2013- |
| FPC 2  | ROM  | Juniper ROM Monitor Version 10.0b39         |
|        | O/S  | Version 12.3-20130415.0 by builder on 2013- |
| FPC 3  | ROM  | Juniper ROM Monitor Version 10.0b39         |
|        | O/S  | Version 12.3-20130415.0 by builder on 2013- |
| FPC 4  | ROM  | Juniper ROM Monitor Version 10.0b39         |
|        | O/S  | Version 12.3-20130415.0 by builder on 2013- |
| FPC 5  | ROM  | Juniper ROM Monitor Version 10.0b39         |
|        | O/S  | Version 12.3-20130415.0 by builder on 2013- |
| FPC 6  | ROM  | Juniper ROM Monitor Version 10.0b39         |
|        | O/S  | Version 12.3-20130415.0 by builder on 2013- |
| FPC 7  | ROM  | Juniper ROM Monitor Version 10.0b39         |
|        | O/S  | Version 12.3-20130415.0 by builder on 2013- |
| FPC 8  | ROM  | Juniper ROM Monitor Version 10.0b39         |
|        | O/S  | Version 12.3-20130415.0 by builder on 2013- |
| FPC 9  | ROM  | Juniper ROM Monitor Version 10.0b39         |
|        | O/S  | Version 12.3-20130415.0 by builder on 2013- |
| FPC 10 | ROM  | Juniper ROM Monitor Version 10.0b39         |
|        | O/S  | Version 12.3-20130415.0 by builder on 2013- |
| FPC 11 | ROM  | Juniper ROM Monitor Version 10.0b39         |
|        | O/S  | Version 12.3-20130415.0 by builder on 2013- |
| FPC 12 | ROM  | Juniper ROM Monitor Version 10.0b39         |
|        | O/S  | Version 12.3-20130415.0 by builder on 2013- |
| FPC 13 | ROM  | Juniper ROM Monitor Version 10.0b39         |
|        | O/S  | Version 12.3-20130415.0 by builder on 2013- |
| FPC 14 | ROM  | Juniper ROM Monitor Version 10.0b39         |
|        | O/S  | Version 12.3-20130415.0 by builder on 2013- |
| FPC 15 | ROM  | Juniper ROM Monitor Version 10.0b39         |
|        | O/S  | Version 12.3-20130415.0 by builder on 2013- |
| FPC 16 | ROM  | Juniper ROM Monitor Version 10.0b39         |
|        | O/S  | Version 12.3-20130415.0 by builder on 2013- |
| FPC 17 | ROM  | Juniper ROM Monitor Version 10.0b39         |

|        |     |                                             |
|--------|-----|---------------------------------------------|
| FPC 18 | O/S | Version 12.3-20130415.0 by builder on 2013- |
|        | ROM | Juniper ROM Monitor Version 10.0b39         |
| FPC 19 | O/S | Version 12.3-20130415.0 by builder on 2013- |
|        | ROM | Juniper ROM Monitor Version 10.0b39         |
| SPMB 0 | O/S | Version 12.3-20130415.0 by builder on 2013- |
|        | ROM | Juniper ROM Monitor Version 12.1b1          |
| SPMB 1 | O/S | Version 12.3-20130415.0 by builder on 2013- |
|        | ROM | Juniper ROM Monitor Version 12.1b1          |
|        | O/S | Version 12.3-20130415.0 by builder on 2013- |

#### show chassis firmware (MX240, MX480, MX960 Router with Application Services Modular Line Card)

```
user@host> show chassis firmware
```

| Part  | Type | Version                                     |
|-------|------|---------------------------------------------|
| FPC 1 | ROM  | Juniper ROM Monitor Version 12.1b1          |
|       | O/S  | Version 12.2I21 by manish on 2012-06-19 17: |

#### show chassis firmware (EX4200 Switch)

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

| Part  | Type   | Version                                     |
|-------|--------|---------------------------------------------|
| FPC 0 | uboot  | U-Boot 1.1.6 (Feb 6 2008 - 11:27:42)        |
|       | loader | FreeBSD/PowerPC U-Boot bootstrap loader 2.1 |
| FPC 1 | uboot  | U-Boot 1.1.6 (Feb 6 2008 - 11:27:42)        |
|       | loader | FreeBSD/PowerPC U-Boot bootstrap loader 2.1 |
| FPC 2 | uboot  | U-Boot 1.1.6 (Feb 6 2008 - 11:27:42)        |
|       | loader | FreeBSD/PowerPC U-Boot bootstrap loader 2.1 |

#### show chassis firmware (EX8200 Switch)

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

| Part             | Type   | Version                                     |
|------------------|--------|---------------------------------------------|
| FPC 0            | U-Boot | U-Boot 1.1.6 (Mar 25 2009 - 06:13:12) 2.4.0 |
|                  | loader | FreeBSD/PowerPC U-Boot bootstrap loader 2.2 |
| FPC 3            | U-Boot | U-Boot 1.1.6 (Dec 4 2009 - 13:17:34) 3.1.0  |
|                  | loader | FreeBSD/PowerPC U-Boot bootstrap loader 2.2 |
| FPC 5            | U-Boot | U-Boot 1.1.6 (Mar 25 2009 - 06:13:12) 2.4.0 |
|                  | loader | FreeBSD/PowerPC U-Boot bootstrap loader 2.2 |
| FPC 7            | U-Boot | U-Boot 1.1.6 (Feb 6 2009 - 05:31:46) 2.4.0  |
|                  | loader | FreeBSD/PowerPC U-Boot bootstrap loader 2.2 |
| Routing Engine 0 | U-Boot | U-Boot 1.1.6 (Mar 25 2009 - 06:13:12) 2.4.0 |
|                  | loader | FreeBSD/PowerPC U-Boot bootstrap loader 2.2 |
| Routing Engine 1 | U-Boot | U-Boot 1.1.6 (Mar 25 2009 - 06:13:12) 2.4.0 |
|                  | loader | FreeBSD/PowerPC U-Boot bootstrap loader 2.2 |

#### show chassis firmware lcc (TX Matrix Router)

```
user@host> show chassis firmware lcc 0
lcc0-re0:
```

| Part  | Type | Version                                     |
|-------|------|---------------------------------------------|
| FPC 1 | ROM  | Juniper ROM Monitor Version 6.4b18          |
|       | O/S  | Version 7.0-20040804.0 by builder on 2004-0 |
| FPC 2 | ROM  | Juniper ROM Monitor Version 6.4b20          |
|       | O/S  | Version 7.0-20040804.0 by builder on 2004-0 |

|        |     |                                             |
|--------|-----|---------------------------------------------|
| SPMB 0 | ROM | Juniper ROM Monitor Version 6.4b18          |
|        | O/S | Version 7.0-20040804.0 by builder on 2004-0 |

### show chassis firmware scc (TX Matrix Router)

```
user@host> show chassis firmware scc
scc-re0:
```

| Part   | Type | Version                                     |
|--------|------|---------------------------------------------|
| SPMB 0 | ROM  | Juniper ROM Monitor Version 6.4b18          |
|        | O/S  | Version 7.0-20040804.0 by builder on 2004-0 |

### show chassis firmware (TX Matrix Plus Router)

```
user@host> show chassis firmware
sfc0-re0:
```

| Part          | Type | Version                                     |
|---------------|------|---------------------------------------------|
| Global FPC 4  |      |                                             |
| Global FPC 6  |      |                                             |
| Global FPC 7  |      |                                             |
| Global FPC 12 |      |                                             |
| Global FPC 14 |      |                                             |
| Global FPC 15 |      |                                             |
| Global FPC 20 |      |                                             |
| Global FPC 21 |      |                                             |
| Global FPC 22 |      |                                             |
| Global FPC 23 |      |                                             |
| Global FPC 24 |      |                                             |
| Global FPC 25 |      |                                             |
| Global FPC 26 |      |                                             |
| Global FPC 28 |      |                                             |
| Global FPC 29 |      |                                             |
| Global FPC 31 |      |                                             |
| SPMB 0        | ROM  | Juniper ROM Monitor Version 9.5b1           |
|               | O/S  | Version 9.6-20090507.0 by builder on 2009-0 |
| SPMB 1        | ROM  | Juniper ROM Monitor Version 9.5b1           |
|               | O/S  | Version 9.6-20090507.0 by builder on 2009-0 |

```
lcc0-re1:
```

| Part   | Type | Version                                     |
|--------|------|---------------------------------------------|
| FPC 4  | ROM  | Juniper ROM Monitor Version 9.0b2           |
|        | O/S  | Version 9.6-20090507.0 by builder on 2009-0 |
| FPC 6  | ROM  | Juniper ROM Monitor Version 9.0b2           |
|        | O/S  | Version 9.6-20090507.0 by builder on 2009-0 |
| FPC 7  | ROM  | Juniper ROM Monitor Version 9.0b2           |
|        | O/S  | Version 9.6-20090507.0 by builder on 2009-0 |
| SPMB 0 | ROM  | Juniper ROM Monitor Version 9.5b1           |
|        | O/S  | Version 9.6-20090507.0 by builder on 2009-0 |
| SPMB 1 | ROM  | Juniper ROM Monitor Version 9.5b1           |
|        | O/S  | Version 9.6-20090507.0 by builder on 2009-0 |

```
lcc1-re1:
```

| Part  | Type | Version                                     |
|-------|------|---------------------------------------------|
| FPC 4 | ROM  | Juniper ROM Monitor Version 9.0b2           |
|       | O/S  | Version 9.6-20090507.0 by builder on 2009-0 |
| FPC 6 | ROM  | Juniper ROM Monitor Version 9.0b2           |
|       | O/S  | Version 9.6-20090507.0 by builder on 2009-0 |
| FPC 7 | ROM  | Juniper ROM Monitor Version 9.0b2           |

```

O/S      Version 9.6-20090507.0 by builder on 2009-0
SPMB 0   ROM      Juniper ROM Monitor Version 9.5b1
O/S      Version 9.6-20090507.0 by builder on 2009-0
SPMB 1   ROM      Juniper ROM Monitor Version 9.5b1
O/S      Version 9.6-20090507.0 by builder on 2009-0

```

#### lcc2-re1:

```

-----
Part      Type      Version
FPC 4     ROM      Juniper ROM Monitor Version 9.0b2
O/S      Version 9.6-20090507.0 by builder on 2009-0
FPC 5     ROM      Juniper ROM Monitor Version 9.0b2
O/S      Version 9.6-20090507.0 by builder on 2009-0
FPC 6     ROM      Juniper ROM Monitor Version 9.0b2
O/S      Version 9.6-20090507.0 by builder on 2009-0
FPC 7     ROM      Juniper ROM Monitor Version 7.5b4
O/S      Version 9.6-20090507.0 by builder on 2009-0
SPMB 0    ROM      Juniper ROM Monitor Version 9.5b1
O/S      Version 9.6-20090507.0 by builder on 2009-0
SPMB 1    ROM      Juniper ROM Monitor Version 9.5b1
O/S      Version 9.6-20090507.0 by builder on 2009-0

```

#### lcc3-re1:

```

-----
Part      Type      Version
FPC 0     ROM      Juniper ROM Monitor Version 9.0b2
O/S      Version 9.6-20090507.0 by builder on 2009-0
FPC 1     ROM      Juniper ROM Monitor Version 9.0b2
O/S      Version 9.6-20090507.0 by builder on 2009-0
FPC 2     ROM      Juniper ROM Monitor Version 9.0b2
O/S      Version 9.6-20090507.0 by builder on 2009-0
FPC 4     ROM      Juniper ROM Monitor Version 7.5b4
O/S      Version 9.6-20090507.0 by builder on 2009-0
FPC 5     ROM      Juniper ROM Monitor Version 9.0b2
O/S      Version 9.6-20090507.0 by builder on 2009-0
FPC 7     ROM      Juniper ROM Monitor Version 9.0b2
O/S      Version 9.6-20090507.0 by builder on 2009-0
SPMB 0    ROM      Juniper ROM Monitor Version 9.5b1
O/S      Version 9.6-20090507.0 by builder on 2009-0
SPMB 1    ROM      Juniper ROM Monitor Version 9.5b1
O/S      Version 9.6-20090507.0 by builder on 2009-0

```

### show chassis firmware lcc (TX Matrix Plus Router)

```
user@host> show chassis firmware lcc 0
```

#### lcc0-re1:

```

-----
Part      Type      Version
FPC 4     ROM      Juniper ROM Monitor Version 9.0b2
O/S      Version 9.6-20090507.0 by builder on 2009-0
FPC 6     ROM      Juniper ROM Monitor Version 9.0b2
O/S      Version 9.6-20090507.0 by builder on 2009-0
FPC 7     ROM      Juniper ROM Monitor Version 9.0b2
O/S      Version 9.6-20090507.0 by builder on 2009-0
SPMB 0    ROM      Juniper ROM Monitor Version 9.5b1
O/S      Version 9.6-20090507.0 by builder on 2009-0
SPMB 1    ROM      Juniper ROM Monitor Version 9.5b1
O/S      Version 9.6-20090507.0 by builder on 2009-0

```

**show chassis firmware sfc (TX Matrix Plus Router)**

```

user@host> show chassis firmware sfc 0
sfc0-re0:
-----
Part                               Type      Version
Global FPC 4
Global FPC 6
Global FPC 7
Global FPC 12
Global FPC 14
Global FPC 15
Global FPC 20
Global FPC 21
Global FPC 22
Global FPC 23
Global FPC 24
Global FPC 25
Global FPC 26
Global FPC 28
Global FPC 29
Global FPC 31
SPMB 0                             ROM        Juniper ROM Monitor Version 9.5b1
                                      O/S        Version 9.6-20090507.0 by builder on 2009-0
SPMB 1                             ROM        Juniper ROM Monitor Version 9.5b1
                                      O/S        Version 9.6-20090507.0 by builder on 2009-0

```

**show chassis firmware (QFX Series)**

```

user@switch> show chassis firmware
Part                               Type      Version
FPC 0
Routing Engine 0                  U-Boot    U-Boot 1.1.6 (Sep 15 2010 - 02:11:11) 1.0.5
                                      loader     FreeBSD/MIPS U-Boot bootstrap loader 0.1

```

**show chassis firmware interconnect-device (QFabric System)**

```

user@switch> show chassis firmware interconnect-device interconnect1
Part                               Type      Version
Routing Engine 0                  U-Boot    U-Boot 1.1.6 (May 10 2011 - 04:52:59) 1.1.1
                                      loader     FreeBSD/MIPS U-Boot bootstrap loader 0.1
Routing Engine 1                  U-Boot    U-Boot 1.1.6 (May 10 2011 - 04:52:59) 1.1.1
                                      loader     FreeBSD/MIPS U-Boot bootstrap loader 0.1

```

**show chassis firmware (ACX2000 Universal Access Router)**

```

user@switch> show chassis firmware
Part                               Type      Version
FPC                               O/S        Version 12.2I13 by jisjoy on 2012-05-29 06:
FEB                               O/S        Version 12.2I13 by jisjoy on 2012-05-29 06:

```

**show chassis firmware detail (EX3300 Switch)**

```

user@switch> show chassis firmware detail
FPC 0
  Boot SYSPLD                     3
  PoE firmware                     4.1.6
  PFE-0                           3
  PFE-1                           3
  PHY
    microcode                      0x514

```

| Boot Firmware |                                       |       |
|---------------|---------------------------------------|-------|
| uboot         | U-Boot 1.1.6 (Aug 21 2011 - 01:45:26) | 1.0.0 |
| loader        | FreeBSD/arm U-Boot loader 1.0         |       |

**show chassis firmware (MX Routers with Media Services Blade [MSB])**

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

| Part  | Type | Version                                     |
|-------|------|---------------------------------------------|
| FPC 1 | ROM  | Juniper ROM Monitor Version 12.1b1          |
|       | O/S  | Version 12.2I21 by manish on 2012-06-19 17: |



## show chassis fpc

|                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                               | show chassis fpc<br><detail <slot>>   <pic-status <slot>>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Syntax (EX Series Switches)</b>                          | show chassis fpc<br><detail <fpc-slot>>   <pic-status <fpc-slot>><br><fpc-slot>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Syntax (T4000 Routers)</b>                               | show chassis fpc<br><detail <fpc-slot>><br><pic-status <fpc-slot>>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Syntax (TX Matrix and TX Matrix Plus Routers)</b>        | show chassis fpc<br><detail <fpc-slot>>   <pic-status <fpc-slot>><br><slot>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Syntax (MX Series Routers and EX Series switches)</b>    | show chassis fpc<br><detail <slot>>   <pic-status <slot>><br><all-members><br><local><br><member <i>member-id</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Syntax (MX2010 and MX2020 3D Universal Edge Routers)</b> | show chassis fpc<br><slot> detail   <detail <slot>>   <pic-status <slot>><br><fpc-slot>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Syntax (QFX Series)</b>                                  | show chassis fpc<br><detail><br><interconnect-device <i>name</i> <fpc-slot fpc-slot>><br><node-device <i>name</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Syntax (PTX Series Packet Transport Routers)</b>         | show chassis fpc<br><detail <fpc-slot>>   <pic-status <fpc-slot>><br><fpc-slot>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Syntax (ACX Series Universal Access Routers)</b>         | show chassis fpc<br><detail <fpc-slot>>   <pic-status <fpc-slot>><br><fpc-slot>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>                                  | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.1 for QFX Series.<br>Command introduced in Junos OS Release 12.1x48 for PTX Series Packet Transport Routers.<br>Command introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.<br>Command introduced in Junos OS Release 12.3 for MX2020 3D Universal Edge Routers.<br>Command introduced in Junos OS Release 12.3 for MX2010 3D Universal Edge Routers.<br>Command introduced in Junos OS Release 13.2 for MX04 3D Universal Edge Routers. |
| <b>Description</b>                                          | Display status information about the installed Flexible PIC Concentrators (FPCs) and PICs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

**Options** **none**—Display status information for all FPCs. On a TX Matrix router, display status information for all FPCs on the attached T640 routers in the routing matrix. On a TX Matrix Plus router, display status information for all FPCs on the attached routers in the routing matrix.



**NOTE:** In EX8200 switches, line cards initialize Packet Forwarding Engine during startup. If an error occurs during hardware initialization, the FPCs with bad hardware parts power down after transferring the debug information to the Routing Engine. The Routing Engine marks the FPC offline, logs the error in system log messages (/var/log/messages), and generates an alarm to inform the user.

See the following sample output:

```
user@host> show chassis fpc
```

| Utilization (%) | Temp | CPU               | Utilization (%) | Memory         |
|-----------------|------|-------------------|-----------------|----------------|
| Slot State      | (C)  | Total             | Interrupt       | DRAM (MB) Heap |
| Buffer          |      |                   |                 |                |
| 0 Empty         |      |                   |                 |                |
| 1 Empty         |      |                   |                 |                |
| 2 Empty         |      |                   |                 |                |
| 3 Empty         |      |                   |                 |                |
| 4 Empty         |      |                   |                 |                |
| 5 Offline       | ---  | Hard FPC error--- |                 |                |
| 6 Empty         |      |                   |                 |                |
| 7 Online        | 26   | 4                 | 0               | 1024 0         |
| 32              |      |                   |                 |                |

The following sample output shows the alarm raised for the failed FPCs.

```
user@host > show chassis alarms
4 alarms currently active
```

| Alarm time              | Class | Description                          |
|-------------------------|-------|--------------------------------------|
| 2011-03-24 00:52:51 UTC | Major | FPC 5 Hard errors                    |
| 2011-03-24 00:52:31 UTC | Major | Fan Tray Failure                     |
| 2011-03-24 00:52:31 UTC | Major | Fan Tray Failure                     |
| 2011-03-24 00:51:26 UTC | Minor | Loss of communication with Backup RE |



**NOTE:** On T4000 routers, when you include the enhanced-mode statement at the [edit chassis network-services] hierarchy level and reboot the system, only the T4000 Type 5 FPCs present on the router become online while the remaining FPCs are offline, and FPC misconfiguration alarms are generated. The show chassis alarm command output displays FPC misconfiguration (FPC *fpc-slot* misconfig) as the reason for the generation the alarms.

The following sample output shows the FPC status after the enhanced-mode statement is configured on the T4000 router. The T4000 Type 5 FPC present in slot 5 becomes online while the remaining FPCs are offline.

```
user@host> show chassis fpc
```

|                 | Temp | CPU Utilization (%)     |           | Memory    |      |
|-----------------|------|-------------------------|-----------|-----------|------|
| Utilization (%) |      |                         |           |           |      |
| Slot State      | (C)  | Total                   | Interrupt | DRAM (MB) | Heap |
| Buffer          |      |                         |           |           |      |
| 0 offline       | ---  | FPC misconfiguration--- |           |           |      |
| 1 offline       | ---  | FPC misconfiguration--- |           |           |      |
| 2 offline       | ---  | FPC misconfiguration--- |           |           |      |
| 3 Empty         |      |                         |           |           |      |
| 4 Empty         |      |                         |           |           |      |
| 5 Online        | 66   | 50                      | 0         | 2816      | 29   |
| 27              |      |                         |           |           |      |

The following sample output shows FPC misconfiguration alarms.

```
user@host > show chassis alarms
3 alarms currently active
Alarm time      Class  Description
2011-03-24 00:52:51 PST Major  FPC 1 misconfig
2011-03-24 00:52:31 PST Major  FPC 2 misconfig
2011-03-24 00:52:31 PST Major  FPC 3 misconfig
```

**detail**—(Optional) Display detailed status information for all FPCs or for the FPC in the specified slot (see *fpc-slot* or *slot*).

**all-members**—(MX Series routers and EX Series switches only) (Optional) Display status information for all FPCs on all members of the Virtual Chassis configuration.

**interconnect-device *name***—(QFabric systems only) (Optional) Display status information for all FPCs on the Interconnect device.

***fpc-slot***—(Optional) FPC slot number:

- (TX Matrix and TX Matrix Plus router only)—On a TX Matrix router, if you specify the number of the T640 router (line-card chassis) by using the **lcc *number*** option (the recommended method), replace *fpc-slot* with a value from 0 through 7. Otherwise, replace *fpc-slot* with a value from 0 through 31. Likewise, on a TX Matrix Plus router, if you specify the number of the specified router (line-card chassis)

by using the **lcc number** option (the recommended method), replace **fpc-slot** with a value from 0 through 7. Otherwise, replace **fpc-slot** with a value from 0 through 31. For example, the following commands have the same result:

```
user@host> show chassis fpc detail 1 lcc 1
user@host> show chassis fpc detail 9
```

- M120 router—Replace **fpc-slot** with a value from 0 through 5.
- MX80 router—Replace **fpc-slot** with a value from 0 through 1.
- MX240 router—Replace **fpc-slot** with a value from 0 through 2.
- MX480 router—Replace **fpc-slot** with a value from 0 through 5.
- MX-960 router—Replace **fpc-slot** with a value from 0 through 11.
- MX2010 router—Replace **fpc-slot-number** with a value from 0 through 9.
- MX2020 router—Replace **fpc-slot-number** with a value from 0 through 19.
- Other routers—Replace **fpc-slot** with a value from 0 through 7.
- EX Series switches:
  - EX3200 switches and EX4200 standalone switches—Replace **fpc-slot** with 0.
  - EX4200 switches in a Virtual Chassis configuration—Replace **fpc-slot** with a value from 0 through 9.
  - EX6210 switches—Replace **fpc-slot** with a value from 0 through 9.
  - EX8208 switches—Replace **fpc-slot** with a value from 0 through 7.
  - EX8216 switches—Replace **fpc-slot** with a value from 0 through 15.
- QFX Series:
  - QFX3500 switches—Replace **fpc-slot** with 0.
  - QFabric systems—Replace **fpc-slot** with 0 through 31 on the Interconnect device.
- PTX Series Packet Transport Routers:
  - PTX5000 Packet Transport Router—Replace **fpc-slot** with a value from 0 through 7.
- ACX Series Universal Access Routers:
  - ACX1000 and ACX2000 Universal Access Routers—Replace **fpc-slot** with 0.

**local**—(MX Series routers and EX Series switches only) (Optional) Display status information for all FPCs on the local Virtual Chassis member.

**member member-id**—(MX Series routers and EX Series switches only) (Optional) Display status information for all FPCs on the specified member of the Virtual Chassis configuration. Replace **member-id** with a value of 0 or 1.

**node-device name**—(QFabric systems only) (Optional) Display status information for each Node device. Each Node device is equivalent to an FPC.

**pic-status**—(Optional) Display status information for all PICs or for the PIC in the specified slot (see *fpc-slot*).



**NOTE:** On T1600 routers, Type 4 FPCs with ASICs based on the SL2.0 chipset do not support the 10-Gigabit Ethernet LAN/WAN PIC with SFP+ (10x10GE [LAN/WAN] SFPP). If you issue the `show chassis fpc` command with the `pic-status` option, the CLI displays the string “Not Supported” for 10x10GE(LAN/WAN) SFPP PICs installed on such FPCs. The following is a sample output:

```
user@host> show chassis fpc pic-status
Slot 0   Online      E2-FPC Type 1
  PIC 0   Online      1x G/E SFP, 1000 BASE
  PIC 1   Online      Adaptive Services-II
  PIC 2   Online      1x G/E IQ, 1000 BASE
  PIC 3   Online      1x G/E IQ, 1000 BASE
Slot 1   Online      FPC Type 3-ES
  PIC 0   Present     UNUSED- Not Supported
Slot 2   Online      FPC Type 4-ES
  PIC 0   Offline     4x OC-192 SONET XFP
  PIC 1   Present     10x10GE(LAN/WAN) SFPP- Not Supported
<<<<<<
Slot 4   Offline     FPC Type 1-ES
Slot 5   Offline     FPC Type 2-ES
Slot 6   Online      E2-FPC Type 3
  PIC 0   Online      1x OC-192 SONET XFP
  PIC 1   Online      4x OC-48 SONET
  PIC 2   Online      4x OC-48 SONET
  PIC 3   Online      MultiServices 500
Slot 7   Online      FPC Type 4-ES
  PIC 0   Online      4x 10GE (LAN/WAN) XFP
  PIC 1   Online      4x 10GE (LAN/WAN) XFP
```

In addition, an entry is logged in the system log messages (/var/log/messages) that the PIC is not supported. The following is a sample message logged in the system log:

```
Apr  5 08:47:36 router1 chassisd[2770]: CHASSISD_UNSUPPORTED_PIC:
PIC 1 in FPC 2 (type 763, version 257) is not supported
```

If you see this issue, contact Juniper Networks Technical Assistance Center (JTAC) for a possible fix. For more information about this issue and a possible solution, see [PSN-2010-03-696](https://www.juniper.net/support/psn/2010-03-696).



**NOTE:** When there is a double-bit ECC error in a network processor's memory, the Channelized OC3/STM1 (Multi-Rate) Circuit Emulation MIC with SFP or Channelized E1/T1 Circuit Emulation MIC is switched to the offline state.

```
user@host> show chassis fpc pic-status
Slot 1   Online      MPC Type 2 3D Q
PIC 0   Offline     1xC0C12/4xC0C3 CH-CE- ECC error detected
```

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

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

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**Required Privilege Level**

view

**Related Documentation**

- *request chassis fpc*
- *show chassis fpc-feb-connectivity*
- *show chassis fabric fpcs*
- *Configuring the Junos OS to Resynchronize FPC Sequence Numbers with Active FPCs when an FPC Comes Online*
- *MX960 Flexible PIC Concentrator Description*
- [ACX2000 and ACX2100 Routers Hardware and CLI Terminology Mapping on page 13](#)
- *enhanced-mode*

**List of Sample Output**

[show chassis fpc \(EX6210 Switch\) on page 417](#)  
[show chassis fpc \(M10 Router\) on page 418](#)  
[show chassis fpc \(M20 Router\) on page 418](#)  
[show chassis fpc detail \(M Series Routers\) on page 418](#)  
[show chassis fpc detail \(MX80 Router\) on page 418](#)  
[show chassis fpc \(MX240 Router\) on page 418](#)  
[show chassis fpc \(EX Series Switch\) on page 419](#)  
[show chassis fpc \(MX480 Router\) on page 419](#)  
[show chassis fpc \(MX480 Router with 100-Gigabit Ethernet CFP\) on page 419](#)  
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**Output Fields** Table 36 on page 416 lists the output fields for the **show chassis fpc** command. Output fields are listed in the approximate order in which they appear.

**Table 36: show chassis fpc Output Fields**

| Field Name                           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Level of Output          |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| <b>Slot</b> or <b>Slot State</b>     | Slot number and state. The state can be one of the following conditions: <ul style="list-style-type: none"> <li>• <b>Dead</b>—Held in reset because of errors.</li> <li>• <b>Diag</b>—Slot is being ignored while the FPC is running diagnostics.</li> <li>• <b>Dormant</b>—Held in reset.</li> <li>• <b>Empty</b>—No FPC is present.</li> <li>• <b>Offline</b>—(PTX Series Packet Transport Routers only) One of the following two states is displayed: <ul style="list-style-type: none"> <li>• <b>FPC offlined due to unreachable destinations</b></li> <li>• <b>FPC Offlined due to degraded FPC action</b></li> </ul> </li> <li>• <b>Online</b>—FPC is online and running.</li> <li>• <b>Present</b>—FPC is detected by the chassis daemon but either is not supported by the current version of Junos OS or is inserted in the wrong slot. The output also states either <b>Hardware Not Supported</b> or <b>Hardware Not In Right Slot</b>. The FPC is coming up but not yet online.</li> <li>• <b>Probed</b>—Probe is complete; awaiting restart of the Packet Forwarding Engine.</li> <li>• <b>Probe-wait</b>—Waiting to be probed.</li> </ul> | all levels               |
| <b>Logical slot</b>                  | Slot number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | all levels               |
| <b>Temp (C) or Temperature</b>       | Temperature of the air passing by the FPC, in degrees Celsius or in both Celsius and Fahrenheit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | all levels<br>all levels |
| <b>Temperature (PTX Series)</b>      | On PTX Series Packet Transport Routers, temperature details are provided in degrees Celsius and Fahrenheit. Output includes: <ul style="list-style-type: none"> <li>• Temperature (PMB)—Temperature of the air passing by the Processor Mezzanine Board (PMB) at the bottom of the FPC.</li> <li>• Temperature (Intake)—Temperature of the air flowing into the chassis.</li> <li>• Temperature (Exhaust)—Exhaust temperatures for multiple zones (Exhaust A and Exhaust B).</li> <li>• Temperature (TLn)—Temperature of the specified Lookup ASIC (TL) of the packet forwarding engine on the FPC.</li> <li>• Temperature (TQn)—Temperature of the specified Queuing and Memory Interface ASIC (TQ) of the packet forwarding engine on the FPC.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                             | detail                   |
| <b>Total CPU Utilization (%)</b>     | Total percentage of CPU being used by the FPC's processor.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | all levels               |
| <b>Interrupt CPU Utilization (%)</b> | Of the total CPU being used by the FPC's processor, the percentage being used for interrupts.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | none specified           |
| <b>Memory DRAM (MB)</b>              | Total DRAM, in megabytes, available to the FPC's processor.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | none specified           |



Table 36: show chassis fpc Output Fields (*continued*)

| Field Name                           | Field Description                                                                                                                                                                                                                                                                                                                                                                | Level of Output |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Heap Utilization (%)</b>          | Percentage of heap space (dynamic memory) being used by the FPC's processor. If this number exceeds 80 percent, there may be a software problem (memory leak).<br><br><i>NOTE:</i> On MX Series routers and EX Series switches in a broadband edge environment, heap utilization levels higher than 70 percent can affect unified ISSU, router stability, or scaling capability. | none specified  |
| <b>Buffer Utilization (%)</b>        | Percentage of buffer space being used by the FPC's processor for buffering internal messages.                                                                                                                                                                                                                                                                                    | none specified  |
| <b>Total CPU DRAM</b>                | Amount of DRAM available to the FPC's CPU.                                                                                                                                                                                                                                                                                                                                       | <b>detail</b>   |
| <b>Total RLDRAM</b>                  | Amount of reduced latency dynamic random access memory (RLDRAM) available to the FPC CPU.                                                                                                                                                                                                                                                                                        | <b>detail</b>   |
| <b>Total DDR DRAM</b>                | Amount of double data rate dynamic random access memory (DDR DRAM) available to the FPC CPU.                                                                                                                                                                                                                                                                                     | <b>detail</b>   |
| <b>Total SRAM</b>                    | Amount of static RAM (SRAM) used by the FPC's CPU.                                                                                                                                                                                                                                                                                                                               | <b>detail</b>   |
| <b>Total SDRAM</b>                   | Total amount of memory used for storing packets and notifications.                                                                                                                                                                                                                                                                                                               | <b>detail</b>   |
| <b>I/O Manager ASICs information</b> | I/O Manager version number, manufacturer, and part number.                                                                                                                                                                                                                                                                                                                       | <b>detail</b>   |
| <b>Start time</b>                    | Time when the Routing Engine detected that the FPC was running.                                                                                                                                                                                                                                                                                                                  | <b>detail</b>   |
| <b>Uptime</b>                        | How long the Routing Engine has been connected to the FPC and, therefore, how long the FPC has been up and running.                                                                                                                                                                                                                                                              | <b>detail</b>   |
| <b>PIC type</b>                      | (pic-status output only) Type of PIC.                                                                                                                                                                                                                                                                                                                                            | none specified  |

## Sample Output

### show chassis fpc (EX6210 Switch)

```

user@switch> show chassis fpc

```

| Slot | State  | Temp (C) | CPU Utilization (%)<br>Total Interrupt | Memory<br>DRAM (MB) | Utilization (%)<br>Heap Buffer |
|------|--------|----------|----------------------------------------|---------------------|--------------------------------|
| 0    | Empty  |          |                                        |                     |                                |
| 1    | Online | 7        | 5 0                                    | 1024                | 0 32                           |
| 2    | Empty  |          |                                        |                     |                                |
| 3    | Empty  |          |                                        |                     |                                |
| 4    | Online | 25       | 17 2                                   | 2048                | 0 30                           |
| 5    | Online | 25       | 3 0                                    | 2048                | 0 24                           |
| 6    | Online | 6        | 5 0                                    | 1024                | 0 32                           |
| 7    | Empty  |          |                                        |                     |                                |

```

      8 Empty
      9 Online           8      7      0      1024      0      32

```

### show chassis fpc (M10 Router)

```

user@host> show chassis fpc
FPC status:

```

| Slot | State  | Temp (C) |
|------|--------|----------|
| 0    | Online | 27       |
| 1    | Online | 28       |

### show chassis fpc (M20 Router)

```

user@host> show chassis fpc
FPC status:

```

| Slot | State  | Temp (C) | CPU Utilization (%) | Memory    | Utilization (%) |
|------|--------|----------|---------------------|-----------|-----------------|
|      |        |          | Total Interrupt     | DRAM (MB) | Heap Buffer     |
| 0    | Empty  | 0        | 0 0                 | 0         | 0 0             |
| 1    | Online | 38       | 0 0                 | 8         | 0 4             |
| 2    | Online | 35       | 0 0                 | 8         | 0 3             |
| 3    | Empty  | 0        | 0 0                 | 0         | 0 0             |

### show chassis fpc detail (M Series Routers)

```

user@host> show chassis fpc detail 1
Slot 1 information:
  State Online
  Temperature 48 degrees C
  Total CPU DRAM 32 MB
  Total SRAM 4 MB
  Total SDRAM 256 MB
  I/O Manager ASICs information Version 2.0, Foundry IBM, Part number 0
  I/O Manager ASICs information Version 2.0, Foundry IBM, Part number 0
  Start time 2000-02-08 02:18:49 UTC
  Uptime 14 hours, 41 minutes, 41 seconds

```

### show chassis fpc detail (MX80 Router)

```

user@host> show chassis fpc detail
Slot 0 information:
  State Online
  Temperature 47 degrees C / 116 degrees F
  Total CPU DRAM 1024 MB
  Total SRAM 331 MB
  Total SDRAM 1280 MB
  Start time 2010-02-08 12:25:33 PST
  Uptime 2 hours, 13 minutes, 19 seconds
Slot 1 information:
  State Online
  Temperature 47 degrees C / 116 degrees F
  Total CPU DRAM 1024 MB
  Total SRAM 331 MB
  Total SDRAM 1280 MB
  Start time 2010-02-08 12:25:33 PST
  Uptime 2 hours, 13 minutes, 19 seconds

```

### show chassis fpc (MX240 Router)

```

user@host> show chassis fpc

```

| Slot | State | Temp (C) | CPU Utilization (%) | Memory    | Utilization (%) |
|------|-------|----------|---------------------|-----------|-----------------|
|      |       |          | Total Interrupt     | DRAM (MB) | Heap Buffer     |

```

0 Empty
1 Online      34      6      0      1024      18      30
2 Online      33      9      0      1024      24      30

```

### show chassis fpc (EX Series Switch)

```

user@host> show chassis fpc

```

| Slot | State  | Temp (C) | CPU Utilization (%) Total | Utilization (%) Interrupt | Memory DRAM (MB) | Utilization (%) Heap | Buffer |
|------|--------|----------|---------------------------|---------------------------|------------------|----------------------|--------|
| 0    | Empty  |          |                           |                           |                  |                      |        |
| 1    | Online | 41       | 13                        | 0                         | 2048             | 19                   | 14     |
| 2    | Online | 42       | 12                        | 0                         | 2048             | 19                   | 14     |

### show chassis fpc (MX480 Router)

```

user@host> show chassis fpc

```

| Slot | State  | Temp (C) | CPU Utilization (%) Total | Utilization (%) Interrupt | Memory DRAM (MB) | Utilization (%) Heap | Buffer |
|------|--------|----------|---------------------------|---------------------------|------------------|----------------------|--------|
| 0    | Empty  |          |                           |                           |                  |                      |        |
| 1    | Online | 36       | 9                         | 0                         | 1024             | 17                   | 57     |
| 2    | Empty  |          |                           |                           |                  |                      |        |
| 3    | Empty  |          |                           |                           |                  |                      |        |
| 4    | Empty  |          |                           |                           |                  |                      |        |
| 5    | Empty  |          |                           |                           |                  |                      |        |

### show chassis fpc (MX480 Router with 100-Gigabit Ethernet CFP)

```

user@host> show chassis fpc

```

| Slot | State  | Temp (C) | CPU Utilization (%) Total | Utilization (%) Interrupt | Memory DRAM (MB) | Utilization (%) Heap | Buffer |
|------|--------|----------|---------------------------|---------------------------|------------------|----------------------|--------|
| 0    | Online | 33       | 4                         | 0                         | 2048             | 10                   | 13     |
| 1    | Online | 36       | 7                         | 0                         | 2048             | 16                   | 13     |
| 2    | Online | 29       | 6                         | 0                         | 1024             | 27                   | 29     |
| 3    | Online | 33       | 0                         | 0                         | 0                | 0                    | 0      |
| 4    | Online | 36       | 7                         | 0                         | 2048             | 19                   | 13     |
| 5    | Online | 34       | 31                        | 11                        | 2048             | 14                   | 13     |

### show chassis fpc pic-status (MX480 Router with 100-Gigabit Ethernet CFP)

```

user@host> show chassis fpc pic-status
Slot 1 Online MPC Type 3
PIC 2 Online 1X100GE CFP
Slot 2 Online DPCE 40x 1GE R EQ
PIC 0 Online 10x 1GE(LAN) EQ
PIC 1 Online 10x 1GE(LAN) EQ
PIC 2 Online 10x 1GE(LAN) EQ
PIC 3 Online 10x 1GE(LAN) EQ
Slot 3 Online MPC Type 3
PIC 0 Online 1X100GE CFP
PIC 2 Online 1X100GE CFP
Slot 4 Online MPC Type 3
PIC 0 Online 1X100GE CFP
PIC 2 Online 1X100GE CFP
Slot 5 Online MPC Type 2 3D EQ
PIC 0 Online 2x 10GE XFP
PIC 1 Online 2x 10GE XFP
PIC 2 Online 10x 1GE(LAN) SFP
PIC 3 Online 10x 1GE(LAN) SFP

```

### show chassis fpc pic-status (EX Series Switch)

```

user@host> show chassis fpc pic-status

```

```

Slot 1  Online      EX9200 32x10G SFP
      PIC 0 Online      8X10GE SFPP
      PIC 1 Online      8X10GE SFPP
      PIC 2 Online      8X10GE SFPP
      PIC 3 Online      8X10GE SFPP
Slot 2  Online      EX9200 32x10G SFP
      PIC 0 Online      8X10GE SFPP
      PIC 1 Online      8X10GE SFPP
      PIC 2 Online      8X10GE SFPP
      PIC 3 Online      8X10GE SFPP

```

#### show chassis fpc (MX480 Router with MPC4E)

```

user@host> show chassis fpc

```

| Slot | State  | Temp (C) | CPU Utilization (%) | Memory Interrupt | Utilization (%) | DRAM (MB) | Heap | Buffer |
|------|--------|----------|---------------------|------------------|-----------------|-----------|------|--------|
| 0    | Empty  |          |                     |                  |                 |           |      |        |
| 1    | Empty  |          |                     |                  |                 |           |      |        |
| 2    | Online | 38       | 7                   | 0                |                 | 2048      | 19   | 14     |
| 3    | Online | 39       | 8                   | 0                |                 | 2048      | 18   | 14     |
| 4    | Online | 39       | 7                   | 0                |                 | 2048      | 17   | 14     |
| 5    | Empty  |          |                     |                  |                 |           |      |        |

#### show chassis fpc detail (MX480 Router with MPC4E)

```

user@host> show chassis fpc detail
Slot 2 information:
  State Online
  Temperature 38
  Total CPU DRAM 2048 MB
  Total RLDRAM 1036 MB
  Total DDR DRAM 11264 MB
  Start time: 2013-02-18 05:06:57 PST
  Uptime: 17 hours, 41 minutes, 9 seconds
  Max Power Consumption 610 Watts
Slot 3 information:
  State Online
  Temperature 38
  Total CPU DRAM 2048 MB
  Total RLDRAM 1036 MB
  Total DDR DRAM 11264 MB
  Start time: 2013-02-18 05:07:00 PST
  Uptime: 17 hours, 41 minutes, 6 seconds
  Max Power Consumption 610 Watts
Slot 4 information:
  State Diagnostics
  Temperature 37
  Total CPU DRAM 0 MB
  Total RLDRAM 0 MB
  Total DDR DRAM 0 MB
  Max Power Consumption 520 Watts

```

#### show chassis fpc (MX480 Router with MPC4E)

```

user@host> show chassis fpc

```

| Slot | State  | Temp (C) | CPU Utilization (%) | Memory Interrupt | Utilization (%) | DRAM (MB) | Heap | Buffer |
|------|--------|----------|---------------------|------------------|-----------------|-----------|------|--------|
| 0    | Empty  |          |                     |                  |                 |           |      |        |
| 1    | Empty  |          |                     |                  |                 |           |      |        |
| 2    | Online | 38       | 7                   | 0                |                 | 2048      | 19   | 14     |
| 3    | Online | 39       | 8                   | 0                |                 | 2048      | 18   | 14     |

```

4 Online          39      7          0      2048      17      14
5 Empty

```

#### show chassis fpc detail (MX480 Router with MPC4E)

```

user@host> show chassis fpc detail
Slot 2 information:
  State                Online
  Temperature           38
  Total CPU DRAM        2048 MB
  Total RLDRAM          1036 MB
  Total DDR DRAM        11264 MB
  Start time:           2013-02-18 05:06:57 PST
  Uptime:               17 hours, 41 minutes, 9 seconds
  Max Power Consumption 610 Watts
Slot 3 information:
  State                Online
  Temperature           38
  Total CPU DRAM        2048 MB
  Total RLDRAM          1036 MB
  Total DDR DRAM        11264 MB
  Start time:           2013-02-18 05:07:00 PST
  Uptime:               17 hours, 41 minutes, 6 seconds
  Max Power Consumption 610 Watts
Slot 4 information:
  State                Diagnostics
  Temperature           37
  Total CPU DRAM        0 MB
  Total RLDRAM          0 MB
  Total DDR DRAM        0 MB
  Max Power Consumption 520 Watts

```

#### show chassis fpc (MX960 Router)

```

user@host> show chassis fpc

```

| Slot | State  | Temp (C) | Total | CPU Utilization (%) | Interrupt | Memory DRAM (MB) | Heap | Utilization (%) | Buffer |
|------|--------|----------|-------|---------------------|-----------|------------------|------|-----------------|--------|
| 0    | Empty  |          |       |                     |           |                  |      |                 |        |
| 1    | Empty  |          |       |                     |           |                  |      |                 |        |
| 2    | Empty  |          |       |                     |           |                  |      |                 |        |
| 3    | Online | 25       | 19    | 0                   |           | 1024             | 15   | 57              |        |
| 4    | Empty  |          |       |                     |           |                  |      |                 |        |
| 5    | Online | 26       | 27    | 0                   |           | 1024             | 15   | 57              |        |
| 6    | Empty  |          |       |                     |           |                  |      |                 |        |
| 7    | Empty  |          |       |                     |           |                  |      |                 |        |
| 8    | Empty  |          |       |                     |           |                  |      |                 |        |
| 9    | Empty  |          |       |                     |           |                  |      |                 |        |
| 10   | Empty  |          |       |                     |           |                  |      |                 |        |
| 11   | Empty  |          |       |                     |           |                  |      |                 |        |

#### show chassis fpc (MX240, MX480, MX960 Routers with Application Services Modular Line Card)

```

user@host> show chassis fpc 1

```

| Slot | State  | Temp (C) | Total | CPU Utilization (%) | Interrupt | Memory DRAM (MB) | Heap | Utilization (%) | Buffer |
|------|--------|----------|-------|---------------------|-----------|------------------|------|-----------------|--------|
| 1    | Online | 34       | 5     | 0                   |           | 3072             | 5    |                 | 13     |

#### show chassis fpc (MX240, MX480, MX960 with Application Services Modular Line Card)

```

user@host> show chassis fpc 1 detail
Slot 1 information:
  State                Online

```

```

Temperature                34
Total CPU DRAM              3072 MB
Total RLD RAM               259 MB
Total DDR DRAM              4864 MB
Start time:                 2012-06-19 10:51:43 PDT
Uptime:                     16 minutes, 48 seconds
Max Power Consumption       550 Watts

```

#### show chassis fpc (MX2010 Routers)

```

user@host> show chassis fpc

```

| Slot | State  | Temp (C) | CPU Utilization (%) | Memory Total | Memory Interrupt | Utilization (%) | DRAM (MB) | Heap | Buffer |
|------|--------|----------|---------------------|--------------|------------------|-----------------|-----------|------|--------|
| 0    | Online | 34       | 9                   | 0            | 0                | 2048            | 18        | 13   |        |
| 1    | Online | 32       | 9                   | 0            | 0                | 2048            | 15        | 13   |        |
| 2    | Empty  |          |                     |              |                  |                 |           |      |        |
| 3    | Empty  |          |                     |              |                  |                 |           |      |        |
| 4    | Empty  |          |                     |              |                  |                 |           |      |        |
| 5    | Empty  |          |                     |              |                  |                 |           |      |        |
| 6    | Empty  |          |                     |              |                  |                 |           |      |        |
| 7    | Empty  |          |                     |              |                  |                 |           |      |        |
| 8    | Online | 31       | 13                  | 0            | 0                | 2048            | 11        | 13   |        |
| 9    | Online | 33       | 10                  | 0            | 0                | 2048            | 18        | 13   |        |

#### show chassis fpc (MX2020 Routers)

```

user@host> show chassis fpc

```

| Slot | State  | Temp (C) | CPU Utilization (%) | Memory Total | Memory Interrupt | Utilization (%) | DRAM (MB) | Heap | Buffer |
|------|--------|----------|---------------------|--------------|------------------|-----------------|-----------|------|--------|
| 0    | Online | 10       | 12                  | 0            | 0                | 2048            | 18        | 13   |        |
| 1    | Online | 8        | 9                   | 0            | 0                | 2048            | 18        | 13   |        |
| 2    | Online | 7        | 9                   | 0            | 0                | 2048            | 18        | 13   |        |
| 3    | Online | 8        | 10                  | 0            | 0                | 2048            | 18        | 13   |        |
| 4    | Online | 9        | 10                  | 0            | 0                | 2048            | 18        | 13   |        |
| 5    | Online | 8        | 9                   | 0            | 0                | 2048            | 18        | 13   |        |
| 6    | Online | 8        | 10                  | 0            | 0                | 2048            | 18        | 13   |        |
| 7    | Online | 9        | 9                   | 0            | 0                | 2048            | 18        | 13   |        |
| 8    | Online | 9        | 10                  | 0            | 0                | 2048            | 18        | 13   |        |
| 9    | Online | 10       | 9                   | 0            | 0                | 2048            | 18        | 13   |        |
| 10   | Online | 16       | 8                   | 0            | 0                | 2048            | 18        | 13   |        |
| 11   | Online | 11       | 10                  | 0            | 0                | 2048            | 18        | 13   |        |
| 12   | Online | 10       | 10                  | 0            | 0                | 2048            | 18        | 13   |        |
| 13   | Online | 11       | 9                   | 0            | 0                | 2048            | 18        | 13   |        |
| 14   | Online | 12       | 10                  | 0            | 0                | 2048            | 18        | 13   |        |
| 15   | Online | 13       | 9                   | 0            | 0                | 2048            | 18        | 13   |        |
| 16   | Online | 13       | 9                   | 0            | 0                | 2048            | 18        | 13   |        |
| 17   | Online | 12       | 9                   | 0            | 0                | 2048            | 18        | 13   |        |
| 18   | Online | 12       | 8                   | 0            | 0                | 2048            | 18        | 13   |        |
| 19   | Online | 14       | 10                  | 0            | 0                | 2048            | 18        | 13   |        |

#### show chassis fpc (MX2020 Router with MPC4E)

```

user@host> show chassis fpc

```

| Slot | State  | Temp (C) | CPU Utilization (%) | Memory Total | Memory Interrupt | Utilization (%) | DRAM (MB) | Heap | Buffer |
|------|--------|----------|---------------------|--------------|------------------|-----------------|-----------|------|--------|
| 0    | Online | 33       | 12                  | 2            | 2                | 2048            | 11        | 13   |        |
| 1    | Empty  |          |                     |              |                  |                 |           |      |        |
| 2    | Empty  |          |                     |              |                  |                 |           |      |        |
| 3    | Empty  |          |                     |              |                  |                 |           |      |        |
| 4    | Empty  |          |                     |              |                  |                 |           |      |        |
| 5    | Empty  |          |                     |              |                  |                 |           |      |        |
| 6    | Empty  |          |                     |              |                  |                 |           |      |        |

|    |        |    |    |   |      |    |    |
|----|--------|----|----|---|------|----|----|
| 7  | Empty  |    |    |   |      |    |    |
| 8  | Empty  |    |    |   |      |    |    |
| 9  | Online | 31 | 10 | 0 | 2048 | 11 | 13 |
| 10 | Online | 32 | 7  | 0 | 2048 | 14 | 13 |
| 11 | Empty  |    |    |   |      |    |    |
| 12 | Empty  |    |    |   |      |    |    |
| 13 | Empty  |    |    |   |      |    |    |
| 14 | Online | 28 | 12 | 0 | 2048 | 15 | 14 |
| 15 | Empty  |    |    |   |      |    |    |
| 16 | Empty  |    |    |   |      |    |    |
| 17 | Empty  |    |    |   |      |    |    |
| 18 | Empty  |    |    |   |      |    |    |
| 19 | Online | 38 | 8  | 0 | 2048 | 18 | 13 |

#### show chassis fpc detail (MX2020 Router with MPC4E)

```

user@host> show chassis fpc detail
Slot 0 information:
  State                Online
  Temperature           34
  Total CPU DRAM        2048 MB
  Total RLDRAM          806 MB
  Total DDR DRAM        2632 MB
  Start time:           2013-02-17 08:17:35 PST
  Uptime:               1 day, 14 hours, 50 minutes, 39 seconds
  Max Power Consumption 368 Watts
Slot 9 information:
  State                Online
  Temperature           32
  Total CPU DRAM        2048 MB
  Total RLDRAM          806 MB
  Total DDR DRAM        2632 MB
  Start time:           2013-02-17 08:17:43 PST
  Uptime:               1 day, 14 hours, 50 minutes, 31 seconds
  Max Power Consumption 368 Watts
Slot 10 information:
  State                Online
  Temperature           37
  Total CPU DRAM        2048 MB
  Total RLDRAM          1036 MB
  Total DDR DRAM        6656 MB
  Start time:           2013-02-17 08:17:54 PST
  Uptime:               1 day, 14 hours, 50 minutes, 20 seconds
  Max Power Consumption 520 Watts
Slot 14 information:
  State                Online
  Temperature           32
  Total CPU DRAM        2048 MB
  Total RLDRAM          1036 MB
  Total DDR DRAM        11264 MB
  Start time:           2013-02-17 08:18:01 PST
  Uptime:               1 day, 14 hours, 50 minutes, 13 seconds
  Max Power Consumption 610 Watts
Slot 19 information:
  State                Online
  Temperature           38
  Total CPU DRAM        2048 MB
  Total RLDRAM          1324 MB
  Total DDR DRAM        5120 MB
  Start time:           2013-02-17 08:18:08 PST

```

```

Uptime:                               1 day, 14 hours, 50 minutes, 6 seconds
Max Power Consumption                  440 Watts

```

### show chassis fpc detail (MX Series Routers)

```

user@host> show chassis fpc detail 2
Slot 0 information:
  State                               Online
  Temperature                         36 degrees C / 96 degrees F
  Total CPU DRAM                      1024 MB
  Total RLDRAM                        256 MB
  Total DDR DRAM                      4096 MB
  Start time:                        2009-08-11 21:20:30 PDT
  Uptime:                             2 hours, 8 minutes, 50 seconds
  Max Power Consumption                335 Watts

```

### show chassis fpc detail (EX Series Switches)

```

user@host> show chassis fpc detail 2
Slot 1 information:
  State                               Online
  Temperature                         41
  Total CPU DRAM                      2048 MB
  Total RLDRAM                        1036 MB
  Total DDR DRAM                      11264 MB
  Start time:                        2013-04-02 00:04:52 PDT
  Uptime:                             7 days, 9 hours, 47 minutes, 46 seconds
  Max Power Consumption                610 Watts

Slot 2 information:
  State                               Online
  Temperature                         41
  Total CPU DRAM                      2048 MB
  Total RLDRAM                        1036 MB
  Total DDR DRAM                      11264 MB
  Start time:                        2013-04-02 00:04:56 PDT
  Uptime:                             7 days, 9 hours, 47 minutes, 42 seconds
  Max Power Consumption                610 Watts

```

### show chassis fpc (Hardware Not Supported)

```

user@host> show chassis fpc
show chassis fpc

Slot State      Temp  CPU Utilization (%)  Memory  Utilization (%)
              (C)  Total  Interrupt          DRAM (MB) Heap    Buffer
-----
0  Online      ----- CPU less FPC -----
1  Present      ----- Hardware Not In Right Slot -----
2  Online         0         0         0         0         0
3  Present      ----- Hardware Not Supported -----
4  Empty
5  Empty
6  Online         0         0         0         0         0

```

### show chassis fpc detail (Hardware Not Supported)

```

user@host> show chassis fpc detail
Slot 0 information:
  State                               Online
  Total CPU DRAM                      ---- CPU less FPC ----
  Start time                          2006-07-07 03:21:00 UTC
  Uptime                              27 minutes, 51 seconds

Slot 1 information:
  State                               Present

```



```

Reason                                     --- Hardware Not In Right Slot ---
Slot 2 information:
State                                     Online
Total CPU DRAM                           32 MB
Start time                               2006-07-07 03:20:59 UTC
Uptime                                   27 minutes, 52 seconds
Slot 3 information:
State                                     Present
Reason                                   --- Hardware Not Supported ---
Total CPU DRAM                           0 MB
Slot 6 information:
State                                     Online
Total CPU DRAM                           32 MB
Start time                               2006-07-07 03:21:01 UTC
Uptime                                   27 minutes, 50 seconds

```

### show chassis fpc pic-status

```

user@host> show chassis fpc pic-status
Slot 0 Online
  PIC 1   1x OC-12 ATM, MM
  PIC 2   1x OC-12 ATM, MM
  PIC 3   1x OC-12 ATM, MM
Slot 1 Online
  PIC 0   1x OC-48 SONET, SMIR
Slot 2 Online
  PIC 0   1x OC-192 SONET, SMSR

```

### show chassis fpc pic-status (M Series Routers)

```

user@host> show chassis fpc pic-status
Slot 1  Online      FPC Type 1
  PIC 0  Present    2x OC-3 ATM, MM- Hardware Error
  PIC 1  Online     4x OC-3 SONET, SMIR
Slot 2  Online      E-FPC Type 2
  PIC 0  Online     4x G/E, 1000 BASE-SX
  PIC 1  Online     2x G/E SFP, 1000 BASE
  PIC 3  Online     1x Tunnel
Slot 3  Online      E-FPC Type 1
  PIC 0  Online     1x G/E IQ, 1000 BASE
  PIC 2  Online     1x G/E SFP, 1000 BASE
Slot 4  Online      E-FPC Type 2
  PIC 0  Online     4x G/E SFP, 1000 BASE
  PIC 1  Online     4x G/E SFP, 1000 BASE
  PIC 2  Online     4x G/E SFP, 1000 BASE
  PIC 3  Online     4x G/E SFP, 1000 BASE
Slot 5  Online      FPC Type 2
...

```

### show chassis fpc pic-status (M120 Router)

```

user@host> show chassis fpc pic-status
Slot 1  Online      M120 CFPC 10GE
  PIC 0  Online     1x 10GE(LAN/WAN) XFP
Slot 3  Online      M120 FPC Type 2 (proto)
  PIC 0  Online     2x G/E IQ, 1000 BASE
  PIC 1  Online     4x OC-3 SONET, SMIR
  PIC 2  Online     2x G/E IQ, 1000 BASE
  PIC 3  Online     8x 1GE(LAN), IQ2
Slot 4  Online      M120 FPC Type 3 (proto)
  PIC 0  Online     10x 1GE(LAN), 1000 BASE

```

```

Slot 5  Online      M120 FPC Type 1 (proto)
PIC 0   Present     1x G/E, 1000 BASE-LX- Not Supported
PIC 1   Online      1x CHOC3 IQ SONET, SMLR
PIC 2   Online      4x CHDS3 IQ
PIC 3   Online      1x G/E SFP, 1000 BASE

```

#### show chassis fpc pic-status (MX240, MX480, and MX960 Routers with Application Services Modular Line Card)

In the following output **Slot 1 and Slot 5** are the Application Services Modular Carrier Cards (AS MCC), **PIC 0** is the Application Services Modular Storage Card (AS MSC), and **PIC 2** is the Application Services Modular Processing Card (AS MXC).

```

user@host>show chassis fpc pic-status
Slot 2  Online      MPC Type 1 3D Q
Slot 1  Online      AS-MCC
PIC 0   Online      AS-MSC
PIC 2   Online      AS-MXC
Slot 4  Offline     MPC 3D 16x 10GE
Slot 5  Offline     AS-MCC

```

#### show chassis fpc lcc (TX Matrix Router)

```

user@host> show chassis fpc lcc 0
lcc0-re0:

```

| Slot | State  | Temp (C) | CPU Total | Utilization (%) Interrupt | Memory Utilization (%) DRAM (MB) Heap Buffer |
|------|--------|----------|-----------|---------------------------|----------------------------------------------|
| 0    | Empty  |          |           |                           |                                              |
| 1    | Online | 27       | 2         | 0                         | 256 8 44                                     |
| 2    | Online | 27       | 3         | 0                         | 256 15 44                                    |
| 3    | Empty  |          |           |                           |                                              |
| 4    | Empty  |          |           |                           |                                              |
| 5    | Empty  |          |           |                           |                                              |
| 6    | Empty  |          |           |                           |                                              |
| 7    | Empty  |          |           |                           |                                              |

#### show chassis fpc pic-status (TX Matrix Router)

```

user@host> show chassis fpc pic-status
lcc0-re0:

```

```

Slot 0  Online      FPC Type 3
PIC 0   Online      1x OC-192 SM SR1
PIC 1   Online      1x OC-192 SM SR2
PIC 2   Online      1x OC-192 SM SR1
PIC 3   Online      1x Tunnel
Slot 1  Online      FPC Type 2
PIC 0   Online      1x OC-48 SONET, SMSR
PIC 1   Online      1x OC-48 SONET, SMSR

```

```
lcc1-re0:
```

```
lcc2-re0:
```

```

Slot 1  Online      FPC Type 3
PIC 0   Online      1x OC-192 SM SR1
Slot 5  Online      FPC Type 2
PIC 0   Online      1x OC-48 SONET, SMSR
PIC 1   Online      2x G/E, 1000 BASE-LX
PIC 2   Online      2x G/E, 1000 BASE-LX

```

PIC 3 Online 1x OC-48 SONET, SMSR

lcc3-re0:

#### show chassis fpc pic-status lcc (TX Matrix Router)

user@host> show chassis fpc pic-status lcc 0

lcc0-re0:

```

Slot 0 Online FPC Type 3
      PIC 0 Online 1x OC-192 SM SR2
Slot 1 Online FPC Type 2
      PIC 0 Online 2x OC-12 ATM2 IQ, MM
      PIC 1 Online 1x OC-48 SONET, SMSR
      PIC 2 Online 1x OC-48 SONET, SMSR
      PIC 3 Online 4x G/E, 1000 BASE-SX

```

#### show chassis fpc (TX Matrix Plus Router)

user@host> show chassis fpc

lcc0-re0:

| Slot | State  | Temp (C) | CPU Utilization (%) |           | Memory DRAM (MB) | Utilization (%) |        |
|------|--------|----------|---------------------|-----------|------------------|-----------------|--------|
|      |        |          | Total               | Interrupt |                  | Heap            | Buffer |
| 0    | Empty  |          |                     |           |                  |                 |        |
| 1    | Online | 38       | 4                   | 0         | 2048             | 3               | 24     |
| 2    | Online | 43       | 8                   | 0         | 2048             | 6               | 24     |
| 3    | Empty  |          |                     |           |                  |                 |        |
| 4    | Online | 43       | 6                   | 0         | 2048             | 6               | 24     |
| 5    | Empty  |          |                     |           |                  |                 |        |
| 6    | Online | 42       | 13                  | 0         | 2048             | 6               | 24     |
| 7    | Online | 45       | 7                   | 0         | 2048             | 3               | 24     |

lcc2-re0:

| Slot | State  | Temp (C) | CPU Utilization (%) |           | Memory DRAM (MB) | Utilization (%) |        |
|------|--------|----------|---------------------|-----------|------------------|-----------------|--------|
|      |        |          | Total               | Interrupt |                  | Heap            | Buffer |
| 0    | Online | 42       | 10                  | 0         | 2048             | 6               | 24     |
| 1    | Empty  |          |                     |           |                  |                 |        |
| 2    | Online | 42       | 11                  | 0         | 2048             | 6               | 24     |
| 3    | Online | 40       | 5                   | 0         | 2048             | 3               | 24     |
| 4    | Online | 33       | 26                  | 0         | 1024             | 8               | 49     |
| 5    | Empty  |          |                     |           |                  |                 |        |
| 6    | Online | 43       | 8                   | 0         | 2048             | 6               | 24     |
| 7    | Online | 46       | 6                   | 0         | 2048             | 3               | 24     |

lcc3-re0:

| Slot | State  | Temp (C) | CPU Utilization (%) |           | Memory DRAM (MB) | Utilization (%) |        |
|------|--------|----------|---------------------|-----------|------------------|-----------------|--------|
|      |        |          | Total               | Interrupt |                  | Heap            | Buffer |
| 0    | Empty  |          |                     |           |                  |                 |        |
| 1    | Empty  |          |                     |           |                  |                 |        |
| 2    | Online | 39       | 30                  | 0         | 2048             | 7               | 24     |
| 3    | Empty  |          |                     |           |                  |                 |        |
| 4    | Online | 41       | 8                   | 0         | 2048             | 6               | 24     |
| 5    | Online | 41       | 12                  | 0         | 2048             | 6               | 24     |
| 6    | Online | 40       | 8                   | 0         | 2048             | 6               | 24     |
| 7    | Online | 42       | 4                   | 0         | 2048             | 3               | 24     |

**show chassis fpc lcc (TX Matrix Plus Router)**

```
user@host> show chassis fpc lcc 0
lcc0-re0:
```

| Slot | State  | Temp | CPU Utilization (%) |           | Memory    | Utilization (%) |        |
|------|--------|------|---------------------|-----------|-----------|-----------------|--------|
|      |        | (C)  | Total               | Interrupt | DRAM (MB) | Heap            | Buffer |
| 0    | Empty  |      |                     |           |           |                 |        |
| 1    | Online | 38   | 4                   | 0         | 2048      | 3               | 24     |
| 2    | Online | 43   | 8                   | 0         | 2048      | 6               | 24     |
| 3    | Empty  |      |                     |           |           |                 |        |
| 4    | Online | 43   | 6                   | 0         | 2048      | 6               | 24     |
| 5    | Empty  |      |                     |           |           |                 |        |
| 6    | Online | 42   | 14                  | 0         | 2048      | 6               | 24     |
| 7    | Online | 45   | 6                   | 0         | 2048      | 3               | 24     |

**show chassis fpc detail (TX Matrix Plus Router)**

```
user@host> show chassis fpc details
```

```
lcc0-re0:
```

**Slot 1 information:**

```
State Online
Temperature 38 degrees C / 100 degrees F
Total CPU DRAM 2048 MB
Total SRAM 64 MB
Total SDRAM 1280 MB
Start time 2010-10-04 20:06:22 PDT
Uptime 1 hour, 32 minutes, 51 seconds
```

**Slot 2 information:**

```
State Online
Temperature 43 degrees C / 109 degrees F
Total CPU DRAM 2048 MB
Total SRAM 128 MB
Total SDRAM 2560 MB
Start time 2010-10-04 20:06:37 PDT
Uptime 1 hour, 32 minutes, 36 seconds
```

**Slot 4 information:**

```
State Online
Temperature 43 degrees C / 109 degrees F
Total CPU DRAM 2048 MB
Total SRAM 128 MB
Total SDRAM 2560 MB
Start time 2010-10-04 20:06:40 PDT
Uptime 1 hour, 32 minutes, 33 seconds
```

**Slot 6 information:**

```
State Online
Temperature 42 degrees C / 107 degrees F
Total CPU DRAM 2048 MB
Total SRAM 128 MB
Total SDRAM 2560 MB
Start time 2010-10-04 20:06:42 PDT
Uptime 1 hour, 32 minutes, 31 seconds
```

**Slot 7 information:**

```
State Online
Temperature 45 degrees C / 113 degrees F
Total CPU DRAM 2048 MB
Total SRAM 64 MB
Total SDRAM 1280 MB
Start time 2010-10-04 20:06:43 PDT
```

```

Uptime                               1 hour, 32 minutes, 30 seconds

lcc2-re0:
-----
Slot 0 information:
  State                               Online
  Temperature                         42 degrees C / 107 degrees F
  Total CPU DRAM                      2048 MB
  Total SRAM                          128 MB
  Total SDRAM                         2560 MB
  Start time                         2010-10-04 20:06:35 PDT
  Uptime                             1 hour, 32 minutes, 38 seconds
Slot 2 information:
  State                               Online
  Temperature                         42 degrees C / 107 degrees F
  Total CPU DRAM                      2048 MB
  Total SRAM                          128 MB
  Total SDRAM                         2560 MB
  Start time                         2010-10-04 20:06:37 PDT
  Uptime                             1 hour, 32 minutes, 36 seconds
Slot 3 information:
  State                               Online
  Temperature                         40 degrees C / 104 degrees F
  Total CPU DRAM                      2048 MB
  Total SRAM                          64 MB
  Total SDRAM                         1280 MB
  Start time                         2010-10-04 20:06:28 PDT
  Uptime                             1 hour, 32 minutes, 45 seconds
Slot 4 information:
  State                               Online
  Temperature                         33 degrees C / 91 degrees F
  Total CPU DRAM                      1024 MB
  Total SRAM                          64 MB
  Total SDRAM                         1280 MB
  Start time                         2010-10-04 20:08:03 PDT
  Uptime                             1 hour, 31 minutes, 10 seconds
Slot 6 information:
  State                               Online
  Temperature                         43 degrees C / 109 degrees F
  Total CPU DRAM                      2048 MB
  Total SRAM                          128 MB
  Total SDRAM                         2560 MB
  Start time                         2010-10-04 20:06:44 PDT
  Uptime                             1 hour, 32 minutes, 29 seconds
Slot 7 information:
  State                               Online
  Temperature                         46 degrees C / 114 degrees F
  Total CPU DRAM                      2048 MB
  Total SRAM                          64 MB
  Total SDRAM                         1280 MB
  Start time                         2010-10-04 20:06:46 PDT
  Uptime                             1 hour, 32 minutes, 27 seconds

lcc3-re0:
-----
Slot 2 information:
  State                               Online
  Temperature                         38 degrees C / 100 degrees F
  Total CPU DRAM                      2048 MB
  Total SRAM                          128 MB
  Total SDRAM                         2560 MB

```

```

Start time                2010-10-04 20:17:31 PDT
Uptime                    1 hour, 21 minutes, 42 seconds
Slot 4 information:
State                     Online
Temperature               41 degrees C / 105 degrees F
Total CPU DRAM            2048 MB
Total SRAM                128 MB
Total SDRAM               2560 MB
Start time                2010-10-04 20:17:34 PDT
Uptime                    1 hour, 21 minutes, 39 seconds
Slot 5 information:
State                     Online
Temperature               41 degrees C / 105 degrees F
Total CPU DRAM            2048 MB
Total SRAM                128 MB
Total SDRAM               2560 MB
Start time                2010-10-04 20:17:36 PDT
Uptime                    1 hour, 21 minutes, 37 seconds
Slot 6 information:
State                     Online
Temperature               40 degrees C / 104 degrees F
Total CPU DRAM            2048 MB
Total SRAM                128 MB
Total SDRAM               2560 MB
Start time                2010-10-04 20:17:39 PDT
Uptime                    1 hour, 21 minutes, 34 seconds
Slot 7 information:
State                     Online
Temperature               42 degrees C / 107 degrees F
Total CPU DRAM            2048 MB
Total SRAM                64 MB
Total SDRAM               1280 MB
Start time                2010-10-04 20:17:41 PDT
Uptime                    1 hour, 21 minutes, 32 seconds

```

### show chassis fpc pic-status (TX Matrix Plus Router)

```
user@host> show chassis fpc pic-status
```

```
1cc0-re0:
```

```

-----
Slot 1  Online      FPC Type 2-ES
PIC 0   Online      8x 1GE(LAN), IQ2
Slot 2  Online      FPC Type 4-ES
PIC 0   Online      4x 10GE (LAN/WAN) XFP
Slot 4  Online      FPC Type 4-ES
PIC 0   Online      4x 10GE (LAN/WAN) XFP
Slot 6  Online      FPC Type 4-ES
PIC 0   Online      4x 10GE (LAN/WAN) XFP
PIC 1   Online      4x 10GE (LAN/WAN) XFP
Slot 7  Online      FPC Type 3-ES
PIC 0   Online      10x 1GE(LAN), 1000 BASE
PIC 2   Online      1x OC-192 SM SR2
PIC 3   Online      10x 1GE(LAN), 1000 BASE

```

```
1cc2-re0:
```

```

-----
Slot 0  Online      FPC Type 4-ES
PIC 0   Online      4x 10GE (LAN/WAN) XFP
Slot 2  Online      FPC Type 4-ES
PIC 0   Online      4x 10GE (LAN/WAN) XFP

```

```

    PIC 1 Online      4x 10GE (LAN/WAN) XFP
Slot 3 Online      FPC Type 2-ES
    PIC 0 Online      8x 1GE(LAN), IQ2
Slot 4 Online      FPC Type 4
    PIC 0 Online      10x10GE(LAN/WAN) SFPP
Slot 6 Online      FPC Type 4-ES
    PIC 0 Online      4x OC-192 SONET XFP
Slot 7 Online      FPC Type 3-ES
    PIC 0 Online      10x 1GE(LAN), 1000 BASE
    PIC 1 Offline     1x 10GE(LAN/WAN) IQ2E
    PIC 2 Online      1x OC-192 SM SR2
    PIC 3 Online      1x Tunnel

```

1cc3-re0:

```

-----
Slot 2 Online      FPC Type 4-ES
    PIC 0 Online      10x10GE(LAN/WAN) SFPP
Slot 4 Online      FPC Type 4-ES
    PIC 0 Online      4x OC-192 SONET XFP
Slot 5 Online      FPC Type 4-ES
    PIC 0 Online      4x OC-192 SONET XFP
    PIC 1 Online      4x 10GE (LAN/WAN) XFP
Slot 6 Online      FPC Type 4-ES
    PIC 1 Online      4x 10GE (LAN/WAN) XFP
Slot 7 Online      FPC Type 3-ES
    PIC 0 Online      10x 1GE(LAN), 1000 BASE
    PIC 1 Online      8x 1GE(TYPE3), IQ2E
    PIC 2 Online      4x OC-48 SONET

```

### show chassis fpc (T1600 Router)

user@host> show chassis fpc

| Slot | State  | Temp<br>(C) | CPU Utilization (%)<br>Total Interrupt | Memory<br>DRAM (MB) | Utilization (%)<br>Heap | Buffer |
|------|--------|-------------|----------------------------------------|---------------------|-------------------------|--------|
| 0    | Empty  |             |                                        |                     |                         |        |
| 1    | Empty  |             |                                        |                     |                         |        |
| 2    | Online | 49          | 3 0                                    | 2048                | 3                       | 24     |
| 3    | Online | 46          | 6 0                                    | 2048                | 6                       | 24     |
| 4    | Empty  |             |                                        |                     |                         |        |
| 5    | Online | 46          | 5 0                                    | 2048                | 3                       | 24     |
| 6    | Empty  |             |                                        |                     |                         |        |
| 7    | Online | 44          | 8 0                                    | 1024                | 7                       | 49     |

### show chassis fpc detail (T1600 Router)

user@host> show chassis fpc detail

show chassis fpc detail

Slot 2 information:

```

State                               Online
Temperature                         49 degrees C / 120 degrees F
Total CPU DRAM                      2048 MB
Total SRAM                          64 MB
Total SDRAM                         1280 MB
Start time                          2010-10-04 21:12:52 PDT
Uptime                              32 minutes, 9 seconds

```

Slot 3 information:

```

State                               Online
Temperature                         47 degrees C / 116 degrees F
Total CPU DRAM                      2048 MB
Total SRAM                          128 MB

```

```

Total SDRAM                2560 MB
Start time                  2010-10-04 21:13:06 PDT
Uptime                      31 minutes, 55 seconds
Slot 5 information:
State                       Online
Temperature                  46 degrees C / 114 degrees F
Total CPU DRAM              2048 MB
Total SRAM                   64 MB
Total SDRAM                 1280 MB
Start time                  2010-10-04 21:12:56 PDT
Uptime                      32 minutes, 5 seconds
Slot 7 information:
State                       Online
Temperature                  44 degrees C / 111 degrees F
Total CPU DRAM              1024 MB
Total SRAM                   64 MB
Total SDRAM                 1280 MB
Start time                  2010-10-04 21:14:34 PDT
Uptime                      30 minutes, 27 seconds

```

#### show chassis fpc <fpc-slot> (EX Series Switch)

```
user@host> show chassis fpc 2
```

| Slot | State  | Temp<br>(C) | CPU Utilization (%)<br>Total Interrupt | Memory<br>DRAM (MB) | Utilization (%)<br>Heap Buffer |
|------|--------|-------------|----------------------------------------|---------------------|--------------------------------|
| 2    | Online | 40          | 12 0                                   | 2048                | 19 14                          |

#### show chassis fpc slot (T1600 Router)

```
user@host> show chassis fpc slot 2
```

| Slot | State  | Temp<br>(C) | CPU Utilization (%)<br>Total Interrupt | Memory<br>DRAM (MB) | Utilization (%)<br>Heap Buffer |
|------|--------|-------------|----------------------------------------|---------------------|--------------------------------|
| 2    | Online | 49          | 3 0                                    | 2048                | 3 24                           |

#### show chassis fpc pic-status (T1600 Router)

```
user@host> show chassis fpc pic-status
```

```

Slot 2  Online      FPC Type 1-ES
PIC 0   Online      Load Type 1
PIC 1   Online      4x 1GE(LAN), IQ2E
PIC 3   Online      1x OC-12-3 SFP
Slot 3  Online      FPC Type 4-ES
PIC 0   Online      4x 10GE (LAN/WAN) XFP
PIC 1   Online      4x OC-192 SONET XFP
Slot 5  Online      FPC Type 2-ES
PIC 0   Online      Load Type 2
PIC 1   Online      8x 1GE(LAN), IQ2E
PIC 2   Online      8x 1GE(LAN), IQ2E
PIC 3   Online      1x OC-48-12-3 SFP
Slot 7  Online      FPC Type 4
PIC 0   Online      4x 10GE (LAN/WAN) XFP

```

#### show chassis fpc (T4000 Router)

```
user@host> show chassis fpc
```

```
regress@stymphalian# run show chassis fpc
```

| Slot | State | Temp<br>(C) | CPU Utilization (%)<br>Total Interrupt | Memory<br>DRAM (MB) | Utilization (%)<br>Heap Buffer |
|------|-------|-------------|----------------------------------------|---------------------|--------------------------------|
|------|-------|-------------|----------------------------------------|---------------------|--------------------------------|



|   |        |    |    |   |      |    |    |
|---|--------|----|----|---|------|----|----|
| 0 | Online | 48 | 15 | 0 | 2816 | 21 | 27 |
| 1 | Empty  |    |    |   |      |    |    |
| 2 | Empty  |    |    |   |      |    |    |
| 3 | Online | 51 | 15 | 0 | 2816 | 21 | 27 |
| 4 | Empty  |    |    |   |      |    |    |
| 5 | Online | 39 | 8  | 0 | 2048 | 6  | 23 |
| 6 | Online | 49 | 15 | 0 | 2816 | 21 | 27 |
| 7 | Empty  |    |    |   |      |    |    |

### show chassis fpc detail (T4000 Router)

```

user@host> show chassis fpc detail
Slot 0 information:
  State                Online
  Temperature          48 degrees C / 118 degrees F
  Total CPU DRAM       2816 MB
  Total SRAM           1554 MB
  Total SDRAM          10752 MB
  Start time           2012-02-09 22:56:25 PST
  Uptime               2 hours, 40 minutes, 52 seconds
Slot 3 information:
  State                Online
  Temperature          51 degrees C / 123 degrees F
  Total CPU DRAM       2816 MB
  Total SRAM           1554 MB
  Total SDRAM          10752 MB
  Start time           2012-02-09 22:56:22 PST
  Uptime               2 hours, 40 minutes, 55 seconds
Slot 5 information:
  State                Online
  Temperature          39 degrees C / 102 degrees F
  Total CPU DRAM       2048 MB
  Total SRAM           128 MB
  Total SDRAM          2560 MB
  Start time           2012-02-09 22:51:27 PST
  Uptime               2 hours, 45 minutes, 50 seconds
Slot 6 information:
  State                Online
  Temperature          49 degrees C / 120 degrees F
  Total CPU DRAM       2816 MB
  Total SRAM           1554 MB
  Total SDRAM          10752 MB
  Start time           2012-02-09 22:56:29 PST
  Uptime               2 hours, 40 minutes, 48 seconds

```

### show chassis fpc pic-status (T4000 Router)

```

user@host> show chassis fpc pic-status
Slot 0  Online      FPC Type 5-3D
  PIC 0  Online      12x10GE (LAN/WAN) SFPP
  PIC 1  Online      12x10GE (LAN/WAN) SFPP
Slot 3  Online      FPC Type 5-3D
  PIC 0  Online      1x100GE
  PIC 1  Online      12x10GE (LAN/WAN) SFPP
Slot 5  Online      FPC Type 4-ES
  PIC 0  Online      100GE
  PIC 1  Online      100GE CFP
Slot 6  Online      FPC Type 5-3D
  PIC 0  Online      12x10GE (LAN/WAN) SFPP
  PIC 1  Online      12x10GE (LAN/WAN) SFPP

```

### show chassis fpc (QFX Series)

```
user@switch> show chassis fpc
Temp  CPU Utilization (%)  Memory      Utilization (%)
Slot State              (C)  Total  Interrupt    DRAM (MB)  Heap      Buffer
0  Online                26    2      0          2820      0         49
```

### show chassis fpc detail (QFX3500 Switches)

```
user@switch> show chassis fpc detail
Slot 0 information:
State                               Online
Temperature                         28 degrees C / 82 degrees F
Total CPU DRAM                      2820 MB
Total SRAM                          0 MB
Total SDRAM                         0 MB
Start time                          2010-09-20 01:34:13 PDT
Uptime                              3 days, 3 hours, 31 minutes, 48 seconds
```

### show chassis fpc pic-status (QFX3500 Switches)

```
user@switch> show chassis fpc pic-status
Slot 0  Online      QFX 48x10G 4x40G Switch
PIC 0   Online      48x 10G-SFP+
PIC 1   Online      15x 10G-SFP+
```

### show chassis fpc interconnect-device (QFabric System)

```
user@switch> show chassis fpc interconnect-device interconnect1
FPC status:
Slot State      Temp
              (C)
0  Online        0
1  Online        0
2  Online        0
3  Online        0
4  Online        0
5  Online        0
6  Online        0
7  Online        0
8  Online        0
9  Online        0
10 Online        0
11 Online        0
12 Online        0
13 Online        0
14 Online        0
15 Online        0
```

### show chassis fpc interconnect-device (QFabric System)

```
user@switch> show chassis fpc interconnect-device interconnect1 3
FPC status:
Slot State      Temp
              (C)
3  Online        0
```

### show chassis fpc interconnect-device detail (QFabric System)

```
user@switch> show chassis fpc interconnect-device interconnect1 3 detail
```

## Slot 3 information:

|             |                            |
|-------------|----------------------------|
| State       | Online                     |
| Temperature | 0 degrees C / 32 degrees F |
| Start time  | 2011-08-18 10:45:04 PDT    |
| Uptime      | 1 minute, 49 seconds       |

## show chassis fpc pic-status interconnect-device (QFabric System)

```
user@switch> show chassis fpc pic-status interconnect-device interconnect1
```

```
Slot 0  Online      QFX 16-port QSFP+ Front Card
  PIC 0  Online      16x 40G-QSFP+
  PIC 1  Online      16x 40G-GE
Slot 1  Online      QFX 16-port QSFP+ Front Card
  PIC 0  Online      16x 40G-QSFP+
  PIC 1  Online      16x 40G-GE
Slot 2  Online      QFX 16-port QSFP+ Front Card
  PIC 0  Online      16x 40G-QSFP+
  PIC 1  Online      16x 40G-GE
Slot 3  Online      QFX 16-port QSFP+ Front Card
  PIC 0  Online      16x 40G-QSFP+
  PIC 1  Online      16x 40G-GE
Slot 4  Online      QFX 16-port QSFP+ Front Card
  PIC 0  Online      16x 40G-QSFP+
  PIC 1  Online      16x 40G-GE
Slot 5  Online      QFX 16-port QSFP+ Front Card
  PIC 0  Online      16x 40G-QSFP+
  PIC 1  Online      16x 40G-GE
Slot 6  Online      QFX 16-port QSFP+ Front Card
  PIC 0  Online      16x 40G-QSFP+
  PIC 1  Online      16x 40G-GE
Slot 7  Online      QFX 16-port QSFP+ Front Card
  PIC 0  Online      16x 40G-QSFP+
  PIC 1  Online      16x 40G-GE
Slot 8  Online      QFX Fabric Rear Card
  PIC 0  Online      16x 40G-GE
Slot 9  Online      QFX Fabric Rear Card
  PIC 0  Online      16x 40G-GE
Slot 10 Online      QFX Fabric Rear Card
  PIC 0  Online      16x 40G-GE
Slot 11 Online      QFX Fabric Rear Card
  PIC 0  Online      16x 40G-GE
Slot 12 Online      QFX Fabric Rear Card
  PIC 0  Online      16x 40G-GE
Slot 13 Online      QFX Fabric Rear Card
  PIC 0  Online      16x 40G-GE
Slot 14 Online      QFX Fabric Rear Card
  PIC 0  Online      16x 40G-GE
Slot 15 Online      QFX Fabric Rear Card
  PIC 0  Online      16x 40G-GE
```

## show chassis fpc pic-status node-device (QFabric System)

```
user@switch> show chassis fpc pic-status node-device node1
```

```
Slot node1 Online      QFX 48x10G 4x40G Switch
  PIC 0  Online      48x 10G-SFP+
  PIC 1  Online      4x 40G-QSFP+
```

## show chassis fpc (PTX5000 Packet Transport Router)

```
user@host> show chassis fpc
```

| Slot | State  | Temp<br>(C) | CPU<br>Total | Utilization (%)<br>Interrupt | Memory<br>DRAM (MB) | Utilization (%)<br>Heap | Utilization (%)<br>Buffer |
|------|--------|-------------|--------------|------------------------------|---------------------|-------------------------|---------------------------|
| 0    | Empty  |             |              |                              |                     |                         |                           |
| 1    | Empty  |             |              |                              |                     |                         |                           |
| 2    | Online | 50          | 6            | 0                            | 2816                | 5                       | 27                        |
| 3    | Empty  |             |              |                              |                     |                         |                           |
| 4    | Empty  |             |              |                              |                     |                         |                           |
| 5    | Online | 48          | 9            | 0                            | 2816                | 5                       | 27                        |
| 6    | Empty  |             |              |                              |                     |                         |                           |
| 7    | Online | 49          | 8            | 0                            | 2816                | 5                       | 27                        |

### show chassis fpc detail (PTX5000 Packet Transport Router)

user@host> show chassis fpc detail

Slot 2 information:

```

State                               Online
Temperature                         35 degrees C / 95 degrees F (PMB)
Temperature                         35 degrees C / 95 degrees F (Intake)
Temperature                         50 degrees C / 122 degrees F (Exhaust A)
Temperature                         54 degrees C / 129 degrees F (Exhaust B)
Temperature                         54 degrees C / 129 degrees F (TL0)
Temperature                         52 degrees C / 125 degrees F (TQ0)
Temperature                         61 degrees C / 141 degrees F (TL1)
Temperature                         58 degrees C / 136 degrees F (TQ1)
Temperature                         57 degrees C / 134 degrees F (TL2)
Temperature                         58 degrees C / 136 degrees F (TQ2)
Temperature                         62 degrees C / 143 degrees F (TL3)
Temperature                         61 degrees C / 141 degrees F (TQ3)
Total CPU DRAM                     2816 MB
Total SRAM                         0 MB
Total SDRAM                        0 MB
Start time                         2012-01-12 12:05:42 PST
Uptime                             3 hours, 14 minutes, 7 seconds

```

Slot 5 information:

```

State                               Online
Temperature                         35 degrees C / 95 degrees F (PMB)
Temperature                         34 degrees C / 93 degrees F (Intake)
Temperature                         48 degrees C / 118 degrees F (Exhaust A)
Temperature                         53 degrees C / 127 degrees F (Exhaust B)
Temperature                         54 degrees C / 129 degrees F (TL0)
Temperature                         52 degrees C / 125 degrees F (TQ0)
Temperature                         69 degrees C / 156 degrees F (TL1)
Temperature                         56 degrees C / 132 degrees F (TQ1)
Temperature                         54 degrees C / 129 degrees F (TL2)
Temperature                         56 degrees C / 132 degrees F (TQ2)
Temperature                         59 degrees C / 138 degrees F (TL3)
Temperature                         60 degrees C / 140 degrees F (TQ3)
Total CPU DRAM                     2816 MB
Total SRAM                         0 MB
Total SDRAM                        0 MB
Start time                         2012-01-12 12:05:43 PST
Uptime                             3 hours, 14 minutes, 6 seconds

```

Slot 7 information:

```

State                               Online
Temperature                         35 degrees C / 95 degrees F (PMB)
Temperature                         33 degrees C / 91 degrees F (Intake)
Temperature                         50 degrees C / 122 degrees F (Exhaust A)
Temperature                         55 degrees C / 131 degrees F (Exhaust B)
Temperature                         56 degrees C / 132 degrees F (TL0)
Temperature                         56 degrees C / 132 degrees F (TQ0)
Temperature                         61 degrees C / 141 degrees F (TL1)

```

```

Temperature          57 degrees C / 134 degrees F (TQ1)
Temperature          55 degrees C / 131 degrees F (TL2)
Temperature          59 degrees C / 138 degrees F (TQ2)
Temperature          62 degrees C / 143 degrees F (TL3)
Temperature          62 degrees C / 143 degrees F (TQ3)
Total CPU DRAM       2816 MB
Total SRAM           0 MB
Total SDRAM          0 MB
Start time           2012-01-12 12:05:44 PST
Uptime               3 hours, 14 minutes, 5 seconds

```

#### show chassis fpc pic-status (PTX5000 Packet Transport Router)

```

user@host> show chassis fpc pic-status
Slot 2  Online      FPC
  PIC 0  Online      24x 10GE(LAN) SFP+
  PIC 1  Online      24x 10GE(LAN) SFP+
Slot 5  Online      FPC
  PIC 0  Online      24x 10GE(LAN) SFP+
  PIC 1  Online      2x 40GE CFP
Slot 7  Online      FPC
  PIC 0  Online      24x 10GE(LAN) SFP+
  PIC 1  Online      2x 40GE CFP

```

#### show chassis fpc (ACX2000 Universal Access Router)

```

user@host> show chassis fpc

```

| Slot | State  | Temp (C) | CPU Utilization (%) | Memory DRAM (MB) | Utilization (%) |
|------|--------|----------|---------------------|------------------|-----------------|
|      |        |          | Total Interrupt     | Heap             | Buffer          |
| 0    | Online | 61       | 17 6                | 512 21           | 37              |

#### show chassis fpc 0 (ACX2000 Universal Access Router)

```

user@host> show chassis fpc 0

```

| Slot | State  | Temp (C) | CPU Utilization (%) | Memory DRAM (MB) | Utilization (%) |
|------|--------|----------|---------------------|------------------|-----------------|
|      |        |          | Total Interrupt     | Heap             | Buffer          |
| 0    | Online | 61       | 17 6                | 512 21           | 37              |

#### show chassis fpc detail (ACX2000 Universal Access Router)

```

user@host> show chassis fpc detail
Slot 0 information:
State                Online
Temperature          61 degrees C / 141 degrees F
Total CPU DRAM       512 MB
Start time           2012-05-29 02:52:06 PDT
Uptime               27 minutes, 17 seconds

```

#### show chassis fpc pic-status (ACX2000 Universal Access Router)

```

user@host> show chassis fpc pic-status
Slot 0  Online
  PIC 0  Online      16x CHE1T1, RJ48
  PIC 1  Online      8x 1GE(LAN) RJ45
  PIC 2  Online      2x 1GE(LAN) SFP
  PIC 3  Online      2x 10GE(LAN) SFP+

```

#### show chassis FPC 1 (MX Routers with Media Services Blade [MSB])

```

user@switch> show chassis fpc 1

```

| Slot | State | Temp (C) | CPU Utilization (%) | Memory DRAM (MB) | Utilization (%) |
|------|-------|----------|---------------------|------------------|-----------------|
|      |       |          | Total Interrupt     | Heap             | Buffer          |

|   |        |    |   |   |      |   |    |
|---|--------|----|---|---|------|---|----|
| 1 | Online | 34 | 5 | 0 | 3072 | 5 | 13 |
|---|--------|----|---|---|------|---|----|

**show chassis FPC 1 detail (MX Routers with Media Services Blade [MSB])**

```
user@switch> show chassis fpc 1 detail
Slot 1 information:
  State                               Online
  Temperature                         34
  Total CPU DRAM                      3072 MB
  Total RLDRAM                        259 MB
  Total DDR DRAM                      4864 MB
  Start time:                         2012-06-19 10:51:43 PDT
  Uptime:                             16 minutes, 48 seconds
  Max Power Consumption               550 Watts
```

## show chassis hardware

---

|                                                             |                                                                                                                                                |
|-------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                               | show chassis hardware<br><detail   extensive><br><clei-models><br><models>                                                                     |
| <b>Syntax (EX Series)</b>                                   | show chassis hardware<br><clei-models><br><detail   extensive><br><models>                                                                     |
| <b>Syntax (T4000 Router)</b>                                | show chassis hardware<br><clei-models><br><detail   extensive><br><models>                                                                     |
| <b>Syntax (TX Matrix Router)</b>                            | show chassis hardware<br><clei-models><br><detail   extensive><br><models><br><lcc <i>number</i>   scc>                                        |
| <b>Syntax (TX Matrix Plus Router)</b>                       | show chassis hardware<br><clei-models><br><detail   extensive><br><models><br><lcc <i>number</i>   sfc <i>number</i> >                         |
| <b>Syntax (MX Series Routers)</b>                           | show chassis hardware<br><detail   extensive><br><clei-models><br><models><br><all-members><br><local><br><member <i>member-id</i> >           |
| <b>Syntax (MX2010 and MX2020 3D Universal Edge Routers)</b> | show chassis hardware<br><clei-models><br><detail   extensive><br><models>                                                                     |
| <b>Syntax (QFX Series)</b>                                  | show chassis hardware<br><detail   extensive><br><clei-models><br><interconnect-device <i>name</i> ><br><node-device <i>name</i> ><br><models> |
| <b>Syntax (PTX Series Packet Transport Routers)</b>         | show chassis hardware<br><detail   extensive><br><clei-models><br><models>                                                                     |

**Syntax (ACX Series  
Universal Access  
Routers)**    `show chassis hardware`  
                  `<detail | extensive>`  
                  `<clei-models>`  
                  `<models>`

**Release Information**    Command introduced before Junos OS Release 7.4.  
                              **models** option introduced in Junos OS Release 8.2.  
                              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 QFX Series.  
                              Command introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers.  
                              Command introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.  
                              Command introduced in Junos OS Release 12.3 for MX2020 3D Universal Edge Routers.  
                              Command introduced in Junos OS Release 12.3 for MX2010 3D Universal Edge Routers.

**Description**    Display a list of all Flexible PIC Concentrators (FPCs) and PICs installed in the router or switch chassis, including the hardware version level and serial number.

In the EX Series switch command output, FPC refers to the following:

- On EX2200 switches, EX3200 switches, EX4200 standalone switches, and EX4500 switches—Refers to the switch; FPC *number* is always 0.
- On EX4200 switches in a Virtual Chassis configuration—Refers to the member of a Virtual Chassis; FPC *number* equals the member ID, from 0 through 9.
- On EX8208 and EX8216 switches—Refers to a line card; FPC *number* equals the slot number for the line card.

On a QFX3500 standalone switch, both the FPC and FPC *number* are always 0.

On Type 5 FPC on T4000 routers, there are no **top temperature sensor** or **bottom temperature sensor** parameters. Instead, **fan intake temperature sensor** and **fan exhaust temperature sensors** parameters are displayed.

**Options**    **none**—Display information about hardware. For a TX Matrix router, display information about the TX Matrix router and its attached T640 routers. For a TX Matrix Plus router, display information about the TX Matrix Plus router and its attached routers.

**clei-models**—(Optional) Display Common Language Equipment Identifier (CLEI) barcode and model number for orderable field-replaceable units (FRUs).

**detail**—(Optional) Include RAM and disk information in output.

**extensive**—(Optional) Display ID EEPROM information.

**all-members**—(MX Series routers only) (Optional) Display hardware-specific information for all the members of the Virtual Chassis configuration.

**interconnect-device *name***—(QFabric systems only) (Optional) Display hardware-specific information for the Interconnect device.



**lcc *number***—(TX Matrix routers and TX Matrix Plus router only) (Optional) On a TX Matrix router, display hardware information for a specified T640 router (line-card chassis) that is connected to the TX Matrix router. On a TX Matrix Plus router, display hardware information for a specified router (line-card chassis) that is connected to the TX Matrix Plus router.

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

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**local**—(MX Series routers only) (Optional) Display hardware-specific information for the local Virtual Chassis members.

**member *member-id***—(MX Series routers and EX Series switches) (Optional) Display hardware-specific information for the specified member of the Virtual Chassis configuration. Replace *member-id* variable with a value 0 or 1.

**models**—(Optional) Display model numbers and part numbers for orderable FRUs and, for components that use ID EEPROM format v2, the CLEI code.

**node-device *name***—(QFabric systems only) (Optional) Display hardware-specific information for the Node device.

**scc**—(TX Matrix router only) (Optional) Display hardware information for the TX Matrix router (switch-card chassis).

**sfc *number***—(TX Matrix Plus router only) (Optional) Display hardware information for the TX Matrix Plus router (switch-fabric chassis). Replace *number* variable with 0.

**Additional Information** The **show chassis hardware detail** command now displays DIMM information for the following Routing Engines:

**Table 37: Routing Engines Displaying DIMM Information**

| Routing Engines             | Routers                         |
|-----------------------------|---------------------------------|
| RE-S-1800x2 and RE-S-1800x4 | MX240, MX480, and MX960 routers |
| RE-A-1800x2                 | M120 and M320 routers           |

**Required Privilege Level** view

**Related Documentation**

- *show chassis power*

**List of Sample Output**

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[show chassis hardware clei-models \(EX8216 Switch\) on page 448](#)  
[show chassis hardware clei-models \(T1600 Router\) on page 448](#)  
[show chassis hardware detail \(EX4200 Switch\) on page 449](#)  
[show chassis hardware models \(EX4500 Switch\) on page 449](#)  
[show chassis hardware \(J6350 Router\) on page 449](#)  
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[show chassis hardware extensive \(MX Routers with Media Services Blade \[MSB\]\) on page 556](#)

**Output Fields** [Table 38 on page 444](#) lists the output fields for the **show chassis hardware** command. Output fields are listed in the approximate order in which they appear.

**Table 38: show chassis hardware Output Fields**

| Field Name         | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Level of Output |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Item</b>        | <p>Chassis component:</p> <ul style="list-style-type: none"> <li>(EX Series switches)—Information about the chassis, Routing Engine (SRE and Routing Engine modules in EX8200 switches), power supplies, fan trays, and LCD panel. Also displays information about Flexible PIC Concentrators (FPCs) and associated Physical Interface Cards (PICs). Information about the backplane, midplane, and SIBs (SF modules) is displayed for EX8200 switches. See <i>EX Series Switches Hardware and CLI Terminology Mapping</i>.</li> <li>(MX Series routers and EX Series switches)—Information about the backplane, Routing Engine, Power Entry Modules (PEMs), and fan trays. Also displays information about Flexible PIC Concentrators (FPCs) and associated Physical Interface Cards (PICs), Modular Port Concentrators (MPCs) and associated Modular Interface Cards (MICs), or Dense Port Concentrators (DPCs). MX80 routers have a single Routing Engine and a built-in Packet Forwarding Engine that attaches directly to MICs. The Packet Forwarding Engine has two “pseudo” FPCs (FPC 0 and FPC1). MX80 routers also have a Forwarding Engine Board (FEB).</li> <li>(M Series routers, except for the M320 router)—Information about the backplane; power supplies; fan trays; Routing Engine; maxicab (the connection between the Routing Engine and the backplane, for the M40 router only); SCB, SSB, SFM, or FEB; MCS and PCG (for the M160 router only); each FPC and PIC; and each fan, blower, and impeller.</li> <li>(M120, M320, and T Series routers)—Information about the backplane, power supplies, fan trays, midplane, FPM (craft interface), CIP, PEM, SCG, CB, FPC, PIC, SFP, SPMB, and SIB.</li> <li>(QFX Series)—Information about the chassis, Routing Engine, power supplies, fan trays, Interconnect devices, and Node devices. Also displays information about Flexible PIC Concentrators (FPCs) and associated Physical Interface Cards (PICs).</li> <li>(PTX Series)—Information about the chassis, midplane, craft interface (FPM), power distribution units (PDUs) and Power Supply Modules (PSMs), Centralized Clock Generators (CCGs), Routing Engines, Control Boards (CBs) and Switch Processor Mezzanine Boards (SPMBs), Flexible PIC Concentrators (FPCs), PICs, Switch Interface Boards (SIBs), and fan trays (vertical and horizontal).</li> <li>(MX2010 and MX2020 routers)—Information about the chassis, midplane, craft interface (FPM), power midplane (PMP), Power Supply Modules (PSMs), Power Distribution Modules (PDMs), Routing Engines, Control Boards (CBs) and Switch Processor Mezzanine Boards (SPMBs), Switch Fabric Boards (SFBs), Flexible PIC Concentrators (FPCs), PICs, adapter cards (ADCs) and fan trays.</li> </ul> | All levels      |
| <b>Version</b>     | Revision level of the chassis component.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | All levels      |
| <b>Part number</b> | Part number of the chassis component.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | All levels      |

Table 38: show chassis hardware Output Fields (*continued*)

| Field Name                    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Level of Output  |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Serial number</b>          | Serial number of the chassis component. The serial number of the backplane is also the serial number of the router chassis. Use this serial number when you need to contact Juniper Networks Customer Support about the router or switch chassis.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | All levels       |
| <b>Assb ID or Assembly ID</b> | ( <b>extensive</b> keyword only) Identification number that describes the FRU hardware.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>extensive</b> |
| <b>Assembly Version</b>       | ( <b>extensive</b> keyword only) Version number of the FRU hardware.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>extensive</b> |
| <b>Assembly Flags</b>         | ( <b>extensive</b> keyword only) Flags.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>extensive</b> |
| <b>FRU model number</b>       | ( <b>clei-models</b> , <b>extensive</b> , and <b>models</b> keyword only) Model number of the FRU hardware component.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | none specified   |
| <b>CLEI code</b>              | ( <b>clei-models</b> and <b>extensive</b> keyword only) Common Language Equipment Identifier code. This value is displayed only for hardware components that use ID EEPROM format v2. This value is not displayed for components that use ID EEPROM format v1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | none specified   |
| <b>EEPROM Version</b>         | ID EEPROM version used by the hardware component: <b>0x00</b> (version 0), <b>0x01</b> (version 1), or <b>0x02</b> (version 2).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>extensive</b> |
| <b>Description</b>            | <p>Brief description of the hardware item:</p> <ul style="list-style-type: none"> <li>• Type of power supply.</li> <li>• Type of PIC. If the PIC type is not supported on the current software release, the output states <b>Hardware Not Supported</b>.</li> <li>• Type of FPC: <b>FPC Type 1</b>, <b>FPC Type 2</b>, <b>FPC Type 3</b>, <b>FPC Type 4</b>, or <b>FPC TypeOC192</b>.</li> </ul> <p>On EX Series switches, a brief description of the FPC.</p> <p>On the J Series routers, the FPC type corresponds to the Physical Interface Module (PIM). The following list shows the PIM abbreviation in the output and the corresponding PIM name.</p> <ul style="list-style-type: none"> <li>• <b>2x FE</b>—Either two built-in Fast Ethernet interfaces (fixed PIM) or dual-port Fast Ethernet PIM</li> <li>• <b>4x FE</b>—4-port Fast Ethernet ePIM</li> <li>• <b>1x GE Copper</b>—Copper Gigabit Ethernet ePIM (one 10-Mbps, 100-Mbps, or 1000-Mbps port)</li> <li>• <b>1x GE SFP</b>—SFP Gigabit Ethernet ePIM (one fiber port)</li> <li>• <b>4x GE Base PIC</b>—Four built-in Gigabit Ethernet ports on a J4350 or J6350 chassis (fixed PIM)</li> <li>• <b>2x Serial</b>—Dual-port serial PIM</li> <li>• <b>2x T1</b>—Dual-port T1 PIM</li> <li>• <b>2x E1</b>—Dual-port E1 PIM</li> <li>• <b>2x CTIE1</b>—Dual-port channelized T1/E1 PIM</li> <li>• <b>1x T3</b>—T3 PIM (one port)</li> <li>• <b>1x E3</b>—E3 PIM (one port)</li> <li>• <b>4x BRI S/T</b>—4-port ISDN BRI S/T PIM</li> </ul> | All levels       |

Table 38: show chassis hardware Output Fields (*continued*)

| Field Name | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Level of Output |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
|            | <ul style="list-style-type: none"> <li>• <b>4x BRI U</b>—4-port ISDN BRI U PIM</li> <li>• <b>1x ADSL Annex A</b>—ADSL 2/2+ Annex A PIM (one port, for POTS)</li> <li>• <b>1x ADSL Annex B</b>—ADSL 2/2+ Annex B PIM (one port, for ISDN)</li> <li>• <b>2xSHDSL (ATM)</b>—G SHDSL PIM (2-port two-wire module or 1-port four-wire module)</li> <li>• <b>1x TGM550</b>—TGM550 Telephony Gateway Module (Avaya VoIP gateway module with one console port, two analog <b>LINE</b> ports, and two analog <b>TRUNK</b> ports)</li> <li>• <b>1x DS1 TIM510</b>—TIM510 E1/T1 Telephony Interface Module (Avaya VoIP media module with one E1 or T1 trunk termination port and ISDN PRI backup)</li> <li>• <b>4x FXS, 4x FXO, TIM514</b>—TIM514 Analog Telephony Interface Module (Avaya VoIP media module with four analog <b>LINE</b> ports and four analog <b>TRUNK</b> ports)</li> <li>• <b>4x BRI TIM521</b>—TIM521 BRI Telephony Interface Module (Avaya VoIP media module with four ISDN BRI ports)</li> <li>• <b>Crypto Accelerator Module</b>—For enhanced performance of cryptographic algorithms used in IP Security (IPsec) services</li> <li>• <b>MPC M 16x 10GE</b>—16-port 10-Gigabit Module Port Concentrator that supports SFP+ optical transceivers. (Not on EX Series switches.)</li> <li>• For hosts, the Routing Engine type.</li> <li>• For small form-factor pluggable transceiver (SFP) modules, the type of fiber: <b>LX, SX, LH</b>, or <b>T</b>.</li> <li>• LCD description for EX Series switches (except EX2200 switches).</li> <li>• <b>MPC2</b>—1-port MPC2 that supports two separate slots for MICs.</li> <li>• <b>MPC3E</b>—1-port MPC3E that supports two separate slots for MICs (MIC-3D-1X100GE-CFP and MIC-3D-20GE-SFP) on MX960, MX480, and MX240 routers. The MPC3E maps one MIC to one PIC (1 MIC, 1 PIC), which differs from the mapping of legacy MPCs.</li> <li>• 100GBASE-LR4, pluggable CFP optics</li> <li>• Supports the Enhanced MX Switch Control Board with fabric redundancy and existing SCBs without fabric redundancy.</li> <li>• Interoperates with existing MX Series line cards, including Flexible Port Concentrators (FPC), Dense Port Concentrators (DPCs), and Modular Port Concentrators (MPCs).</li> <li>• <b>MPC4E</b>—Fixed configuration MPC4E that is available in two flavors: MPC4E-3D-32XGE-SFPP and MPC4E-3D-2CGE-8XGE on MX2020, MX960, MX480, and MX240 routers.</li> <li>• LCD description for MX Series routers</li> </ul> |                 |

## Sample Output

### show chassis hardware (EX8216 Switch)

```

user@host> show chassis hardware
Hardware inventory:
Item          Version  Part number  Serial number  Description
Chassis       REV 06                CY0109220035  EX8216
Midplane      REV 06      710-016845    BA0909120112  EX8216-MP
CB 0          REV 22      710-020771    AX0109197723  EX8216-RE320

```

|                  |        |            |              |                       |
|------------------|--------|------------|--------------|-----------------------|
| CB 1             | REV 22 | 710-020771 | AX0109197726 | EX8216-RE320          |
| Routing Engine 1 |        | BUILTIN    | BUILTIN      | RE-EX8216             |
| FPC 3            | REV 19 | 710-020683 | BC0109083125 | EX8200-48F            |
| CPU              | REV 13 | 710-020598 | BF0109144549 | EX8200-CPU            |
| FPC 4            | REV 17 | 710-020683 | BC0108500127 | EX8200-48F            |
| CPU              | REV 10 | 710-020598 | BF0108460510 | EX8200-CPU            |
| PIC 0            |        | BUILTIN    | BUILTIN      | 48x 100 Base-QFX/1000 |
| Base-X           |        |            |              |                       |
| Xcvr 1           | REV 01 | 740-011613 | PE70V89      | SFP-SX                |
| Xcvr 11          | REV 01 | 740-011613 | PE70YCE      | SFP-SX                |
| Xcvr 12          | REV 01 | 740-011613 | PE70VSH      | SFP-SX                |
| Xcvr 13          | REV 01 | 740-011613 | E08C02063    | SFP-SX                |
| Xcvr 14          | REV 01 | 740-011613 | PE70VKU      | SFP-SX                |
| Xcvr 15          | REV 01 | 740-011613 | E08E03372    | SFP-SX                |
| Xcvr 21          | REV 01 | 740-011613 | PE70VAD      | SFP-SX                |
| Xcvr 22          | REV 01 | 740-011613 | E08E01228    | SFP-SX                |
| Xcvr 23          | REV 01 | 740-011613 | PE70VSL      | SFP-SX                |
| Xcvr 24          | REV 01 | 740-011613 | E08E03409    | SFP-SX                |
| Xcvr 25          | REV 01 | 740-011613 | PE70VL4      | SFP-SX                |
| Xcvr 26          | REV 01 | 740-011613 | PDQ4L2Z      | SFP-SX                |
| Xcvr 27          | REV 01 | 740-011613 | PE70WFK      | SFP-SX                |
| Xcvr 28          | REV 01 | 740-011782 | PBD2B5U      | SFP-SX                |
| Xcvr 29          | REV 01 | 740-011613 | PE70UQX      | SFP-SX                |
| Xcvr 30          | REV 01 | 740-011613 | PE70VL5      | SFP-SX                |
| Xcvr 31          | REV 01 | 740-011613 | PE70V0F      | SFP-SX                |
| Xcvr 32          | REV 01 | 740-011613 | E08C02052    | SFP-SX                |
| Xcvr 33          | REV 01 | 740-011613 | E08C02197    | SFP-SX                |
| Xcvr 34          | REV 01 | 740-011613 | PE70V0L      | SFP-SX                |
| Xcvr 35          | REV 01 | 740-011613 | E08E03390    | SFP-SX                |
| Xcvr 36          | REV 01 | 740-011613 | PDQ4VL9      | SFP-SX                |
| Xcvr 37          | REV 01 | 740-011613 | E08E03370    | SFP-SX                |
| Xcvr 38          | REV 01 | 740-011613 | E08E03362    | SFP-SX                |
| Xcvr 39          | REV 01 | 740-011613 | E08C02065    | SFP-SX                |
| Xcvr 40          | REV 01 | 740-011613 | E08E03405    | SFP-SX                |
| Xcvr 41          | REV 01 | 740-011613 | E08E03411    | SFP-SX                |
| Xcvr 43          | REV 01 | 740-011613 | E08C02171    | SFP-SX                |
| Xcvr 45          | REV 01 | 740-011613 | E08E03410    | SFP-SX                |
| FPC 13           | REV 16 | 710-016837 | BB0109051344 | EX8200-8XS            |
| CPU              |        |            |              |                       |
| SIB 0            | REV 10 | 710-021613 | AY0109166244 | EX8216-SF320          |
| SIB 1            | REV 10 | 710-021613 | AY0109166357 | EX8216-SF320          |
| SIB 2            | REV 10 | 710-021613 | AY0109166362 | EX8216-SF320          |
| SIB 3            | REV 10 | 710-021613 | AY0109166338 | EX8216-SF320          |
| SIB 4            | REV 10 | 710-021613 | AY0109166350 | EX8216-SF320          |
| SIB 5            | REV 10 | 710-021613 | AY0109166365 | EX8216-SF320          |
| SIB 6            | REV 10 | 710-021613 | AY0109166361 | EX8216-SF320          |
| SIB 7            | REV 10 | 710-021613 | AY0109166399 | EX8216-SF320          |
| PSU 0            | REV 17 | 740-021466 | BG0709170003 | EX8200-AC2K           |
| PSU 1            | REV 17 | 740-021466 | BG0709170004 | EX8200-AC2K           |
| PSU 2            | REV 17 | 740-021466 | BG0709170020 | EX8200-AC2K           |
| PSU 3            | REV 17 | 740-021466 | BG0709170017 | EX8200-AC2K           |
| PSU 4            | REV 17 | 740-021466 | BG0709170008 | EX8200-AC2K           |
| PSU 5            | REV 17 | 740-021466 | BG0709170018 | EX8200-AC2K           |
| Top Fan Tray     |        |            |              |                       |
| FTC 0            | REV 4  | 760-022620 | CX1209140212 | EX8216-FT             |
| FTC 1            | REV 4  | 760-022620 | CX1209140212 | EX8216-FT             |
| Bottom Fan Tray  |        |            |              |                       |
| FTC 0            | REV 4  | 760-022620 | CX1209140211 | EX8216-FT             |
| FTC 1            | REV 4  | 760-022620 | CX1209140211 | EX8216-FT             |
| LCD 0            | REV 04 | 710-025742 | CE0109186919 | EX8200 LCD            |

**show chassis hardware clei-models (EX8216 Switch)**

```

user@host> show chassis hardware clei-models
Hardware inventory:
Item          Version  Part number  CLEI code      FRU model number
Midplane      REV 08   710-016845
PSU 0         REV 05   740-023002   COUPAEAEAA     EX8200-PWR-AC3KR
PSU 1         REV 05   740-023002   COUPAEAEAA     EX8200-PWR-AC3KR
PSU 2         REV 05   740-023002   COUPAEAEAA     EX8200-PWR-AC3KR
PSU 3         REV 05   740-023002   COUPAEAEAA     EX8200-PWR-AC3KR
PSU 4         REV 05   740-023002   COUPAEAEAA     EX8200-PWR-AC3KR
PSU 5         REV 05   740-023002   COUPAEAEAA     EX8200-PWR-AC3KR
Top Fan Tray
Bottom Fan Tray

```

**show chassis hardware clei-models (T1600 Router)**

```

user@host> show chassis hardware clei-models
Hardware inventory:
Item          Version  Part number  CLEI code      FRU model number
Midplane      REV 03   710-005608
FPM Display   REV 05   710-002897
CIP           REV 06   710-002895
PEM 0         Rev 07   740-017906   IPUPAC7KTA     PWR-T1600-3-80-DC-S
PEM 1         Rev 18   740-002595
SCG 0         REV 15   710-003423
Routing Engine 0 REV 08   740-014082
Routing Engine 1 REV 07   740-014082
CB 0          REV 05   710-007655
CB 1          REV 03   710-017707
FPC 0         REV 07   710-013558
  PIC 0       REV 01   750-010618
  PIC 1       REV 06   750-001900
  PIC 2       REV 14   750-001901
  PIC 3       REV 07   750-001900
FPC 1         REV 06   710-013553
  PIC 0       REV 08   750-001072
  PIC 1       REV 10   750-012266
  PIC 2       REV 22   750-005634
FPC 2
  PIC 0       REV 16   750-007141
  PIC 1       REV 06   750-015217
  PIC 2       REV 05   750-004695
  PIC 3       REV 17   750-009553
FPC 3         REV 01   710-010154
  PIC 0       REV 07   750-012793
  PIC 1       REV 25   750-007141
  PIC 2       REV 17   750-009553
  PIC 3       REV 32   750-003700
FPC 4         REV 16   710-013037
  PIC 1       REV 06   750-034781
FPC 5         REV 02   710-013037
  PIC 0       REV 16   750-012518
  PIC 1       REV 01   750-010850
FPC 6         REV 14   710-013037
  PIC 0       REV 11   750-017405
  PIC 1       REV 13   750-017405
FPC 7         REV 09   710-007529
  PIC 0       REV 10   750-012793
  PIC 1       REV 01   750-015217
  PIC 2       REV 01   750-015217
CHAS-BP-T640-S
CRAFT-T640-S
CIP-L-T640-S
PWR-T-DC-S
SCG-T-S
RE-A-2000-4096-S
RE-A-2000-4096-S
CB-T-S
CB-T-S
T640-FPC2-E2
PB-4GE-SFP
PB-10C48-SON-SMSR
PB-40C12-SON-SMIR
PB-10C48-SON-SMSR
T640-FPC1-E2
P-1GE-SX
PB-4GE-TYPE1-SFP-IQ2
PB-1CHOC12SMIR-QPP
PC-10GE-SFP
PC-8GE-TYPE3-SFP-IQ2
PC-TUNNEL
PC-40C48-SON-SFP
T640-FPC3-E
PC-1XGE-TYPE3-XFP-IQ2
PC-10GE-SFP
PC-40C48-SON-SFP
PC-10C192-SON-VSR
T1600-FPC4-ES
PD-1CE-CFP
T1600-FPC4-ES
PD-40C192-SON-XFP
PD-10C768-SON-SR
T1600-FPC4-ES
PD-4XGE-XFP
PD-4XGE-XFP
T640-FPC3
PC-1XGE-TYPE3-XFP-IQ2
PC-8GE-TYPE3-SFP-IQ2
PC-8GE-TYPE3-SFP-IQ2

```



|            |        |            |                    |
|------------|--------|------------|--------------------|
| PIC 3      | REV 15 | 750-009450 | PC-10C192-SON-SR2  |
| SIB 0      | REV 07 | 710-013074 | SIB-I-T1600-S      |
| SIB 1      | REV 07 | 710-013074 | SIB-I-T1600-S      |
| SIB 2      | REV 07 | 710-013074 | SIB-I-T1600-S      |
| SIB 3      | REV 07 | 710-013074 | SIB-I-T1600-S      |
| SIB 4      | REV 07 | 710-013074 | SIB-I-T1600-S      |
| Fan Tray 0 |        |            | FANTRAY-T-S        |
| Fan Tray 1 |        |            | FANTRAY-T-S        |
| Fan Tray 2 |        |            | FAN-REAR-TX-T640-S |

### show chassis hardware detail (EX4200 Switch)

```
user@host> show chassis hardware detail
Hardware inventory:
```

| Item             | Version | Part number | Serial number | Description            |
|------------------|---------|-------------|---------------|------------------------|
| Chassis          |         |             | BM0208327733  | EX4200-24T             |
| Routing Engine 0 | REV 11  | 750-021256  | BM0208327733  | EX4200-24T, 8 POE      |
| Routing Engine 0 |         |             | BM0208327733  | EX4200-24T, 8 POE      |
| FPC 0            | REV 11  | 750-021256  | BM0208327733  | EX4200-24T, 8 POE      |
| CPU              |         | BUILTIN     | BUILTIN       | FPC CPU                |
| PIC 0            |         | BUILTIN     | BUILTIN       | 24x 10/100/1000 Base-T |
| PIC 1            | REV 03B | 711-021270  | AR0208162285  | 4x GE SFP              |
| BRD              | REV 08  | 711-021264  | AK0208328289  | EX4200-24T, 8 POE      |
| Power Supply 0   | REV 03  | 740-020957  | AT0508346354  | PS 320W AC             |
| Fan Tray         |         |             |               | Fan Tray               |

### show chassis hardware models (EX4500 Switch)

```
user@host> show chassis hardware models
Hardware inventory:
```

| Item             | Version | Part number | Serial number | FRU model number  |
|------------------|---------|-------------|---------------|-------------------|
| Routing Engine 0 | REV 01  | 750-035700  | GG0210271867  | EX4500-40F-FB-C   |
| FPC 0            | REV 01  | 750-035700  | GG0210271867  | EX4500-40F-FB-C   |
| PIC 0            |         | BUILTIN     | BUILTIN       | EX4500-40F-FB-C   |
| Power Supply 1   | REV 01  | 740-029654  | H884FS00JC09  | EX4500-PWR1-AC-FB |

### show chassis hardware (J6350 Router)

```
user@host> show chassis hardware
Hardware inventory:
```

| Item           | Version | Part number | Serial number | Description                  |
|----------------|---------|-------------|---------------|------------------------------|
| Chassis        |         |             | JN1090E07ADB  | JSR6350                      |
| Midplane       | REV 03  | 710-014593  | NP1265        |                              |
| System IO      | REV 01  | 710-016210  | NN9950        | JX350 System IO              |
| Crypto Module  |         |             |               | Crypto Acceleration          |
| Routing Engine | REV 08  | 710-015273  | NM6509        | RE-J6350-3400                |
| ad0            | 248 MB  | 256MB       | CKS           | 00102006C24A00000039 Compact |
| Flash          |         |             |               |                              |
| FPC 0          |         |             |               | FPC                          |
| PIC 0          |         |             |               | 4x GE Base PIC               |
| FPC 1          | REV 06  | 750-010355  | AI07030023    | FPC                          |
| PIC 0          |         |             |               | 2x T1                        |
| FPC 3          | REV 06  | 750-011148  | AJ06520151    | FPC                          |
| PIC 0          |         |             |               | 2x E1                        |
| FPC 6          | REV 06  | 750-013492  | NC4170        | FPC                          |
| PIC 0          |         |             |               | 4x FE                        |
| Power Supply 0 |         |             |               |                              |

### show chassis hardware (J6300 Router)

```
user@host> show chassis hardware
```

## Hardware inventory:

| Item           | Version   | Part number | Serial number | Description        |
|----------------|-----------|-------------|---------------|--------------------|
| Chassis        |           |             | JN000164AB    | J6300              |
| Midplane       | REV 02.04 | 710-010001  | CORE99570     |                    |
| System IO      | REV 02.00 | 710-010003  | CORE100848    | System IO board    |
| Routing Engine | RevX2.6   | 750-010006  | IWGS40735390  | RE-J.3             |
| FPC 0          |           |             |               | FPC                |
| PIC 0          |           |             |               | 2x FE              |
| FPC 1          | RevX2.0   | 750-011380  | N3960005      | FPC                |
| PIC 0          |           |             |               | 1xADSL pic Annex A |
| FPC 2          | RevX2.0   | 750-011380  | N3960002      | FPC                |
| PIC 0          |           |             |               | 1xADSL pic Annex B |
| FPC 3          | REV 03    | 750-010354  | N0780028      | FPC                |
| PIC 0          |           |             |               | 1x T3              |

## show chassis hardware (M7i Router)

user@host&gt; show chassis hardware

## Hardware inventory:

| Item           | Version | Part number | Serial number | Description             |
|----------------|---------|-------------|---------------|-------------------------|
| Chassis        |         |             | 31959         | M7i                     |
| Midplane       | REV 02  | 710-008761  | CA0209        | M7i Midplane            |
| Power Supply 0 | Rev 04  | 740-008537  | PD10272       | AC Power Supply         |
| Routing Engine | REV 01  | 740-008846  | 1000396803    | RE-5.0                  |
| CFEB           | REV 02  | 750-009492  | CA0166        | Internet Processor IIv1 |
| FPC 0          |         |             |               | E-FPC                   |
| PIC 0          | REV 04  | 750-003163  | HJ6416        | 1x G/E, 1000 BASE-SX    |
| PIC 1          | REV 04  | 750-003163  | HJ6423        | 1x G/E, 1000 BASE-SX    |
| PIC 2          | REV 04  | 750-003163  | HJ6421        | 1x G/E, 1000 BASE-SX    |
| PIC 3          | REV 02  | 750-003163  | HJ0425        | 1x G/E, 1000 BASE-SX    |
| FPC 1          |         |             |               | E-FPC                   |
| PIC 2          | REV 01  | 750-009487  | HM2275        | ASP - Integrated        |
| PIC 3          | REV 01  | 750-009098  | CA0142        | 2x F/E, 100 BASE-TX     |

## Hardware inventory:

| Item           | Version | Part number | Serial number | Description           |
|----------------|---------|-------------|---------------|-----------------------|
| Chassis        |         |             | B1157         | M7i                   |
| Midplane       | REV 05  | 710-008761  | DM0840        | M7i Midplane          |
| Power Supply 0 | Rev 08  | 740-008537  | TE53755       | AC Power Supply       |
| Routing Engine | REV 07  | 740-011202  | 1000736567    | RE-850                |
| CFEB           | REV 09  | 750-010463  | DK6952        | Internet Processor II |
| FPC 0          |         |             |               | E-FPC                 |
| PIC 0          | REV 12  | 750-012838  | DL7993        | 4x 1GE(LAN), IQ2      |
| Xcvr 0         | REV 01  | 740-011614  | PD94TDJ       | SFP-LX10              |
| Xcvr 1         | REV 01  | 740-011615  | PAD5EER       | UNSUPPORTED           |
| Xcvr 2         | REV 01  | 740-011614  | PD94THU       | SFP-LX10              |
| Xcvr 3         |         | NON-JNPR    | PDC2E7A       | SFP-LX10              |
| PIC 1          | REV 03  | 750-023116  | JT0203        | 4x CHSTM1 SDH CE SFP  |
| Xcvr 0         | REV 01  | 740-012434  | AGT063832PS   | SFP-SR                |
| Xcvr 1         | REV 01  | 740-012434  | AGT063832LY   | SFP-SR                |
| Xcvr 3         | REV 01  | 740-016064  | C06J19018     | SFP-LR                |
| PIC 2          | REV 15  | 750-014895  | DM5757        | MultiServices 100     |
| PIC 3          | REV 01  | 750-025390  | JW9448        | 12x T1/E1 CE          |
| FPC 1          |         |             |               | E-FPC                 |
| PIC 2          |         | BUILTIN     | BUILTIN       | 1x Tunnel             |
| PIC 3          | REV 09  | 750-009099  | DM0899        | 1x G/E, 1000 BASE     |
| Xcvr 0         | REV 01  | 740-012434  | AGT07150HGJ   | UNSUPPORTED           |
| Fan Tray       |         |             |               | Rear Fan Tray         |

## show chassis hardware (M10 Router)

user@host&gt; show chassis hardware

## Hardware inventory:

| Item           | Version | Part number | Serial number    | Description           |
|----------------|---------|-------------|------------------|-----------------------|
| Chassis        |         |             | 1122             | M10                   |
| Midplane       | REV 1.1 | 710-001950  | S/N AC6626       |                       |
| Power supply A | Rev 01  | 740-002497  | S/N LC36095      | AC                    |
| Power supply B | Rev 01  | 740-002497  | S/N LC36100      | AC                    |
| Display        | REV 1.2 | 710-001995  | S/N AC6656       |                       |
| Host           |         |             | 18000005dfb3fb01 | teknor                |
| FEB            | REV 01  | 710-001948  | S/N AC6632       | Internet Processor II |
| FPC 0          |         |             |                  |                       |
| PIC 0          | REV 08  | 750-001072  | S/N AB2485       | 1x G/E, 1000 BASE-SX  |
| PIC 1          | REV 01  | 750-000613  | S/N AA1048       | 1x OC-12 SONET, SMIR  |
| FPC 1          |         |             |                  |                       |
| Fan Tray 0     |         |             |                  | FANTRAY-M10I-S        |
| Fan Tray 1     |         |             |                  | FANTRAY-M10I-S        |

## show chassis hardware models (M10 Router)

user@host&gt; show chassis hardware models

## Hardware inventory:

| Item             | Version | Part number | CLEI code | FRU model number  |
|------------------|---------|-------------|-----------|-------------------|
| Midplane         | REV 04  | 710-008920  |           | CHAS-MP-M10i-S    |
| Power Supply 0   | Rev 06  | 740-008537  |           | PWR-M10i-M7i-AC-S |
| Power Supply 1   | Rev 06  | 740-008537  |           | PWR-M10i-M7i-AC-S |
| HCM 0            | REV 03  | 710-010580  |           | HCM-M10i-S        |
| HCM 1            | REV 03  | 710-010580  |           | HCM-M10i-S        |
| Routing Engine 0 | REV 09  | 740-009459  |           | RE-400-256-S      |
| CFEB 0           | REV 05  | 750-010465  |           | FEB-M10i-M7i-S    |
| FPC 0            |         |             |           |                   |
| PIC 0            | REV 10  | 750-002971  |           | PE-40C3-SON-MM    |
| PIC 1            | REV 11  | 750-002992  |           | PE-4FE-TX         |
| PIC 2            | REV 03  | 750-002977  |           | PE-20C3-ATM-MM    |
| PIC 3            | REV 08  | 750-005724  |           | PE-20C3-ATM2-MM   |
| FPC 1            |         |             |           |                   |
| PIC 2            | REV 12  | 750-008425  |           | PE-AS             |
| PIC 3            | REV 13  | 750-005636  |           | PE-4CHDS3-QPP     |
| Fan Tray 0       |         |             |           | FANTRAY-M10I-S    |
| Fan Tray 1       |         |             |           | FANTRAY-M10I-S    |

## show chassis hardware (M20 Router)

user@host&gt; show chassis hardware

## Hardware inventory:

| Item           | Version | Part number | Serial number    | Description           |
|----------------|---------|-------------|------------------|-----------------------|
| Chassis        |         |             | 20033            | M20                   |
| Backplane      | REV 07  | 710-001517  | S/N AA7940       |                       |
| Power supply B | Rev 01  | 740-001465  | S/N 000001       | AC                    |
| Display        | REV 02  | 710-001519  | S/N AA9704       |                       |
| Host 0         |         |             | 98000004f8f27501 | teknor                |
| SSB slot 0     | REV 01  | 710-001951  | S/N AD5905       | Internet Processor II |
| SSRAM bank 0   | REV 01  | 710-001385  | S00480           | 2 MB                  |
| SSRAM bank 1   | REV 01  | 710-001385  | S00490           | 2 MB                  |
| SSRAM bank 2   | REV 01  | 710-001385  | S001:?           | 2 MB                  |
| SSRAM bank 3   | REV 01  | 710-001385  | S00483           | 2 MB                  |
| SSB slot 1     | N/A     | N/A         | N/A              | Backup                |
| FPC 1          | REV 01  | 710-001292  | S/N AB7528       |                       |
| SSRAM          | REV 01  | 710-000077  | S/N 304209       | 1 MB                  |
| SDRAM bank 0   | REV 01  | 710-000099  | S/N 000603       | 64 MB                 |
| SDRAM bank 1   | REV 01  | 710-000099  | S/N 000414       | 64 MB                 |
| PIC 0          | REV 03  | 750-000612  | S/N AB8433       | 2x OC-3 ATM, MM       |
| PIC 1          | REV 01  | 750-000616  | S/N AA1168       | 1x OC-12 ATM, MM      |

|              |        |            |            |                       |
|--------------|--------|------------|------------|-----------------------|
| PIC 2        | REV 01 | 750-000613 | S/N AA1008 | 1x OC-12 SONET, SMIR  |
| PIC 3        | REV 01 | 750-002501 | S/N AD5810 | 4x E3                 |
| FPC 2        | REV 01 | 710-001292 | S/N AC0119 |                       |
| SSRAM        | REV 01 | 710-000077 | S/N 503241 | 1 MB                  |
| SDRAM bank 0 | REV 01 | 710-000099 | S/N 306835 | 64 MB                 |
| SDRAM bank 1 | REV 01 | 710-000099 | S/N 306832 | 64 MB                 |
| Fan Tray 0   |        |            |            | Front Upper Fan Tray  |
| Fan Tray 1   |        |            |            | Front Middle Fan Tray |
| Fan Tray 2   |        |            |            | Front Bottom Fan Tray |
| Fan Tray 3   |        |            |            | Rear Fan Tray         |

### show chassis hardware models (M20 Router)

```
user@host> show chassis hardware models
```

Hardware inventory:

| Item             | Version | Part number | CLEI code | FRU model number |
|------------------|---------|-------------|-----------|------------------|
| Backplane        | REV 03  | 710-002334  |           | CHAS-MP-M20-S    |
| Power Supply A   | REV 06  | 740-001465  |           | PWR-M20-AC-S     |
| Display          | REV 04  | 710-001519  |           | CRAFT-M20-S      |
| Routing Engine 0 | REV 06  | 740-003239  |           | RE-333-768-S     |
| Routing Engine 1 | REV 06  | 740-003239  |           | RE-333-768-S     |
| SSB 0            | REV 02  | 710-001951  |           | SSB-E-M20        |
| SSB 1            | N/A     | N/A         |           |                  |
| FPC 0            | REV 03  | 710-003308  |           | FPC-E            |
| PIC 0            | REV 08  | 750-002303  |           | P-4FE-TX         |
| PIC 1            | REV 07  | 750-004745  |           | P-2MCDS3         |
| PIC 2            | REV 03  | 750-002965  |           | PE-4CHDS3        |
| FPC 1            | REV 03  | 710-003308  |           | FPC-E            |
| PIC 0            | REV 03  | 750-002914  |           | P-2OC3-ATM-MM    |
| Fan Tray 0       |         |             |           | FANTRAY-F-M20-S  |
| Fan Tray 1       |         |             |           | FANTRAY-F-M20-S  |
| Fan Tray 2       |         |             |           | FANTRAY-F-M20-S  |
| Fan Tray 3       |         |             |           | FANTRAY-R-M20-S  |

### show chassis hardware (M40 Router)

```
user@host> show chassis hardware
```

Hardware inventory:

| Item           | Version | Part number | Serial number | Description          |
|----------------|---------|-------------|---------------|----------------------|
| Backplane      | REV 02  | 710-000073  | S/N AA0053    |                      |
| Power supply A | Rev 2   | 740-000235  | S/N 000042    | DC                   |
| Maxicab        | REV X1  | 710-000229  | S/N AA0139    |                      |
| Minicab        | REV X1  | 710-000482  | S/N AA0201    |                      |
| Display        | REV 06  | 710-000150  | S/N AA0905    |                      |
| Host           |         |             |               | cpv5000              |
| SCB            | REV X1  | 710-000075  | S/N AA0158    | Internet Processor I |
| SSRAM bank 0   | REV 02  | 710-000077  | S/N AA2267    | 1 MB                 |
| SSRAM bank 1   | REV 02  | 710-000077  | S/N AA2270    | 1 MB                 |
| SSRAM bank 2   | REV 02  | 710-000077  | S/N AA2269    | 1 MB                 |
| SSRAM bank 3   | REV 02  | 710-000077  | S/N AA2268    | 1 MB                 |
| FPC 0          | REV 01  | 710-000175  | S/N AA0048    |                      |
| SSRAM          | REV 01  | 710-000077  | S/N AA2333    | 1 MB                 |
| SDRAM bank 0   | REV 01  | 710-000099  | S/N AA2332    | 64 MB                |
| SDRAM bank 1   | REV X1  | 710-000099  | S/N AA2337    | 64 MB                |
| PIC 0          | REV 04  | 750-000613  | S/N aa0343    | 1x OC-12 SONET, SMIR |
| PIC 1          | REV 04  | 750-000613  | S/N AA0379    | 1x OC-12 SONET, SMIR |
| PIC 2          | REV 04  | 750-000613  | S/N AA0377    | 1x OC-12 SONET, SMIR |
| PIC 3          | REV 04  | 750-000613  | S/N AA0378    | 1x Tunnel            |
| FPC 2          | REV 01  | 710-000175  | S/N AA0042    |                      |
| SSRAM          | REV 02  | 710-000077  | S/N AA2288    | 1 MB                 |
| SDRAM bank 0   | REV 01  | 710-000099  | S/N AA2331    | 64 MB                |

|              |        |            |            |                      |
|--------------|--------|------------|------------|----------------------|
| SDRAM bank 1 | REV 01 | 710-000099 | S/N AA2330 | 64 MB                |
| PIC 0        | REV X1 | 750-000603 | S/N AA0143 | 4x OC-3 SONET, SMIR  |
| PIC 1        | REV X1 | 750-000615 | S/N AA0149 | 4x OC-3 SONET, MM    |
| PIC 2        | REV X1 | 750-000611 | S/N AA0148 | 4x OC-3 SONET, MM    |
| PIC 3        | REV 04 | 750-000613 | S/N AA0330 | 1x OC-12 SONET, SMIR |
| FPC 4        | REV 01 | 710-000175 | S/N AA0050 |                      |
| SSRAM        | REV 01 | 710-000077 | S/N AA2327 | 1 MB                 |
| SDRAM bank 0 | REV 01 | 710-000099 | S/N AA2329 | 64 MB                |
| SDRAM bank 1 | REV 01 | 710-000099 | S/N AA2328 | 64 MB                |
| PIC 0        | REV 04 | 750-000613 | S/N AA0320 | 1x OC-12 SONET, SMIR |
| PIC 2        | REV 05 | 750-000616 | S/N AA1341 | 1x OC-12 ATM, MM     |
| PIC 3        | REV 08 | 750-001072 | S/N AB2462 | 1x G/E, 1000 BASE-SX |
| FPC 5        | REV 10 | 710-000175 | S/N AA7663 |                      |
| SSRAM        | REV 01 | 710-000077 | S/N 501590 | 1 MB                 |
| SDRAM bank 0 | REV 01 | 710-000099 | S/N 300949 | 64 MB                |
| SDRAM bank 1 | REV 01 | 710-000099 | S/N 300868 | 64 MB                |
| PIC 1        | REV 01 | 750-001323 | S/N AB1670 | 1x Tunnel            |

### show chassis hardware (M40e Router)

```
user@host> show chassis hardware
```

Hardware inventory:

| Item        | Version | Part number | Serial number    | Description           |
|-------------|---------|-------------|------------------|-----------------------|
| Chassis     |         |             |                  | m40e                  |
| Midplane    | REV 01  | 710-005071  | AX3671           |                       |
| FPM CMB     | REV 03  | 710-001642  | AR9074           |                       |
| FPM Display | REV 03  | 710-001647  | AR7331           |                       |
| CIP         | REV 04  | 710-002649  | BB4449           |                       |
| PEM 0       | Rev 01  | 740-003787  | MC12364          | Power Entry Module    |
| PEM 1       | Rev 01  | 740-003787  | MC12383          | Power Entry Module    |
| PCG 0       | REV 07  | 710-001568  | AG1332           |                       |
| PCG 1       | REV 07  | 710-001568  | AR3789           |                       |
| Host 0      |         |             | 3e000007c8176601 | Present               |
| MCS 0       | REV 11  | 710-001226  | AN5813           |                       |
| SFM 0 SPP   | REV 07  | 710-001228  | AG4676           |                       |
| SFM 0 SPR   | REV 05  | 710-002189  | AE4735           | Internet Processor II |
| SFM 1 SPP   | REV 07  | 710-001228  | AP1347           |                       |
| SFM 1 SPR   | REV 05  | 710-002189  | BE0063           | Internet Processor II |
| FPC 0       | REV 01  | 710-011725  | BE0669           | M40e-EP-FPC Type 1    |
| CPU         | REV 01  | 710-004600  | BD9504           |                       |
| PIC 0       | REV 03  | 750-003737  | AY3991           | 4x G/E, 1000 BASE-SX  |
| FPC 1       | REV 01  | 710-005197  | BD9842           | M40e-FPC Type 2       |
| CPU         | REV 01  | 710-004600  | BB4869           |                       |
| PIC 0       | REV 07  | 750-001900  | AR8278           | 1x OC-48 SONET, SMSR  |
| FPC 2       | REV 02  | 710-005197  | BD9824           | M40e-FPC Type 2       |
| CPU         | REV 01  | 710-004600  | BD9531           |                       |
| PIC 0       | REV 03  | 750-003737  | AY3986           | 4x G/E, 1000 BASE-SX  |
| FPC 4       | REV 02  | 710-005078  | BE0664           | M40e-FPC Type 1       |
| CPU         | REV 01  | 710-004600  | BD9559           |                       |
| PIC 0       | REV 03  | 750-001894  | AG7963           | 1x G/E, 1000 BASE-SX  |
| PIC 2       | REV 01  | 750-002575  | AF2472           | 4x OC-3 SONET, SMIR   |
| FPC 6       | REV 02  | 710-005078  | BE0652           | M40e-FPC Type 1       |
| CPU         | REV 01  | 710-004600  | BD9607           |                       |
| PIC 0       | REV 02  | 750-002911  | AN2286           | 4x F/E, 100 BASE-TX   |
| PIC 2       | REV 01  | 750-002577  | AP6345           | 4x OC-3 SONET, MM     |

### show chassis hardware (M120 Router)

```
user@host> show chassis hardware
```

Hardware inventory:

| Item | Version | Part number | Serial number | Description |
|------|---------|-------------|---------------|-------------|
|------|---------|-------------|---------------|-------------|

|                  |                                |            |              |                         |
|------------------|--------------------------------|------------|--------------|-------------------------|
| Chassis          |                                |            | JN000054AC   | M120                    |
| Midplane         | REV 01                         | 710-013667 | RB4170       | M120 Midplane           |
| FPM Board        | REV 02                         | 710-011407 | CJ9186       | M120 FPM Board          |
| FPM Display      | REV 02                         | 710-011405 | CJ9173       | M120 FPM Display        |
| FPM CIP          | REV 02                         | 710-011410 | CJ9221       | M120 FPM CIP            |
| PEM 0            | Rev 05                         | 740-011936 | RM28320      | AC Power Entry Module   |
| PEM 1            | Rev 05                         | 740-011936 | RM28321      | AC Power Entry Module   |
| Routing Engine 0 | REV 03                         | 740-014080 | 1000642883   | RE-A-1000               |
| CB 0             | REV 03                         | 710-011403 | CM8346       | M120 Control Board      |
| CB 1             | REV 06                         | 710-011403 | CP6728       | M120 Control Board      |
| FPC 1            | REV 02                         | 710-015908 | CP6925       | M120 CFPC 10GE          |
| PIC 0            |                                | BUILTIN    | BUILTIN      | 1x 10GE(LAN/WAN) XFP    |
| Xcvr 0           | REV 01                         | 740-014279 | 62E204N00007 | XFP-10G-LR              |
| FPC 3            | REV 03                         | 710-011393 | CJ9234       | M120 FPC Type 2         |
| PIC 0            | REV 16                         | 750-008155 | NB5229       | 2x G/E IQ, 1000 BASE    |
| Xcvr 0           | REV 01                         | 740-011613 | P9F15JB      | SFP-SX                  |
| Xcvr 1           | REV 01                         | 740-007326 | P4Q0R9G      | SFP-SX                  |
| PIC 1            | REV 09                         | 750-007745 | CG4360       | 4x OC-3 SONET, SMIR     |
| PIC 2            | REV 16                         | 750-008155 | ND7787       | 2x G/E IQ, 1000 BASE    |
| Xcvr 0           | REV 01                         | 740-011613 | P9F12AS      | SFP-SX                  |
| Xcvr 1           | REV 01                         | 740-011613 | P9F1ALU      | SFP-SX                  |
| PIC 3            | REV 07                         | 750-011800 | JW1284       | 8x 1GE(LAN), IQ2        |
| Xcvr 0           | REV 01                         | 740-011613 | P9F1AM6      | SFP-SX                  |
| Xcvr 6           | REV 01                         | 740-011613 | P9F16NN      | SFP-SX                  |
| Xcvr 7           | REV 01                         | 740-011782 | P8C29Y7      | SFP-SX                  |
| Board B          | REV 02                         | 710-011395 | CN3754       | M120 FPC Mezz           |
| FPC 4            | REV 02                         | 710-011398 | CP6741       | M120 FPC Type 3         |
| PIC 0            | REV 16                         | 750-007141 | NB2855       | 10x 1GE(LAN), 1000 BASE |
| Xcvr 0           | REV 01                         | 740-011782 | P922A1F      | SFP-SX                  |
| Xcvr 1           | REV 01                         | 740-011782 | P922A16      | SFP-SX                  |
| Xcvr 2           | REV 01                         | 740-011782 | P922A0U      | SFP-SX                  |
| Xcvr 3           | REV 01                         | 740-011782 | P9229UZ      | SFP-SX                  |
| Xcvr 4           | REV 01                         | 740-009029 | P11JXWP      | SFP-LX                  |
| Xcvr 6           | REV 01                         | 740-011613 | P9F1ALW      | SFP-SX                  |
| FPC 5            | REV 01                         | 710-011388 | CJ9088       | M120 FPC Type 1         |
| PIC 0            | *** Hardware Not Supported *** |            |              |                         |
| PIC 1            | REV 05                         | 750-012052 | NB0410       | 1x CHOC3 IQ SONET, SMLR |
| PIC 2            | REV 01                         | 750-013167 | CM3824       | 4x CHDS3 IQ             |
| PIC 3            | REV 01                         | 750-010240 | CB5366       | 1x G/E SFP, 1000 BASE   |
| Board B          | REV 01                         | 710-011390 | CJ9103       | M120 FPC Mezz Board     |
| FEB 3            | REV 04                         | 710-011663 | CP6673       | M120 FEB                |
| FEB 4            | REV 04                         | 710-011663 | CJ9368       | M120 FEB                |
| FEB 5            | REV 04                         | 710-011663 | CJ9386       | M120 FEB                |
| Fan Tray 0       |                                |            |              | Front Top Fan Tray      |
| Fan Tray 1       |                                |            |              | Front Bottom Fan Tray   |
| Fan Tray 2       |                                |            |              | Rear Top Fan Tray       |
| Fan Tray 3       |                                |            |              | Rear Bottom Fan Tray    |

### show chassis hardware detail (M120 Router)

```
user@host> show chassis hardware detail
```

```
Hardware inventory:
```

| Item        | Version | Part number | Serial number | Description           |
|-------------|---------|-------------|---------------|-----------------------|
| Chassis     |         |             | JN000054AC    | M120                  |
| Midplane    | REV 01  | 710-013667  | RB4170        | M120 Midplane         |
| FPM Board   | REV 02  | 710-011407  | CJ9186        | M120 FPM Board        |
| FPM Display | REV 02  | 710-011405  | CJ9173        | M120 FPM Display      |
| FPM CIP     | REV 02  | 710-011410  | CJ9221        | M120 FPM CIP          |
| PEM 0       | Rev 05  | 740-011936  | RM28320       | AC Power Entry Module |

|                  |                                |                                              |                |                         |
|------------------|--------------------------------|----------------------------------------------|----------------|-------------------------|
| PEM 1            | Rev 05                         | 740-011936                                   | RM28321        | AC Power Entry Module   |
| Routing Engine 0 | REV 03                         | 740-014080                                   | 1000642883     | RE-A-1000               |
| ad0 248 MB       |                                | SILICONSYSTEMS INC 256M 126CT505S0763SC00110 |                | Compact Flash           |
| ad2 38154 MB     |                                | HTE541040G9SA00                              | MPBBT0X2HS2E3M | Hard Disk               |
| CB 0             | REV 03                         | 710-011403                                   | CM8346         | M120 Control Board      |
| CB 1             | REV 06                         | 710-011403                                   | CP6728         | M120 Control Board      |
| FPC 1            | REV 02                         | 710-015908                                   | CP6925         | M120 CFPC 10GE          |
| PIC 0            |                                | BUILTIN                                      | BUILTIN        | 1x 10GE(LAN/WAN) XFP    |
| Xcvr 0           | REV 01                         | 740-014279                                   | 62E204N00007   | XFP-10G-LR              |
| FPC 3            | REV 03                         | 710-011393                                   | CJ9234         | M120 FPC Type 2         |
| PIC 0            | REV 16                         | 750-008155                                   | NB5229         | 2x G/E IQ, 1000 BASE    |
| Xcvr 0           | REV 01                         | 740-011613                                   | P9F15JB        | SFP-SX                  |
| Xcvr 1           | REV 01                         | 740-007326                                   | P4Q0R9G        | SFP-SX                  |
| PIC 1            | REV 09                         | 750-007745                                   | CG4360         | 4x OC-3 SONET, SMIR     |
| PIC 2            | REV 16                         | 750-008155                                   | ND7787         | 2x G/E IQ, 1000 BASE    |
| Xcvr 0           | REV 01                         | 740-011613                                   | P9F12AS        | SFP-SX                  |
| Xcvr 1           | REV 01                         | 740-011613                                   | P9F1ALU        | SFP-SX                  |
| PIC 3            | REV 07                         | 750-011800                                   | JW1284         | 8x 1GE(LAN), IQ2        |
| Xcvr 0           | REV 01                         | 740-011613                                   | P9F1AM6        | SFP-SX                  |
| Xcvr 6           | REV 01                         | 740-011613                                   | P9F16NN        | SFP-SX                  |
| Xcvr 7           | REV 01                         | 740-011782                                   | P8C29Y7        | SFP-SX                  |
| Board B          | REV 02                         | 710-011395                                   | CN3754         | M120 FPC Mezz           |
| FPC 4            | REV 02                         | 710-011398                                   | CP6741         | M120 FPC Type 3         |
| PIC 0            | REV 16                         | 750-007141                                   | NB2855         | 10x 1GE(LAN), 1000 BASE |
| Xcvr 0           | REV 01                         | 740-011782                                   | P922A1F        | SFP-SX                  |
| Xcvr 1           | REV 01                         | 740-011782                                   | P922A16        | SFP-SX                  |
| Xcvr 2           | REV 01                         | 740-011782                                   | P922A0U        | SFP-SX                  |
| Xcvr 3           | REV 01                         | 740-011782                                   | P9229UZ        | SFP-SX                  |
| Xcvr 4           | REV 01                         | 740-009029                                   | P11JXWP        | SFP-LX                  |
| Xcvr 6           | REV 01                         | 740-011613                                   | P9F1ALW        | SFP-SX                  |
| FPC 5            | REV 01                         | 710-011388                                   | CJ9088         | M120 FPC Type 1         |
| PIC 0            | *** Hardware Not Supported *** |                                              |                |                         |
| PIC 1            | REV 05                         | 750-012052                                   | NB0410         | 1x CHOC3 IQ SONET, SMLR |
| PIC 2            | REV 01                         | 750-013167                                   | CM3824         | 4x CHDS3 IQ             |
| PIC 3            | REV 01                         | 750-010240                                   | CB5366         | 1x G/E SFP, 1000 BASE   |
| Board B          | REV 01                         | 710-011390                                   | CJ9103         | M120 FPC Mezz Board     |
| FEB 3            | REV 04                         | 710-011663                                   | CP6673         | M120 FEB                |
| FEB 4            | REV 04                         | 710-011663                                   | CJ9368         | M120 FEB                |
| FEB 5            | REV 04                         | 710-011663                                   | CJ9386         | M120 FEB                |
| Fan Tray 0       |                                |                                              |                | Front Top Fan Tray      |
| Fan Tray 1       |                                |                                              |                | Front Bottom Fan Tray   |
| Fan Tray 2       |                                |                                              |                | Rear Top Fan Tray       |
| Fan Tray 3       |                                |                                              |                | Rear Bottom Fan Tray    |

### show chassis hardware models (M120 Router)

```

user@host> show chassis hardware models
Hardware inventory:
Item          Version  Part number  CLEI code  FRU model number
Midplane      REV 01   710-013667
FPM CIP       REV 02   710-011410
PEM 0         Rev 05   740-011936
PEM 1         Rev 05   740-011936
Routing Engine 0 REV 03   740-014080
CB 0          REV 03   710-011403
CB 1          REV 06   710-011403
FPC 1         REV 02   710-015908
FPC 3
PIC 0         REV 16   750-008155

```

CRAFT-M120-S  
 PWR-M120-AC-S  
 PWR-M120-AC-S  
 RE-A-1000-2048-S  
 CB-M120-S  
 CB-M120-S  
 M120-cFPC-1XGE-XFP  
 PB-2GE-SFP-QPP

|            |        |            |                      |
|------------|--------|------------|----------------------|
| PIC 1      | REV 09 | 750-007745 | PC-40C3-SON-SMIR     |
| PIC 2      | REV 16 | 750-008155 | PB-2GE-SFP-QPP       |
| PIC 3      | REV 07 | 750-011800 | PB-8GE-TYPE2-SFP-IQ2 |
| FPC 4      |        |            |                      |
| PIC 0      | REV 16 | 750-007141 | PC-10GE-SFP          |
| FPC 5      |        |            |                      |
| PIC 1      | REV 05 | 750-012052 | PB-1CHOC3-SMIR-QPP   |
| PIC 2      | REV 01 | 750-013167 | PE-4CHDS3-QPP        |
| PIC 3      | REV 01 | 750-010240 | PB-1GE-SFP           |
| Fan Tray 0 |        |            | FFANTRAY-M120-S      |
| Fan Tray 1 |        |            | FFANTRAY-M120-S      |
| Fan Tray 2 |        |            | RFANTRAY-M120-S      |
| Fan Tray 3 |        |            | RFANTRAY-M120-S      |

### show chassis hardware (M160 Router)

```
user@host> show chassis hardware
```

| Item        | Version | Part number | Serial number    | Description          |
|-------------|---------|-------------|------------------|----------------------|
| Chassis     |         |             | 101              | M160                 |
| Midplane    | REV 02  | 710-001245  | S/N AB4107       |                      |
| FPM CMB     | REV 01  | 710-001642  | S/N AA2911       |                      |
| FPM Display | REV 01  | 710-001647  | S/N AA2999       |                      |
| CIP         | REV 02  | 710-001593  | S/N AA9563       |                      |
| PEM 0       | Rev 01  | 740-001243  | S/N KJ35769      | DC                   |
| PEM 1       | Rev 01  | 740-001243  | S/N KJ35765      | DC                   |
| PCG 0       | REV 01  | 710-001568  | S/N AA9794       |                      |
| PCG 1       | REV 01  | 710-001568  | S/N AA9804       |                      |
| Host 1      |         |             | da000004f8d57001 | teknor               |
| MCS 1       | REV 03  | 710-001226  | S/N AA9777       |                      |
| SFM 0 SPP   | REV 04  | 710-001228  | S/N AA2975       |                      |
| SFM 0 SPR   | REV 02  | 710-001224  | S/N AA9838       | Internet Processor I |
| SFM 1 SPP   | REV 04  | 710-001228  | S/N AA2860       |                      |
| SFM 1 SPR   | REV 01  | 710-001224  | S/N AB0139       | Internet Processor I |
| FPC 0       | REV 03  | 710-001255  | S/N AA9806       | FPC Type 1           |
| CPU         | REV 02  | 710-001217  | S/N AA9590       |                      |
| PIC 1       | REV 05  | 750-000616  | S/N AA1527       | 1x OC-12 ATM, MM     |
| PIC 2       | REV 05  | 750-000616  | S/N AA1535       | 1x OC-12 ATM, MM     |
| PIC 3       | REV 01  | 750-000616  | S/N AA1519       | 1x OC-12 ATM, MM     |
| FPC 1       | REV 02  | 710-001611  | S/N AA9523       | FPC Type 2           |
| CPU         | REV 02  | 710-001217  | S/N AA9571       |                      |
| PIC 0       | REV 03  | 750-001900  | S/N AA9626       | 1x STM-16 SDH, SMIR  |
| PIC 1       | REV 01  | 710-002381  | S/N AD3633       | 2x G/E, 1000 BASE-SX |
| FPC 2       |         |             |                  | FPC Type OC192       |
| CPU         | REV 03  | 710-001217  | S/N AB3329       |                      |
| PIC 0       | REV 01  |             |                  | 1x OC-192 SM SR-2    |
| Fan Tray 0  |         |             |                  | Rear Bottom Blower   |
| Fan Tray 1  |         |             |                  | Rear Top Blower      |
| Fan Tray 2  |         |             |                  | Front Top Blower     |
| Fan Tray 3  |         |             |                  | Front Fan Tray       |

### show chassis hardware models (M160 Router)

```
user@host> show chassis hardware models
```

| Hardware inventory: |         |             |           |                  |
|---------------------|---------|-------------|-----------|------------------|
| Item                | Version | Part number | CLEI code | FRU model number |
| Midplane            | REV 03  | 710-009120  |           | CHAS-BP-M320-S   |
| FPM Display         | REV 02  | 710-009351  |           | CRAFT-M320-S     |
| CIP                 | REV 03  | 710-005926  |           | CIP-M320-S       |
| PEM 2               | Rev X4  | 740-009148  |           | PWR-M-DC-S       |
| PEM 3               | Rev X4  | 740-009148  |           | PWR-M-DC-S       |
| Routing Engine 0    | REV 02  | 740-008883  |           | RE-1600-2048-S   |



|                  |        |            |                    |
|------------------|--------|------------|--------------------|
| Routing Engine 1 | REV 02 | 740-008883 | RE-1600-2048-S     |
| FPC 0            | REV 02 | 710-010419 | M320-FPC1          |
| PIC 0            | REV 01 | 750-001323 | P-TUNNEL           |
| PIC 1            | REV 02 | 750-002987 | PE-10C12-SON-SMIR  |
| PIC 2            | REV 04 | 750-001894 | PB-1GE-SX          |
| PIC 3            | REV 04 | 750-001896 | PB-10C12-SON-SMIR  |
| FPC 1            | REV 02 | 710-010419 | M320-FPC1          |
| PIC 0            | REV 04 | 750-001894 | PB-1GE-SX          |
| PIC 1            | REV 04 | 750-001894 | PB-1GE-SX          |
| PIC 3            | REV 03 | 750-001894 | PB-1GE-SX          |
| FPC 2            | REV 02 | 710-010419 | M320-FPC1          |
| PIC 0            | REV 10 | 750-005634 | PB-1CHOC12SMIR-QPP |
| PIC 1            | REV 10 | 750-005634 | PB-1CHOC12SMIR-QPP |
| PIC 2            | REV 07 | 750-005634 | PB-1CHOC12SMIR-QPP |
| PIC 3            | REV 07 | 750-005634 | PB-1CHOC12SMIR-QPP |
| PIC 1            | REV 10 | 750-005634 | PB-1CHOC12SMIR-QPP |
| PIC 2            | REV 07 | 750-005634 | PB-1CHOC12SMIR-QPP |
| PIC 3            | REV 07 | 750-005634 | PB-1CHOC12SMIR-QPP |
| FPC 3            |        |            |                    |
| PIC 0            | REV 03 | 750-001895 | PB-10C12-SON-MM    |
| PIC 1            | REV 04 | 750-001894 | PB-1GE-SX          |
| PIC 3            | REV 04 | 750-003141 | PB-1GE-SX-B        |
| FPC 4            | REV 02 | 710-010419 | M320-FPC1          |
| FPC 5            | REV 02 | 710-010419 | M320-FPC1          |
| FPC 6            | REV 02 | 710-010419 | M320-FPC1          |
| FPC 7            |        |            |                    |
| PIC 0            | REV 15 | 750-001901 | PB-40C12-SON-SMIR  |
| PIC 1            | REV 06 | 750-001900 | PB-10C48-SON-SMSR  |
| PIC 2            | REV 07 | 750-001900 | PB-10C48-SON-SMSR  |
| PIC 3            | REV 05 | 750-003737 | PB-4GE-SX          |
| SIB 0            | REV 03 | 710-009184 | SIB-M-S            |
| SIB 1            | REV 03 | 710-009184 | SIB-M-S            |
| SIB 2            | REV 03 | 710-009184 | SIB-M-S            |
| SIB 3            | REV 03 | 710-009184 | SIB-M-S            |
| Fan Tray 0       |        |            | FFANTRAY-M320-S    |
| Fan Tray 1       |        |            | FFANTRAY-M320-S    |
| Fan Tray 2       |        |            | RFANTRAY-M320-S    |

### show chassis hardware detail (M160 Router)

```

user@host> show chassis hardware detail
Hardware inventory:

```

| Item         | Version | Part number | Serial number    | Description          |
|--------------|---------|-------------|------------------|----------------------|
| Chassis      |         |             | 101              | M160                 |
| Midplane     | REV 02  | 710-001245  | S/N AB4107       |                      |
| FPM CMB      | REV 01  | 710-001642  | S/N AA2911       |                      |
| FPM Display  | REV 01  | 710-001647  | S/N AA2999       |                      |
| CIP          | REV 02  | 710-001593  | S/N AA9563       |                      |
| PEM 0        | Rev 01  | 740-001243  | S/N KJ35769      | DC                   |
| PEM 1        | Rev 01  | 740-001243  | S/N KJ35765      | DC                   |
| PCG 0        | REV 01  | 710-001568  | S/N AA9794       |                      |
| PCG 1        | REV 01  | 710-001568  | S/N AA9804       |                      |
| Host 1       |         |             | da000004f8d57001 | teknor               |
| MCS 1        | REV 03  | 710-001226  | S/N AA9777       |                      |
| SFM 0 SPP    | REV 04  | 710-001228  | S/N AA2975       |                      |
| SFM 0 SPR    | REV 02  | 710-001224  | S/N AA9838       | Internet Processor I |
| SSRAM bank 0 | REV 01  | 710-000077  | S/N 306456       | 1 MB                 |
| SSRAM bank 1 | REV 01  | 710-000077  | S/N 306474       | 1 MB                 |
| SSRAM bank 2 | REV 01  | 710-000077  | S/N 306388       | 1 MB                 |
| SSRAM bank 3 | REV 01  | 710-000077  | S/N 306392       | 1 MB                 |
| SFM 1 SPP    | REV 04  | 710-001228  | S/N AA2860       |                      |

|              |        |            |            |                      |
|--------------|--------|------------|------------|----------------------|
| SFM 1 SPR    | REV 01 | 710-001224 | S/N AB0139 | Internet Processor I |
| SSRAM bank 0 | REV 01 | 710-000077 | S/N 302917 | 1 MB                 |
| SSRAM bank 1 | REV 01 | 710-000077 | S/N 302662 | 1 MB                 |
| SSRAM bank 2 | REV 01 | 710-000077 | S/N 302593 | 1 MB                 |
| SSRAM bank 3 | REV 01 | 710-000077 | S/N 100160 | 1 MB                 |
| FPC 0        | REV 03 | 710-001255 | S/N AA9806 | FPC Type 1           |
| CPU          | REV 02 | 710-001217 | S/N AA9590 |                      |
| SSRAM        | REV 01 | 710-000077 | S/N 302836 | 1 MB                 |
| SDRAM 0      | REV 01 | 710-001196 | S00141     | 32 MB                |
| SDRAM 1      | REV 01 | 710-001196 | S0010;     | 32 MB                |
| SSRAM        | REV 01 | 710-000077 | S/N 302633 | 1 MB                 |
| SDRAM 0      | REV 01 | 710-001196 | S00143     | 32 MB                |
| SDRAM 1      | REV 01 | 710-001196 | S00115     | 32 MB                |
| SSRAM        | REV 01 | 710-000077 | S/N 302952 | 1 MB                 |
| SDRAM 0      | REV 01 | 710-001196 | S00135     | 32 MB                |
| SDRAM 1      | REV 01 | 710-001196 | S001=3     | 32 MB                |
| SSRAM        | REV 01 | 710-000077 | S/N 302892 | 1 MB                 |
| SDRAM 0      | REV 01 | 710-001196 | S000?6     | 32 MB                |
| SDRAM 1      | REV 01 | 710-001196 | S001=5     | 32 MB                |
| PIC 1        | REV 05 | 750-000616 | S/N AA1527 | 1x OC-12 ATM, MM     |
| PIC 2        | REV 05 | 750-000616 | S/N AA1535 | 1x OC-12 ATM, MM     |
| PIC 3        | REV 01 | 750-000616 | S/N AA1519 | 1x OC-12 ATM, MM     |
| FPC 1        | REV 02 | 710-001611 | S/N AA9523 | FPC Type 2           |
| CPU          | REV 02 | 710-001217 | S/N AA9571 |                      |
| SSRAM        | REV 01 | 710-000077 | S/N 306340 | 1 MB                 |
| SDRAM 0      | REV 01 | 710-001196 | S00012     | 32 MB                |
| SDRAM 1      | REV 01 | 710-001196 | S0001?     | 32 MB                |
| SSRAM        | REV 01 | 710-000077 | S/N 306454 | 1 MB                 |
| SDRAM 0      | REV 01 | 710-001196 | S00028     | 32 MB                |
| SDRAM 1      | REV 01 | 710-001196 | S0002?     | 32 MB                |
| SSRAM        | REV 01 | 710-000077 | S/N 306492 | 1 MB                 |
| SDRAM 0      | REV 01 | 710-001196 | S00015     | 32 MB                |
| SDRAM 1      | REV 01 | 710-001196 | S00031     | 32 MB                |
| SSRAM        | REV 01 | 710-000077 | S/N 306363 | 1 MB                 |
| SDRAM 0      | REV 01 | 710-001196 | S00013     | 32 MB                |
| SDRAM 1      | REV 01 | 710-001196 | S00032     | 32 MB                |
| PIC 0        | REV 03 | 750-001900 | S/N AA9626 | 1x STM-16 SDH, SMIR  |
| PIC 1        | REV 01 | 710-002381 | S/N AD3633 | 2x G/E, 1000 BASE-SX |
| FPC 2        |        |            |            | FPC Type OC192       |
| ... SSRAM    | REV 01 | 710-000077 | S/N 306466 | 1 MB                 |

### show chassis hardware (M320 Router)

user@host> show chassis hardware

Hardware inventory:

| Item             | Version | Part number | Serial number | Description           |
|------------------|---------|-------------|---------------|-----------------------|
| Chassis          |         |             | 67245         | M320                  |
| Midplane         | REV 05  | 710-009120  | RB1202        | M320 Midplane         |
| FPM GBUS         | REV 04  | 710-005928  | HZ5697        | M320 Board            |
| FPM Display      | REV 05  | 710-009351  | HR1464        | M320 FPM Display      |
| CIP              | REV 04  | 710-005926  | HT8672        | M320 CIP              |
| PEM 0            | Rev 05  | 740-009148  | QK34208       | DC Power Entry Module |
| PEM 1            | Rev 05  | 740-009148  | QK34262       | DC Power Entry Module |
| PEM 2            | Rev 05  | 740-009148  | QF10449       | DC Power Entry Module |
| PEM 3            | Rev 05  | 740-009148  | QJ18257       | DC Power Entry Module |
| Routing Engine 0 | REV 06  | 740-008883  | P11123901185  | RE-4.0                |
| CB 0             | REV 07  | 710-009115  | JB2382        | M320 Control Board    |
| FPC 0            | REV 02  | 710-005017  | CD9926        | M320 FPC Type 2       |
| CPU              | REV 01  | 710-011659  | CJ6940        | M320 PCA SCPU         |
| PIC 0            | REV 07  | 750-001900  | AT1594        | 1x OC-48 SONET, SMSR  |
| PIC 1            | REV 03  | 750-001850  | HS2746        | 1x Tunnel             |

|            |        |            |        |                       |
|------------|--------|------------|--------|-----------------------|
| PIC 2      | REV 05 | 750-010618 | JE7117 | 4x G/E SFP, 1000 BASE |
| PIC 3      | REV 06 | 750-001900 | HE6083 | 1x OC-48 SONET, SMSR  |
| FPC 2      | REV 02 | 710-005017 | CH0319 | M320 FPC Type 1       |
| CPU        | REV 01 | 710-011659 | CJ6942 | M320 PCA SCPU         |
| PIC 0      | REV 05 | 750-003034 | BD8705 | 4x OC-3 SONET, SMIR   |
| FPC 5      | REV 02 | 710-005017 | CD9938 | M320 FPC Type 2       |
| CPU        |        |            |        |                       |
| FPC 7      | REV 02 | 710-005017 | CD9934 | M320 FPC Type 2       |
| CPU        |        |            |        |                       |
| SIB 0      | REV 09 | 710-009184 | JA6540 | M320 SIB              |
| SIB 1      | REV 09 | 710-009184 | HV9511 | M320 SIB              |
| SIB 2      | REV 09 | 710-009184 | HW2057 | M320 SIB              |
| SIB 3      | REV 09 | 710-009184 | JA6687 | M320 SIB              |
| Fan Tray 0 |        |            |        | Front Top Fan Tray    |
| Fan Tray 1 |        |            |        | Front Bottom Fan Tray |
| Fan Tray 2 |        |            |        | Rear Fan Tray         |

### show chassis hardware models (M320 Router)

```

user@host> show chassis hardware models
Hardware inventory:

```

| Item             | Version | Part number | CLEI code | FRU model number   |
|------------------|---------|-------------|-----------|--------------------|
| Midplane         | REV 03  | 710-009120  |           | CHAS-BP-M320-S     |
| FPM Display      | REV 02  | 710-009351  |           | CRAFT-M320-S       |
| CIP              | REV 03  | 710-005926  |           | CIP-M320-S         |
| PEM 2            | Rev X4  | 740-009148  |           | PWR-M-DC-S         |
| PEM 3            | Rev X4  | 740-009148  |           | PWR-M-DC-S         |
| Routing Engine 0 | REV 02  | 740-008883  |           | RE-1600-2048-S     |
| Routing Engine 1 | REV 02  | 740-008883  |           | RE-1600-2048-S     |
| FPC 0            | REV 02  | 710-010419  |           | M320-FPC1          |
| PIC 0            | REV 01  | 750-001323  |           | P-TUNNEL           |
| PIC 1            | REV 02  | 750-002987  |           | PE-10C12-SON-SMIR  |
| PIC 2            | REV 04  | 750-001894  |           | PB-1GE-SX          |
| PIC 3            | REV 04  | 750-001896  |           | PB-10C12-SON-SMIR  |
| FPC 1            | REV 02  | 710-010419  |           | M320-FPC1          |
| PIC 0            | REV 04  | 750-001894  |           | PB-1GE-SX          |
| PIC 1            | REV 04  | 750-001894  |           | PB-1GE-SX          |
| PIC 3            | REV 03  | 750-001894  |           | PB-1GE-SX          |
| FPC 2            | REV 02  | 710-010419  |           | M320-FPC1          |
| PIC 0            | REV 10  | 750-005634  |           | PB-1CHOC12SMIR-QPP |
| PIC 1            | REV 10  | 750-005634  |           | PB-1CHOC12SMIR-QPP |
| PIC 2            | REV 07  | 750-005634  |           | PB-1CHOC12SMIR-QPP |
| PIC 3            | REV 07  | 750-005634  |           | PB-1CHOC12SMIR-QPP |
| PIC 1            | REV 10  | 750-005634  |           | PB-1CHOC12SMIR-QPP |
| PIC 2            | REV 07  | 750-005634  |           | PB-1CHOC12SMIR-QPP |
| PIC 3            | REV 07  | 750-005634  |           | PB-1CHOC12SMIR-QPP |
| FPC 3            |         |             |           |                    |
| PIC 0            | REV 03  | 750-001895  |           | PB-10C12-SON-MM    |
| PIC 1            | REV 04  | 750-001894  |           | PB-1GE-SX          |
| PIC 3            | REV 04  | 750-003141  |           | PB-1GE-SX-B        |
| FPC 4            | REV 02  | 710-010419  |           | M320-FPC1          |
| FPC 5            | REV 02  | 710-010419  |           | M320-FPC1          |
| FPC 6            | REV 02  | 710-010419  |           | M320-FPC1          |
| FPC 7            |         |             |           |                    |
| PIC 0            | REV 15  | 750-001901  |           | PB-40C12-SON-SMIR  |
| PIC 1            | REV 06  | 750-001900  |           | PB-10C48-SON-SMSR  |
| PIC 2            | REV 07  | 750-001900  |           | PB-10C48-SON-SMSR  |
| PIC 3            | REV 05  | 750-003737  |           | PB-4GE-SX          |
| SIB 0            | REV 03  | 710-009184  |           | SIB-M-S            |
| SIB 1            | REV 03  | 710-009184  |           | SIB-M-S            |
| SIB 2            | REV 03  | 710-009184  |           | SIB-M-S            |

|            |        |            |                 |
|------------|--------|------------|-----------------|
| SIB 3      | REV 03 | 710-009184 | SIB-M-S         |
| Fan Tray 0 |        |            | FFANTRAY-M320-S |
| Fan Tray 1 |        |            | FFANTRAY-M320-S |
| Fan Tray 2 |        |            | RFANTRAY-M320-S |

**show chassis hardware (MX5 Router)**

```
user@host> show chassis hardware
```

```
Hardware inventory:
```

| Item           | Version | Part number | Serial number | Description           |
|----------------|---------|-------------|---------------|-----------------------|
| Chassis        |         |             | E1368         | MX5-T                 |
| Midplane       | REV 01  | 711-038215  | YF5288        | MX5-T                 |
| PEM 0          | Rev 04  | 740-028288  | VA01215       | AC Power Entry Module |
| PEM 1          | Rev 04  | 740-028288  | VA01218       | AC Power Entry Module |
| Routing Engine |         | BUILTIN     | BUILTIN       | Routing Engine        |
| TFEB 0         |         | BUILTIN     | BUILTIN       | Forwarding Engine     |
| Processor      |         |             |               |                       |
| QXM 0          | REV 05  | 711-028408  | ZA9136        | MPC QXM               |
| FPC 0          |         | BUILTIN     | BUILTIN       | MPC BUILTIN           |
| MIC 0          |         | BUILTIN     | BUILTIN       | 4x 10GE XFP           |
| PIC 0          |         | BUILTIN     | BUILTIN       | 4x 10GE XFP           |
| FPC 1          |         | BUILTIN     | BUILTIN       | MPC BUILTIN           |
| MIC 0          | REV 24  | 750-028392  | YX9820        | 3D 20x 1GE(LAN) SFP   |
| PIC 0          |         | BUILTIN     | BUILTIN       | 10x 1GE(LAN) SFP      |
| Xcvr 0         | REV 01  | 740-031851  | AM1045SUAQ3   | SFP-SX                |
| Xcvr 1         | REV 01  | 740-031851  | AM1045SUAPA   | SFP-SX                |
| Xcvr 2         | REV 01  | 740-031851  | AM1045SUAN7   | SFP-SX                |
| Xcvr 3         | REV 01  | 740-031851  | AM1045SU91Q   | SFP-SX                |
| Xcvr 4         | REV 01  | 740-031851  | AM1045SUDDR   | SFP-SX                |
| Xcvr 9         | REV 01  | 740-011613  | AM0848SB6A1   | SFP-SX                |
| PIC 1          |         | BUILTIN     | BUILTIN       | 10x 1GE(LAN) SFP      |
| Xcvr 0         | REV 01  | 740-031851  | AM1045SUANO   | SFP-SX                |
| Xcvr 1         | REV 01  | 740-011613  | AS0812S0719   | SFP-SX                |
| Xcvr 2         | REV 01  | 740-011613  | AM0821SA121   | SFP-SX                |
| Xcvr 3         | REV 01  | 740-011613  | PF21K21       | SFP-SX                |
| Xcvr 4         | REV 01  | 740-011613  | AM0848SB69Z   | SFP-SX                |
| Xcvr 5         | REV 01  | 740-011782  | P9P0XV3       | SFP-SX                |
| Xcvr 6         | REV 01  | 740-011613  | AM0812S8WJN   | SFP-SX                |
| Xcvr 7         | REV 01  | 740-011613  | PAM3G9Q       | SFP-SX                |
| Xcvr 8         | REV 01  | 740-011613  | AM0848SB4A6   | SFP-SX                |
| Xcvr 9         | REV 01  | 740-011782  | P9MOU37       | SFP-SX                |
| MIC 1          | REV 20  | 750-028380  | ZG2657        | 3D 2x 10GE XFP        |
| PIC 2          |         | BUILTIN     | BUILTIN       | 1x 10GE XFP           |
| PIC 3          |         | BUILTIN     | BUILTIN       | 1x 10GE XFP           |
| Fan Tray       |         |             |               | Fan Tray              |

**show chassis hardware (MX10 Router)**

```
user@host> show chassis hardware
```

```
Hardware inventory:
```

| Item           | Version | Part number | Serial number | Description           |
|----------------|---------|-------------|---------------|-----------------------|
| Chassis        |         |             | E1372         | MX10-T                |
| Midplane       | REV 01  | 711-038211  | YF5285        | MX10-T                |
| PEM 0          | Rev 04  | 740-028288  | VB01678       | AC Power Entry Module |
| Routing Engine |         | BUILTIN     | BUILTIN       | Routing Engine        |
| TFEB 0         |         | BUILTIN     | BUILTIN       | Forwarding Engine     |
| Processor      |         |             |               |                       |
| QXM 0          | REV 05  | 711-028408  | ZA9053        | MPC QXM               |
| FPC 0          |         | BUILTIN     | BUILTIN       | MPC BUILTIN           |
| MIC 0          |         | BUILTIN     | BUILTIN       | 4x 10GE XFP           |
| PIC 0          |         | BUILTIN     | BUILTIN       | 4x 10GE XFP           |

```

FPC 1          BUILTIN      BUILTIN      MPC BUILTIN
  MIC 0        REV 24      750-028392  YX9436      3D 20x 1GE(LAN) SFP
    PIC 0      BUILTIN      BUILTIN      10x 1GE(LAN) SFP
      Xcvr 0    REV 01      740-031851  AM1107SUFQW SFP-SX
    PIC 1      BUILTIN      BUILTIN      10x 1GE(LAN) SFP
Fan Tray                               Fan Tray

```

### show chassis hardware (MX40 Router)

```

user@host> show chassis hardware
Hardware inventory:
Item          Version  Part number  Serial number  Description
Chassis                               E1367          MX40-T
Midplane      REV 01    711-038211   YF5284         MX40-T
PEM 0         Rev 04    740-028288   VB01680        AC Power Entry Module
PEM 1         Rev 04    740-028288   VB01700        AC Power Entry Module
Routing Engine BUILTIN    BUILTIN      Routing Engine
TFEB 0        BUILTIN    BUILTIN      Forwarding Engine
Processor
  QXM 0        REV 05    711-028408   ZA9048         MPC QXM
FPC 0          BUILTIN    BUILTIN      MPC BUILTIN
  MIC 0        BUILTIN    BUILTIN      4x 10GE XFP
    PIC 0      BUILTIN    BUILTIN      4x 10GE XFP
      Xcvr 0    REV 01    740-014279   M7067UPP       XFP-10G-LR
      Xcvr 1    NON-JNPR   K9J02UN       XFP-10G-LR
FPC 1          BUILTIN    BUILTIN      MPC BUILTIN
  MIC 0        REV 24    750-028392   YX3504         3D 20x 1GE(LAN) SFP
    PIC 0      BUILTIN    BUILTIN      10x 1GE(LAN) SFP
      Xcvr 0    REV 01    740-011613   AM0812S8WTE    SFP-SX
      Xcvr 1    REV 01    740-011613   PFA6KV2         SFP-SX
      Xcvr 2    REV 01    740-031851   AM1045SUDDM     SFP-SX
      Xcvr 3    REV 01    740-011613   PD63C7M         SFP-SX
      Xcvr 4    REV 01    740-011613   PD63DJY         SFP-SX
      Xcvr 5    REV 02    740-011613   AA0950STLL9     SFP-SX
      Xcvr 6    REV 01    740-011782   PAR1YHC         SFP-SX
      Xcvr 7    REV 01    740-011782   P9P0XXL         SFP-SX
      Xcvr 8    REV 01    740-011613   PD63D95         SFP-SX
      Xcvr 9    REV 01    740-031851   AM1045SU9B8     SFP-SX
    PIC 1      BUILTIN    BUILTIN      10x 1GE(LAN) SFP
      Xcvr 0    REV 01    740-011613   PF21L3Z         SFP-SX
      Xcvr 1    REV 01    740-031851   AM1045SU7M9     SFP-SX
      Xcvr 2    REV 01    740-031851   AM1045SUAPT     SFP-SX
      Xcvr 3    REV 01    740-011613   PFF2BZH         SFP-SX
      Xcvr 4    REV 01    740-031851   AM1045SUDDN     SFP-SX
      Xcvr 5    REV 01    740-031851   AM1039S00ZR     SFP-SX
      Xcvr 6    REV 01    740-031851   AM1045SUD6Y     SFP-SX
      Xcvr 8    REV 01    740-011613   PFM1QBS         SFP-SX
      Xcvr 9    REV 01    740-011613   PFF2E25         SFP-SX
  MIC 1        REV 01    750-021130   KG4391         3D 2x 10GE XFP
    PIC 2      BUILTIN    BUILTIN      1x 10GE XFP
      Xcvr 0    REV 01    740-011571   C645XJ04G       XFP-10G-SR
    PIC 3      BUILTIN    BUILTIN      1x 10GE XFP
      Xcvr 0    NON-JNPR   CA49BK0AE       XFP-10G-SR
Fan Tray                               Fan Tray

```

### show chassis hardware (Fixed MX80 Router)

```

user@host> show chassis hardware
Hardware inventory:
Item          Version  Part number  Serial number  Description
Chassis                               MX80-48T

```

|                |        |            |              |                         |
|----------------|--------|------------|--------------|-------------------------|
| Midplane       | REV 01 | 711-031603 | KF9250       | MX80-48T                |
| Routing Engine |        | BUILTIN    | BUILTIN      | Routing Engine          |
| FEB 0          |        | BUILTIN    | BUILTIN      | Forwarding Engine Board |
| FPC 0          |        | BUILTIN    | BUILTIN      | MPC BUILTIN             |
| MIC 0          |        | BUILTIN    | BUILTIN      | 4x 10GE XFP             |
| PIC 0          |        | BUILTIN    | BUILTIN      | 4x 10GE XFP             |
| Xcvr 0         |        | NON-JNPR   | M6439D41     | XFP-10G-LR              |
| Xcvr 1         | REV 01 | 740-014279 | 6XE931N00202 | XFP-10G-LR              |
| Xcvr 2         | REV 01 | 740-014289 | C715XU05F    | XFP-10G-SR              |
| Xcvr 3         | REV 01 | 740-014289 | C650XU0EP    | XFP-10G-SR              |
| FPC 1          |        | BUILTIN    | BUILTIN      | MPC BUILTIN             |
| MIC 0          | REV 01 | 711-029399 | JR6981       | 12x 1GE(LAN) RJ45       |
| PIC 0          |        | BUILTIN    | BUILTIN      | 12x 1GE(LAN) RJ45       |
| PIC 1          |        | BUILTIN    | BUILTIN      | 12x 1GE(LAN) RJ45       |
| MIC 1          | REV 01 | BUILTIN    | BUILTIN      | 12x 1GE(LAN) RJ45       |
| PIC 2          |        | BUILTIN    | BUILTIN      | 12x 1GE(LAN) RJ45       |
| PIC 3          |        | BUILTIN    | BUILTIN      | 12x 1GE(LAN) RJ45       |
| Fan Tray       |        |            |              | Fan Tray                |

### show chassis hardware (Modular MX80 Router)

```
user@host> show chassis hardware
```

Hardware inventory:

| Item           | Version | Part number | Serial number | Description             |
|----------------|---------|-------------|---------------|-------------------------|
| Chassis        |         |             |               | MX80                    |
| Midplane       | REV 02  | 711-031594  | JR7084        | MX80                    |
| PEM 0          | Rev 01  | 740-028288  | 000018        | AC Power Entry Module   |
| Routing Engine |         | BUILTIN     | BUILTIN       | Routing Engine          |
| FEB 0          |         | BUILTIN     | BUILTIN       | Forwarding Engine Board |
| QXM 0          | REV 05  | 711-028408  | JR7041        | MPC QXM                 |
| FPC 0          |         | BUILTIN     | BUILTIN       | MPC BUILTIN             |
| MIC 0          |         | BUILTIN     | BUILTIN       | 4x 10GE XFP             |
| PIC 0          |         | BUILTIN     | BUILTIN       | 4x 10GE XFP             |
| FPC 1          |         | BUILTIN     | BUILTIN       | MPC BUILTIN             |
| MIC 0          | REV 02  | 750-028380  | JR6598        | 3D 2x 10GE XFP          |
| PIC 0          |         | BUILTIN     | BUILTIN       | 1x 10GE XFP             |
| Xcvr 0         | REV 01  | 740-014289  | T07M86365     | XFP-10G-SR              |
| PIC 1          |         | BUILTIN     | BUILTIN       | 1x 10GE XFP             |
| Xcvr 0         | REV 01  | 740-014289  | T07M71094     | XFP-10G-SR              |
| MIC 1          | REV 02  | 750-028380  | JG8548        | 3D 2x 10GE XFP          |
| PIC 2          |         | BUILTIN     | BUILTIN       | 1x 10GE XFP             |
| Xcvr 0         | REV 02  | 740-014289  | T08L86302     | XFP-10G-SR              |
| PIC 3          |         | BUILTIN     | BUILTIN       | 1x 10GE XFP             |
| Xcvr 0         | REV 02  | 740-014289  | C810XU0BA     | XFP-10G-SR              |
| Fan Tray       |         |             |               | Fan Tray                |

### show chassis hardware (MX240 Router)

```
user@host> show chassis hardware
```

Hardware inventory:

| Item             | Version | Part number | Serial number | Description            |
|------------------|---------|-------------|---------------|------------------------|
| Chassis          |         |             | JN10C7F7EAFc  | MX240                  |
| Midplane         | REV 01  | 710-021041  | TR1502        | MX240 Backplane        |
| FPM Board        | REV 01  | 710-017254  | KD4017        | Front Panel Display    |
| PEM 0            | Rev 02  | 740-017330  | 000332        | PS 1.2-1.7kW; 100-240V |
| AC in            |         |             |               |                        |
| PEM 1            | Rev 02  | 740-017330  | 000226        | PS 1.2-1.7kW; 100-240V |
| AC in            |         |             |               |                        |
| Routing Engine 0 | REV 06  | 740-013063  | 1000703522    | RE-S-2000              |

|                  |        |            |            |                   |
|------------------|--------|------------|------------|-------------------|
| Routing Engine 1 | REV 06 | 740-015113 | 1000687625 | RE-S-1300         |
| CB 0             | REV 07 | 710-013385 | KC9057     | MX SCB            |
| CB 1             | REV 05 | 710-013385 | JY4760     | MX SCB            |
| FPC 1            | REV 01 | 750-021679 | KC7340     | DPCE 40x 1GE R    |
| CPU              | REV 06 | 710-013713 | KD4078     | DPC PMB           |
| PIC 0            |        | BUILTIN    | BUILTIN    | 10x 1GE(LAN)      |
| Xcvr 0           | REV 01 | 740-011613 | P9F18ME    | SFP-SX            |
| PIC 1            |        | BUILTIN    | BUILTIN    | 10x 1GE(LAN)      |
| PIC 2            |        | BUILTIN    | BUILTIN    | 10x 1GE(LAN)      |
| PIC 3            |        | BUILTIN    | BUILTIN    | 10x 1GE(LAN)      |
| FPC 2            | REV 04 | 710-016669 | JS4529     | DPCE 40x 1GE R EQ |
| CPU              | REV 06 | 710-013713 | KB3969     | DPC PMB           |
| PIC 0            |        | BUILTIN    | BUILTIN    | 10x 1GE(LAN) EQ   |
| Xcvr 0           | REV 01 | 740-011613 | PBG3Y79    | SFP-SX            |
| Xcvr 1           | REV 01 | 740-011613 | PBG3XU8    | SFP-SX            |
| Xcvr 2           | REV 01 | 740-011613 | PBG3YG6    | SFP-SX            |
| Xcvr 3           | REV 01 | 740-011613 | PBG3XUG    | SFP-SX            |
| Xcvr 4           | REV 01 | 740-011613 | PBG3XTJ    | SFP-SX            |
| PIC 1            |        | BUILTIN    | BUILTIN    | 10x 1GE(LAN) EQ   |
| Xcvr 0           | REV 01 | 740-011613 | PBG3ZUM    | SFP-SX            |
| Xcvr 1           | REV 01 | 740-011613 | PBG3Y5H    | SFP-SX            |
| Xcvr 2           | REV 01 | 740-011613 | PBG3UZT    | SFP-SX            |
| Xcvr 3           | REV 01 | 740-011613 | PBG3US1    | SFP-SX            |
| PIC 2            |        | BUILTIN    | BUILTIN    | 10x 1GE(LAN) EQ   |
| Xcvr 0           | REV 01 | 740-011613 | PBG3YG7    | SFP-SX            |
| Xcvr 1           | REV 01 | 740-011613 | PBG3XZ9    | SFP-SX            |
| Xcvr 2           | REV 01 | 740-011613 | PBG3XTY    | SFP-SX            |
| Xcvr 3           | REV 01 | 740-011613 | PBG3UZG    | SFP-SX            |
| PIC 3            |        | BUILTIN    | BUILTIN    | 10x 1GE(LAN) EQ   |
| Xcvr 0           | REV 01 | 740-011613 | PBG3Y8W    | SFP-SX            |
| Xcvr 1           | REV 01 | 740-011613 | PBG3YVX    | SFP-SX            |
| Xcvr 2           | REV 01 | 740-011613 | PBG3YB3    | SFP-SX            |
| Xcvr 3           | REV 01 | 740-011613 | PBG43VQ    | SFP-SX            |
| Fan Tray 0       | REV 01 | 710-021113 | JS4642     | MX240 Fan Tray    |

### show chassis hardware detail (MX 240 Router with Routing Engine Displaying DIMM information)

```
user@host> show chassis hardware detail
```

| Item             | Version                            | Part number | Serial number        | Description             |
|------------------|------------------------------------|-------------|----------------------|-------------------------|
| Chassis          |                                    |             | JN11279B4AFC         | MX240 Backplane         |
| Midplane         | REV 07                             | 760-021404  | TS2474               | MX240 Backplane         |
| FPM Board        | REV 03                             | 760-021392  | XC2643               | Front Panel Display     |
| PEM 0            | Rev 03                             | 740-017343  | QCS0908A068          | DC Power Entry Module   |
| Routing Engine 0 | REV 01                             | 740-031117  | AARCH00              | RE-S-1800x4             |
| ad0 3764 MB      | STEC M2+                           | CF 9.0.2    | STIM2Q3209239145303  | Removable Compact Flash |
| ad1 28626 MB     | WDC SSD-F0030S-5000                |             | C933Z036237215548S00 | Compact Flash           |
| usb0 (addr 1)    | EHCI root hub 0                    |             | Intel                | uhub0                   |
| usb0 (addr 2)    | product 0x0020 32                  |             | vendor 0x8087        | uhub1                   |
| DIMM 0           | VL31B5263E-F8S DIE REV-0 PCB REV-0 |             |                      | MFR ID-ce80             |
| DIMM 1           | VL31B5263E-F8S DIE REV-0 PCB REV-0 |             |                      | MFR ID-ce80             |
| DIMM 2           | VL31B5263E-F8S DIE REV-0 PCB REV-0 |             |                      | MFR ID-ce80             |
| DIMM 3           | SL31B5263E-F8S DIE REV-0 PCB REV-0 |             |                      | MFR ID-ce80             |
| CB 0             | REV 03                             | 710-021523  | XD7225               | MX SCB                  |
| Fan Tray 0       | REV 01                             | 710-021113  | WZ4986               | MX240 Fan Tray          |

### show chassis hardware (MX240 Router with Enhanced MX SCB)

```
user@host> show chassis hardware
```

## Hardware inventory:

| Item             | Version | Part number | Serial number | Description            |
|------------------|---------|-------------|---------------|------------------------|
| Chassis          |         |             | JN10C7F7EAFB  | MX240                  |
| Midplane         | REV 01  | 710-021041  | TR1502        | MX240 Backplane        |
| FPM Board        | REV 01  | 710-017254  | KD4017        | Front Panel Display    |
| PEM 0            | Rev 02  | 740-017330  | 000332        | PS 1.2-1.7kW; 100-240V |
| AC in            |         |             |               |                        |
| PEM 1            | Rev 02  | 740-017330  | 000226        | PS 1.2-1.7kW; 100-240V |
| AC in            |         |             |               |                        |
| Routing Engine 0 | REV 06  | 740-013063  | 1000703522    | RE-S-2000              |
| Routing Engine 1 | REV 06  | 740-015113  | 1000687625    | RE-S-1300              |
| CB 0             | REV 02  | 710-031391  | YE8494        | Enhanced MX SCB        |
| CB 1             | REV 05  | 710-031391  | YOP5764       | Enhanced MX SCB        |
| FPC 1            | REV 01  | 750-021679  | KC7340        | DPCE 40x 1GE R         |
| CPU              | REV 06  | 710-013713  | KD4078        | DPC PMB                |
| PIC 0            |         | BUILTIN     | BUILTIN       | 10x 1GE(LAN)           |
| Xcvr 0           | REV 01  | 740-011613  | P9F18ME       | SFP-SX                 |
| PIC 1            |         | BUILTIN     | BUILTIN       | 10x 1GE(LAN)           |
| PIC 2            |         | BUILTIN     | BUILTIN       | 10x 1GE(LAN)           |
| PIC 3            |         | BUILTIN     | BUILTIN       | 10x 1GE(LAN)           |
| FPC 2            | REV 04  | 710-016669  | JS4529        | DPCE 40x 1GE R EQ      |
| CPU              | REV 06  | 710-013713  | KB3969        | DPC PMB                |
| PIC 0            |         | BUILTIN     | BUILTIN       | 10x 1GE(LAN) EQ        |
| Xcvr 0           | REV 01  | 740-011613  | PBG3Y79       | SFP-SX                 |
| Xcvr 1           | REV 01  | 740-011613  | PBG3XU8       | SFP-SX                 |
| Xcvr 2           | REV 01  | 740-011613  | PBG3YG6       | SFP-SX                 |
| Xcvr 3           | REV 01  | 740-011613  | PBG3XUG       | SFP-SX                 |
| Xcvr 4           | REV 01  | 740-011613  | PBG3XTJ       | SFP-SX                 |
| PIC 1            |         | BUILTIN     | BUILTIN       | 10x 1GE(LAN) EQ        |
| Xcvr 0           | REV 01  | 740-011613  | PBG3ZUM       | SFP-SX                 |
| Xcvr 1           | REV 01  | 740-011613  | PBG3Y5H       | SFP-SX                 |
| Xcvr 2           | REV 01  | 740-011613  | PBG3UZT       | SFP-SX                 |
| Xcvr 3           | REV 01  | 740-011613  | PBG3US1       | SFP-SX                 |
| PIC 2            |         | BUILTIN     | BUILTIN       | 10x 1GE(LAN) EQ        |
| Xcvr 0           | REV 01  | 740-011613  | PBG3YG7       | SFP-SX                 |
| Xcvr 1           | REV 01  | 740-011613  | PBG3XZ9       | SFP-SX                 |
| Xcvr 2           | REV 01  | 740-011613  | PBG3XTY       | SFP-SX                 |
| Xcvr 3           | REV 01  | 740-011613  | PBG3UZG       | SFP-SX                 |
| PIC 3            |         | BUILTIN     | BUILTIN       | 10x 1GE(LAN) EQ        |
| Xcvr 0           | REV 01  | 740-011613  | PBG3Y8W       | SFP-SX                 |
| Xcvr 1           | REV 01  | 740-011613  | PBG3YVX       | SFP-SX                 |
| Xcvr 2           | REV 01  | 740-011613  | PBG3YB3       | SFP-SX                 |
| Xcvr 3           | REV 01  | 740-011613  | PBG43VQ       | SFP-SX                 |
| Fan Tray 0       | REV 01  | 710-021113  | JS4642        | MX240 Fan Tray         |

## show chassis hardware (MX480 Router)

user@host&gt; show chassis hardware

## Hardware inventory:

| Item             | Version | Part number | Serial number | Description            |
|------------------|---------|-------------|---------------|------------------------|
| Chassis          |         |             | JN10C7F7FAFB  | MX480                  |
| Midplane         | REV 04  | 710-017414  | TR2071        | MX480 Midplane         |
| FPM Board        | REV 02  | 710-017254  | KB8459        | Front Panel Display    |
| PEM 0            | Rev 02  | 740-017330  | QCS07519029   | PS 1.2-1.7kW; 100-240V |
| AC in            |         |             |               |                        |
| PEM 1            | Rev 02  | 740-017330  | QCS07519041   | PS 1.2-1.7kW; 100-240V |
| AC in            |         |             |               |                        |
| PEM 2            | Rev 02  | 740-017330  | QCS07519097   | PS 1.2-1.7kW; 100-240V |
| AC in            |         |             |               |                        |
| Routing Engine 0 | REV 07  | 740-013063  | 1000733381    | RE-S-2000              |
| Routing Engine 1 | REV 07  | 740-013063  | 1000733540    | RE-S-2000              |



|          |        |            |         |                   |
|----------|--------|------------|---------|-------------------|
| CB 0     | REV 07 | 710-013385 | KA8022  | MX SCB            |
| CB 1     | REV 07 | 710-013385 | KA8303  | MX SCB            |
| FPC 0    | REV 09 | 750-020452 | KA8660  | DPCE 40x 1GE X EQ |
| CPU      | REV 06 | 710-013713 | KA8185  | DPC PMB           |
| PIC 0    |        | BUILTIN    | BUILTIN | 10x 1GE(LAN) EQ   |
| PIC 1    |        | BUILTIN    | BUILTIN | 10x 1GE(LAN) EQ   |
| PIC 2    |        | BUILTIN    | BUILTIN | 10x 1GE(LAN) EQ   |
| PIC 3    |        | BUILTIN    | BUILTIN | 10x 1GE(LAN) EQ   |
| Fan Tray |        |            |         | Left Fan Tray     |

### show chassis hardware (MX480 Router with Enhanced MX SCB)

```
user@host> show chassis hardware
Hardware inventory:
```

| Item             | Version | Part number | Serial number | Description            |
|------------------|---------|-------------|---------------|------------------------|
| Chassis          |         |             | JN10C7F7FAFB  | MX480                  |
| Midplane         | REV 04  | 710-017414  | TR2071        | MX480 Midplane         |
| FPM Board        | REV 02  | 710-017254  | KB8459        | Front Panel Display    |
| PEM 0            | Rev 02  | 740-017330  | QCS07519029   | PS 1.2-1.7kW; 100-240V |
| AC in            |         |             |               |                        |
| PEM 1            | Rev 02  | 740-017330  | QCS07519041   | PS 1.2-1.7kW; 100-240V |
| AC in            |         |             |               |                        |
| PEM 2            | Rev 02  | 740-017330  | QCS07519097   | PS 1.2-1.7kW; 100-240V |
| AC in            |         |             |               |                        |
| Routing Engine 0 | REV 07  | 740-013063  | 1000733381    | RE-S-2000              |
| Routing Engine 1 | REV 07  | 740-013063  | 1000733540    | RE-S-2000              |
| CB 0             | REV 07  | 710-013385  | KA8022        | Enhanced MX SCB        |
| CB 1             | REV 07  | 710-013385  | KA8303        | Enhanced MX SCB        |
| FPC 0            | REV 09  | 750-020452  | KA8660        | DPCE 40x 1GE X EQ      |
| CPU              | REV 06  | 710-013713  | KA8185        | DPC PMB                |
| PIC 0            |         | BUILTIN     | BUILTIN       | 10x 1GE(LAN) EQ        |
| PIC 1            |         | BUILTIN     | BUILTIN       | 10x 1GE(LAN) EQ        |
| PIC 2            |         | BUILTIN     | BUILTIN       | 10x 1GE(LAN) EQ        |
| PIC 3            |         | BUILTIN     | BUILTIN       | 10x 1GE(LAN) EQ        |
| Fan Tray         |         |             |               | Left Fan Tray          |

### show chassis hardware (MX960 Router)

```
user@host> show chassis hardware
Hardware inventory:
```

| Item             | Version | Part number | Serial number | Description             |
|------------------|---------|-------------|---------------|-------------------------|
| Chassis          |         |             |               | MX960                   |
| Midplane         | REV 01  | 710-013698  | AA6082        | MX960 Midplane          |
| PIM              | Rev 01  | 740-013110  | 000008        | Power Inlet Module      |
| PEM 2            |         |             |               |                         |
| PEM 3            | Rev 01  | 740-013682  | 000038        | PS 1.7kW; 200-240VAC in |
| Routing Engine 0 | REV 00  | 740-015113  | 1000617944    | RE-S-1300               |
| CB 0             | REV 05  | 710-013725  | JK6947        | MX960 Test SCB          |
| FPC 4            | REV 01  | 710-013305  | JM7617        | MX960 Test DPC          |
| CPU              |         |             |               |                         |
| PIC 0            |         | BUILTIN     | BUILTIN       | 1x 10GE(LAN/WAN)        |
| PIC 1            |         | BUILTIN     | BUILTIN       | 10x 1GE                 |
| FPC 7            | REV 01  | 710-013305  | JL9634        | MX960 Test DPC          |
| CPU              |         |             |               |                         |
| PIC 0            |         | BUILTIN     | BUILTIN       | 1x 10GE(LAN/WAN)        |
| Xcvr 0           |         | NON-JNPR    | MYBG65I82C    | XFP-10G-SR              |
| PIC 1            |         | BUILTIN     | BUILTIN       | 10x 1GE                 |
| Xcvr 1           | REV 01  | 740-011782  | P7N0368       | SFP-SX                  |
| Xcvr 4           | REV 01  | 740-011782  | P8J1W27       | SFP-SX                  |
| Xcvr 6           | REV 01  | 740-011782  | P8J1VSD       | SFP-SX                  |
| Xcvr 9           | REV 01  | 740-011782  | P8J1W25       | SFP-SX                  |

Fan Tray 0  
Fan Tray 1

### show chassis hardware (MX960 Router with Bidirectional Optics)

```

user@host> show chassis hardware
Hardware inventory:
Item          Version  Part number  Serial number  Description
Chassis                               JN10BA5B9AFA  MX960
Midplane      REV 03   710-013698   TR0234        MX960 Backplane
FPM Board     REV 03   710-014974   JA0878        Front Panel Display
PDM           Rev 03   740-013110   QCS11135028   Power Distribution Module
PEM 0         Rev 03   740-013682   QCS11154036   PS 1.7kW; 200-240VAC in
PEM 1         Rev 03   740-013682   QCS11154010   PS 1.7kW; 200-240VAC in
PEM 2         Rev 03   740-013682   QCS11154022   PS 1.7kW; 200-240VAC in
Routing Engine 0 REV 06   740-013063   1000691458    RE-S-2000
CB 0          REV 07   710-013385   KA2190        MX SCB
CB 1          REV 07   710-013385   KA0837        MX SCB
FPC 3         REV 02   750-018122   KB3890        DPCE 40x 1GE R
CPU
FPC 4         REV 01   750-018122   KB3889        DPCE 40x 1GE R
CPU           REV 06   710-013713   KB3976        DPC PMB
PIC 0         BUILTIN  BUILTIN      10x 1GE(LAN)
  Xcvr 1      REV 01   740-020426   4910549       SFP-1000BASE-BX40-D
  Xcvr 2      REV 01   740-020426   4910551       SFP-1000BASE-BX40-D
  Xcvr 5      REV 01   740-021340   77E245N00006  SFP-1000BASE-BX10-U
  Xcvr 6      REV 01   740-020425   4882821       SFP-1000BASE-BX40-U
  Xcvr 8      REV 01   740-020425   4882820       SFP-1000BASE-BX40-U
PIC 1         BUILTIN  BUILTIN      10x 1GE(LAN)
  Xcvr 0      REV 01   740-020465   77E555N00894  SFP-1000BASE-BX10-D
  Xcvr 1      REV 01   740-020465   75E467X00818  SFP-1000BASE-BX10-D
  Xcvr 2      REV 01   740-020465   75E467X00573  SFP-1000BASE-BX10-D
  Xcvr 3      REV 01   740-020465   4888227       SFP-1000BASE-BX10-D
  Xcvr 4      REV 01   740-020465   4888241       SFP-1000BASE-BX10-D
  Xcvr 5      REV 01   740-021340   77E245N00005  SFP-1000BASE-BX10-U
  Xcvr 6      REV 01   740-021340   76E245X00487  SFP-1000BASE-BX10-U
  Xcvr 7      REV 01   740-021341   5255889       SFP-1000BASE-BX10-U
  Xcvr 8      REV 01   740-021341   5255887       SFP-1000BASE-BX10-U
  Xcvr 9      REV 01   740-021340   77E245N00004  SFP-1000BASE-BX10-U
PIC 2         BUILTIN  BUILTIN      10x 1GE(LAN)
  Xcvr 0      REV 01   740-020424   5007582       SFP-1000BASE-BX10-D
  Xcvr 1      REV 01   740-020424   4888187       SFP-1000BASE-BX10-D
  Xcvr 2      REV 01   740-020424   4656500       SFP-1000BASE-BX10-D
  Xcvr 5      REV 01   740-021341   5255886       SFP-1000BASE-BX10-U
  Xcvr 7      REV 01   740-021340   77E245N00003  SFP-1000BASE-BX10-U
  Xcvr 8      REV 01   740-021341   5255888       SFP-1000BASE-BX10-U
PIC 3         BUILTIN  BUILTIN      10x 1GE(LAN)
  Xcvr 0      REV 01   740-017726   74S184H30341  SFP-EX
  Xcvr 1      REV 01   740-017726   4814061       SFP-EX
  Xcvr 5      REV 01   740-017726   6ZS184H31108  SFP-EX
  Xcvr 9      REV 01   740-021340   76E245X00486  SFP-1000BASE-BX10-U
Fan Tray 0
Fan Tray 1    REV 03   740-014971   TP0850        Fan Tray

```

### show chassis hardware (MX960 Router with Enhanced MX SCB)

```

user@host> show chassis hardware
Hardware inventory:
Item          Version  Part number  Serial number  Description
Chassis                               JN1096805AFA  MX960
Midplane      REV 03   710-013698   TR0183        MX960 Backplane

```

|                  |        |            |                 |                           |
|------------------|--------|------------|-----------------|---------------------------|
| Fan Extender     | REV 02 | 710-018051 | JY5227          | Extended Cable Manager    |
| FPM Board        | REV 03 | 710-014974 | JZ6876          | Front Panel Display       |
| PDM              | Rev 03 | 740-013110 | QCS11035023     | Power Distribution Module |
| PEM 1            | Rev 03 | 740-013682 | QCS1109400L     | PS 1.7kW; 200-240VAC in   |
| PEM 2            | Rev 03 | 740-013682 | QCS11094015     | PS 1.7kW; 200-240VAC in   |
| PEM 3            | Rev 03 | 740-013682 | QCS11094012     | PS 1.7kW; 200-240VAC in   |
| Routing Engine 0 | REV 06 | 740-013063 | 1000687969      | RE-S-2000                 |
| Routing Engine 1 | REV 06 | 740-013063 | 1000687955      | RE-S-2000                 |
| CB 0             | REV 11 | 750-031391 | YZ6072          | Enhanced MX SCB           |
| CB 1             | REV 11 | 750-031391 | YZ6068          | Enhanced MX SCB           |
| CB 2             | REV 11 | 750-031391 | YZ6081          | Enhanced MX SCB           |
| FPC 0            | REV 01 | 750-018122 | KA5576          | DPCE 40x 1GE R            |
| CPU              | REV 06 | 710-013713 | KB3961          | DPC PMB                   |
| PIC 0            |        | BUILTIN    | BUILTIN         | 10x 1GE(LAN)              |
| Xcvr 0           | REV 01 | 740-011613 | P9F18GF         | SFP-SX                    |
| Xcvr 2           | REV 01 | 740-011782 | P9M0TL9         | SFP-SX                    |
| Xcvr 7           | REV 01 | 740-011782 | P9P0XXH         | SFP-SX                    |
| Xcvr 9           | REV 01 | 740-011782 | P9M0TN1         | SFP-SX                    |
| PIC 1            |        | BUILTIN    | BUILTIN         | 10x 1GE(LAN)              |
| Xcvr 0           | REV 01 | 740-011613 | PAJ4UHC         | SFP-SX                    |
| PIC 2            |        | BUILTIN    | BUILTIN         | 10x 1GE(LAN)              |
| Xcvr 0           | REV 01 | 740-011613 | PFF2CD0         | SFP-SX                    |
| Xcvr 1           | REV 01 | 740-011613 | PBG3ZUT         | SFP-SX                    |
| Xcvr 2           | REV 01 | 740-011613 | PFF2DDV         | SFP-SX                    |
| Xcvr 5           | REV 01 | 740-011613 | P8E2SST         | SFP-SX                    |
| Xcvr 9           | REV 01 | 740-011782 | PB8329N         | SFP-SX                    |
| PIC 3            |        | BUILTIN    | BUILTIN         | 10x 1GE(LAN)              |
| Xcvr 0           | REV 01 | 740-026192 | 1U0201084503342 | SFP-100BASE-BX10-U        |
| Xcvr 1           | REV 01 | 740-026193 | 1U1201084503313 | SFP-100BASE-BX10-D        |
| Xcvr 2           | REV 01 | 740-011613 | PAJ4Y5B         | SFP-SX                    |
| Xcvr 6           | REV 01 | 740-011782 | P9MOU3M         | SFP-SX                    |
| Xcvr 7           | REV 01 | 740-011782 | P9M0TLA         | SFP-SX                    |
| FPC 1            | REV 16 | 750-031089 | YL0719          | MPC Type 2 3D             |
| CPU              | REV 06 | 711-030884 | YL1463          | MPC PMB 2G                |
| MIC 0            | REV 07 | 750-028387 | JR6500          | 3D 4x 10GE XFP            |
| PIC 0            |        | BUILTIN    | BUILTIN         | 2x 10GE XFP               |
| Xcvr 0           | REV 01 | 740-014279 | 733019A00154    | XFP-10G-LR                |
| Xcvr 1           | REV 02 | 740-014289 | T09F55034       | XFP-10G-SR                |
| PIC 1            |        | BUILTIN    | BUILTIN         | 2x 10GE XFP               |
| Xcvr 0           | REV 01 | 740-014279 | 913019B00791    | XFP-10G-LR                |
| Xcvr 1           | REV 01 | 740-014289 | 98S803A90384    | XFP-10G-SR                |
| MIC 1            | REV 24 | 750-028387 | YJ3950          | 3D 4x 10GE XFP            |
| PIC 2            |        | BUILTIN    | BUILTIN         | 2x 10GE XFP               |
| Xcvr 0           | REV 02 | 740-014279 | T10B36134       | XFP-10G-LR                |
| Xcvr 1           | REV 01 | 740-014289 | T07M86354       | XFP-10G-SR                |
| PIC 3            |        | BUILTIN    | BUILTIN         | 2x 10GE XFP               |
| FPC 2            | REV 08 | 710-014219 | JY9654          | DPCE 4x 10GE R            |
| CPU              | REV 06 | 710-013713 | JZ6549          | DPC PMB                   |
| PIC 0            |        | BUILTIN    | BUILTIN         | 1x 10GE(LAN/WAN)          |
| PIC 1            |        | BUILTIN    | BUILTIN         | 1x 10GE(LAN/WAN)          |
| PIC 2            |        | BUILTIN    | BUILTIN         | 1x 10GE(LAN/WAN)          |
| Xcvr 0           | REV 03 | 740-011571 | C931BK028       | XFP-10G-SR                |
| PIC 3            |        | BUILTIN    | BUILTIN         | 1x 10GE(LAN/WAN)          |
| FPC 3            | REV 10 | 750-024199 | XJ6692          | MX FPC Type 3             |
| CPU              | REV 03 | 710-022351 | XF5182          | DPC PMB                   |
| PIC 0            | REV 17 | 750-009553 | RJ2945          | 4x OC-48 SONET            |
| Xcvr 1           | REV 01 | 740-011785 | PCP3YLL         | SFP-SR                    |
| Xcvr 3           | REV 01 | 740-011785 | PDSOMRY         | SFP-SR                    |
| PIC 1            | REV 32 | 750-003700 | DP2113          | 1x OC-192 12xMM VSR       |
| FPC 5            | REV 25 | 750-028467 | YM8256          | MPC 3D 16x 10GE           |
| CPU              | REV 10 | 711-029089 | YL3029          | AMPC PMB                  |

|            |        |            |              |         |                      |
|------------|--------|------------|--------------|---------|----------------------|
| PIC 0      |        |            | BUILTIN      | BUILTIN | 4x 10GE(LAN) SFP+    |
| Xcvr 1     | REV 01 | 740-031980 | AHNOX1Z      |         | SFP+-10G-SR          |
| PIC 1      |        |            | BUILTIN      | BUILTIN | 4x 10GE(LAN) SFP+    |
| PIC 2      |        |            | BUILTIN      | BUILTIN | 4x 10GE(LAN) SFP+    |
| PIC 3      |        |            | BUILTIN      | BUILTIN | 4x 10GE(LAN) SFP+    |
| FPC 7      | REV 02 | 750-031092 | JR6658       |         | MPC Type 1 3D Q      |
| CPU        | REV 01 | 711-030884 | JZ9038       |         | MPC PMB 2G           |
| MIC 0      | REV 08 | 750-028392 | JZ8737       |         | 3D 20x 1GE(LAN) SFP  |
| PIC 0      |        |            | BUILTIN      | BUILTIN | 10x 1GE(LAN) SFP     |
| Xcvr 0     | REV 01 | 740-011782 | PBE2C6Y      |         | SFP-SX               |
| Xcvr 2     |        | NON-JNPR   | U8105N8      |         | SFP-SX               |
| Xcvr 4     | REV 01 | 740-011613 | PFM18EF      |         | SFP-SX               |
| Xcvr 7     | REV 01 | 740-011613 | PFF2AM8      |         | SFP-SX               |
| Xcvr 8     | REV 01 | 740-011613 | PFF2CT6      |         | SFP-SX               |
| PIC 1      |        |            | BUILTIN      | BUILTIN | 10x 1GE(LAN) SFP     |
| Xcvr 0     | REV 01 | 740-011782 | PB82VHH      |         | SFP-SX               |
| Xcvr 1     | REV 01 | 740-011613 | PFF2CSW      |         | SFP-SX               |
| Xcvr 9     | REV 01 | 740-011613 | PFF2BY0      |         | SFP-SX               |
| QXM 0      | REV 04 | 711-028408 | JR6372       |         | MPC QXM              |
| FPC 8      | REV 05 | 750-024387 | JW9754       |         | MX FPC Type 2        |
| CPU        | REV 03 | 710-022351 | KF1651       |         | DPC PMB              |
| PIC 0      | REV 08 | 750-014730 | DM3664       |         | 4x OC-3 1x OC-12 SFP |
| Xcvr 0     | REV 01 | 740-016065 | 81S290N00077 |         | SFP-SR               |
| Xcvr 1     |        | NON-JNPR   | 2191844      |         | SFP-SR               |
| Xcvr 2     | REV 01 | 740-011618 | PD81EE5      |         | SFP-IR               |
| PIC 1      | REV 08 | 750-014637 | DM3671       |         | 4x OC-12-3 SFP       |
| Xcvr 0     | REV 01 | 740-011785 | PCK3UNK      |         | SFP-SR               |
| Xcvr 3     | REV 01 | 740-011785 | PDSOMPZ      |         | SFP-SR               |
| FPC 10     | REV 04 | 710-013699 | JY4654       |         | DPCE 40x 1GE R       |
| CPU        | REV 05 | 710-013713 | JS9717       |         | DPC PMB              |
| PIC 0      |        |            | BUILTIN      | BUILTIN | 10x 1GE(LAN)         |
| Xcvr 5     | REV 01 | 740-011782 | PAR1L72      |         | SFP-SX               |
| Xcvr 6     | REV 01 | 740-011782 | P8N1YQ4      |         | SFP-SX               |
| PIC 1      |        |            | BUILTIN      | BUILTIN | 10x 1GE(LAN)         |
| PIC 2      |        |            | BUILTIN      | BUILTIN | 10x 1GE(LAN)         |
| Xcvr 0     | REV 01 | 740-011782 | P8Q2AVL      |         | SFP-SX               |
| Xcvr 5     | REV 01 | 740-011782 | PAR1L7B      |         | SFP-SX               |
| Xcvr 6     | REV 01 | 740-011782 | PAR1L2J      |         | SFP-SX               |
| Xcvr 8     | REV 01 | 740-011782 | P8N1YMY      |         | SFP-SX               |
| PIC 3      |        |            | BUILTIN      | BUILTIN | 10x 1GE(LAN)         |
| Fan Tray 0 | REV 03 | 740-014971 | TP0567       |         | Fan Tray             |
| Fan Tray 1 | REV 03 | 740-014971 | TP0702       |         | Fan Tray             |

### show chassis hardware models (MX960 Router with Enhanced MX SCB)

```
user@host> show chassis hardware models
```

| Hardware inventory: |         |             |               |                  |
|---------------------|---------|-------------|---------------|------------------|
| Item                | Version | Part number | Serial number | FRU model number |
| Midplane            | REV 03  | 710-013698  | TR0183        | CHAS-BP-MX960-S  |
| Fan Extender        | REV 02  | 710-018051  | JY5227        | ECM-MX960        |
| FPM Board           | REV 03  | 710-014974  | JZ6876        | CRAFT-MX960-S    |
| Routing Engine 0    | REV 06  | 740-013063  | 1000687969    | RE-S-2000-4096-S |
| Routing Engine 1    | REV 06  | 740-013063  | 1000687955    | RE-S-2000-4096-S |
| CB 0                | REV 11  | 750-031391  | YZ6072        | SCBE-MX-S        |
| CB 1                | REV 11  | 750-031391  | YZ6068        | SCBE-MX-S        |
| CB 2                | REV 11  | 750-031391  | YZ6081        | SCBE-MX-S        |
| FPC 0               | REV 01  | 750-018122  | KA5576        | DPCE-R-40GE-SFP  |
| FPC 1               | REV 16  | 750-031089  | YL0719        | MX-MPC2-3D       |
| MIC 0               | REV 07  | 750-028387  | JR6500        | MIC-3D-4XGE-XFP  |
| MIC 1               | REV 24  | 750-028387  | YJ3950        | MIC-3D-4XGE-XFP  |
| FPC 2               | REV 08  | 710-014219  | JY9654        | DPC-R-4XGE-XFP   |

|            |        |            |        |                        |
|------------|--------|------------|--------|------------------------|
| FPC 3      | REV 10 | 750-024199 | XJ6692 | MX-FPC3                |
| PIC 0      | REV 17 | 750-009553 | RJ2945 | PC-40C48-SON-SFP       |
| PIC 1      | REV 32 | 750-003700 | DP2113 | PC-10C192-SON-VSR      |
| FPC 5      | REV 25 | 750-028467 | YM8256 | MPC-3D-16XGE-SFP       |
| FPC 7      | REV 02 | 750-031092 | JR6658 | MX-MPC1-3D-Q           |
| MIC 0      | REV 08 | 750-028392 | JZ8737 | MIC-3D-20GE-SFP        |
| FPC 8      | REV 05 | 750-024387 | JW9754 | MX-FPC2                |
| PIC 0      | REV 08 | 750-014730 | DM3664 | PB-40C3-10C12-SON2-SFP |
| PIC 1      | REV 08 | 750-014637 | DM3671 | PB-40C3-40C12-SON-SFP  |
| FPC 10     | REV 04 | 710-013699 | JY4654 | DPC-R-40GE-SFP         |
| Fan Tray 0 | REV 03 | 740-014971 | TP0567 | FFANTRAY-MX960-S       |
| Fan Tray 1 | REV 03 | 740-014971 | TP0702 | FFANTRAY-MX960-S       |

### show chassis hardware detail (MX960 Router)

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user@host> show chassis hardware detail
Hardware inventory:
Item                Version  Part number  Serial number  Description
Chassis
Midplane            REV 01    710-013698   AA6082         MX960 Midplane
PIM                 Rev 01    740-013110   000008         Power Inlet Module
PEM 2
PEM 3
Routing Engine 0    REV 00    740-015113   1000617944     PS 1.7kW; 200-240VAC in
ad0 245 MB SanDisk SDCFB-256 111419E1805T1141 RE-S-1300
ad2 38154 MB FUJITSU MHT2040BH NR0WT5925N77 Compact Flash
CB 0                REV 05    710-013725   JK6947         MX960 Test SCB
FPC 4               REV 01    710-013305   JM7617         MX960 Test DPC
CPU
PIC 0
PIC 1
FPC 7               REV 01    710-013305   JL9634         MX960 Test DPC
CPU
PIC 0
Xcvr 0              NON-JNPR   MYBG65I82C    1x 10GE(LAN/WAN)
PIC 1
Xcvr 1              REV 01    740-011782   P7N0368        XFP-10G-SR
Xcvr 4              REV 01    740-011782   P8J1W27        10x 1GE
Xcvr 6              REV 01    740-011782   P8J1VSD        SFP-SX
Xcvr 9              REV 01    740-011782   P8J1W25        SFP-SX
Fan Tray 0
Fan Tray 1

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### show chassis hardware (MX2010 Router)

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user@host > show chassis hardware
Hardware inventory:
Item                Version  Part number  Serial number  Description
Chassis
Midplane            REV 01    750-044636   ABAB8506       MX2010
Midplane 1          REV 01    711-044557   ZY8296         Lower Backplane
PMP                 REV 03    711-032426   ACAJ1388       Upper Backplane
FPM Board           REV 06    711-032349   ZX8744         Power Midplane
PSM 4               REV 0C    740-033727   VK00254        Front Panel Display
Module
PSM 5               REV 0B    740-033727   VG00015        DC 52V Power Supply
Module
PSM 6               REV 0B    740-033727   VH00097        DC 52V Power Supply
Module
PSM 7               REV 0C    740-033727   VJ00151        DC 52V Power Supply
Module

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|                  |        |            |              |                      |
|------------------|--------|------------|--------------|----------------------|
| PSM 8 Module     | REV 0C | 740-033727 | VJ00149      | DC 52V Power Supply  |
| PDM 0            | REV 0B | 740-038109 | WA00008      | DC Power Dist Module |
| PDM 1            | REV 0B | 740-038109 | WA00014      | DC Power Dist Module |
| Routing Engine 0 | REV 02 | 740-041821 | 9009094134   | RE-S-1800x4          |
| Routing Engine 1 | REV 02 | 740-041821 | 9009094141   | RE-S-1800x4          |
| CB 0             | REV 08 | 750-040257 | CAAB3491     | Control Board        |
| CB 1             | REV 08 | 750-040257 | CAAB3489     | Control Board        |
| SPMB 0           | REV 02 | 711-041855 | CAAA6135     | PMB Board            |
| SPMB 1           | REV 02 | 711-041855 | CAAA6137     | PMB Board            |
| SFB 0            | REV 06 | 711-032385 | ZV1828       | Switch Fabric Board  |
| SFB 1            | REV 07 | 711-032385 | ZZ2568       | Switch Fabric Board  |
| SFB 2            | REV 07 | 711-032385 | ZZ2563       | Switch Fabric Board  |
| SFB 3            | REV 07 | 711-032385 | ZZ2564       | Switch Fabric Board  |
| SFB 4            | REV 07 | 711-032385 | ZZ2580       | Switch Fabric Board  |
| SFB 5            | REV 07 | 711-032385 | ZZ2579       | Switch Fabric Board  |
| SFB 6            | REV 07 | 711-032385 | CAAB4882     | Switch Fabric Board  |
| SFB 7            | REV 07 | 711-032385 | CAAB4898     | Switch Fabric Board  |
| FPC 0            | REV 33 | 750-028467 | CAAB1919     | MPC 3D 16x 10GE      |
| CPU              | REV 11 | 711-029089 | CAAB7174     | AMPC PMB             |
| PIC 0            |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+    |
| Xcvr 0           | REV 01 | 740-021308 | AMH02RE      | SFP+-10G-SR          |
| Xcvr 1           | REV 01 | 740-021308 | AMH038C      | SFP+-10G-SR          |
| Xcvr 2           | REV 01 | 740-021308 | AMH0390      | SFP+-10G-SR          |
| Xcvr 3           | REV 01 | 740-021308 | AMG0SUA      | SFP+-10G-SR          |
| PIC 1            |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+    |
| Xcvr 0           | REV 01 | 740-021308 | AMH0579      | SFP+-10G-SR          |
| Xcvr 1           | REV 01 | 740-021308 | AMG0SGP      | SFP+-10G-SR          |
| Xcvr 2           | REV 01 | 740-021308 | AMH04SV      | SFP+-10G-SR          |
| Xcvr 3           | REV 01 | 740-021308 | AMH04X3      | SFP+-10G-SR          |
| PIC 2            |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+    |
| Xcvr 0           | REV 01 | 740-021308 | AMH0135      | SFP+-10G-SR          |
| Xcvr 1           | REV 01 | 740-021308 | AMH02NC      | SFP+-10G-SR          |
| Xcvr 2           | REV 01 | 740-021308 | AMH02XB      | SFP+-10G-SR          |
| Xcvr 3           | REV 01 | 740-021308 | AMH02PN      | SFP+-10G-SR          |
| PIC 3            |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+    |
| Xcvr 0           | REV 01 | 740-021308 | AMH057Y      | SFP+-10G-SR          |
| Xcvr 1           | REV 01 | 740-021308 | AMG0JHE      | SFP+-10G-SR          |
| Xcvr 2           | REV 01 | 740-021308 | AMH02HT      | SFP+-10G-SR          |
| Xcvr 3           | REV 01 | 740-021308 | AMH04V4      | SFP+-10G-SR          |
| FPC 1            | REV 21 | 750-033205 | ZG5027       | MPC Type 3           |
| CPU              | REV 04 | 711-035209 | YT4780       | HMPC PMB 2G          |
| MIC 0            | REV 03 | 750-033307 | ZV6299       | 10X10GE SFPP         |
| PIC 0            |        | BUILTIN    | BUILTIN      | 10X10GE SFPP         |
| Xcvr 0           | REV 01 | 740-031980 | 083363A00410 | SFP+-10G-SR          |
| Xcvr 1           | REV 01 | 740-031980 | 083363A00334 | SFP+-10G-SR          |
| Xcvr 2           | REV 01 | 740-031980 | 113363A00125 | SFP+-10G-SR          |
| Xcvr 3           | REV 01 | 740-031980 | 083363A00953 | SFP+-10G-SR          |
| Xcvr 4           | REV 01 | 740-031980 | AHR013D      | SFP+-10G-SR          |
| Xcvr 5           | REV 01 | 740-031980 | AJ40JUR      | SFP+-10G-SR          |
| Xcvr 6           | REV 01 | 740-031980 | AJ40JKL      | SFP+-10G-SR          |
| Xcvr 7           | REV 01 | 740-031980 | AJ30ECK      | SFP+-10G-SR          |
| Xcvr 8           | REV 01 | 740-021308 | 19T511100864 | SFP+-10G-SR          |
| Xcvr 9           | REV 01 | 740-021308 | 19T511100868 | SFP+-10G-SR          |
| MIC 1            | REV 03 | 750-033307 | ZV6268       | 10X10GE SFPP         |
| PIC 2            |        | BUILTIN    | BUILTIN      | 10X10GE SFPP         |
| Xcvr 0           | REV 01 | 740-031980 | AJCOJML      | SFP+-10G-SR          |
| Xcvr 1           | REV 01 | 740-031980 | AJ403PC      | SFP+-10G-SR          |
| Xcvr 2           | REV 01 | 740-031980 | AJ10N25      | SFP+-10G-SR          |
| Xcvr 3           | REV 01 | 740-031980 | AJ40JF4      | SFP+-10G-SR          |
| Xcvr 4           | REV 01 | 740-031980 | AJ40JSJ      | SFP+-10G-SR          |

|            |        |            |              |                        |
|------------|--------|------------|--------------|------------------------|
| Xcvr 5     | REV 01 | 740-031980 | AJ403V7      | SFP+-10G-SR            |
| Xcvr 6     | REV 01 | 740-031980 | AJ40JN3      | SFP+-10G-SR            |
| Xcvr 7     | REV 01 | 740-031980 | AJ40JSU      | SFP+-10G-SR            |
| Xcvr 8     | REV 01 | 740-021308 | 19T511100468 | SFP+-10G-SR            |
| Xcvr 9     | REV 01 | 740-021308 | 19T511101363 | SFP+-10G-SR            |
| FPC 8      | REV 22 | 750-031089 | ZT9746       | MPC Type 2 3D          |
| CPU        | REV 06 | 711-030884 | ZS1271       | MPC PMB 2G             |
| MIC 0      | REV 26 | 750-028392 | ABBS1150     | 3D 20x 1GE(LAN) SFP    |
| PIC 0      |        | BUILTIN    | BUILTIN      | 10x 1GE(LAN) SFP       |
| Xcvr 0     | REV 01 | 740-031851 | PLG023C      | SFP-SX                 |
| Xcvr 1     | REV 01 | 740-031851 | PLG09C6      | SFP-SX                 |
| Xcvr 2     | REV 02 | 740-011613 | AM0950SF9L7  | SFP-SX                 |
| Xcvr 3     | REV 02 | 740-011613 | AM1001SFN1H  | SFP-SX                 |
| Xcvr 4     | REV 02 | 740-011613 | AM1001SFM9D  | SFP-SX                 |
| Xcvr 5     | REV 02 | 740-011613 | AM1001SFLTJ  | SFP-SX                 |
| Xcvr 6     | REV 01 | 740-031851 | AC1108S03L9  | SFP-SX                 |
| Xcvr 7     | REV 01 | 740-031851 | AC1102S00NC  | SFP-SX                 |
| Xcvr 8     | REV 01 | 740-031851 | AC1102S00MX  | SFP-SX                 |
| Xcvr 9     | REV 01 | 740-031851 | AC1102S0085  | SFP-SX                 |
| PIC 1      |        | BUILTIN    | BUILTIN      | 10x 1GE(LAN) SFP       |
| Xcvr 0     | REV 01 | 740-031851 | AC1102S00KU  | SFP-SX                 |
| Xcvr 1     | REV 01 | 740-031851 | AC1102S00NG  | SFP-SX                 |
| Xcvr 2     | REV 01 | 740-031851 | AC1102S00K3  | SFP-SX                 |
| Xcvr 3     | REV 01 | 740-031851 | AC1102S008R  | SFP-SX                 |
| Xcvr 4     | REV 01 | 740-031851 | AM1107SUFVJ  | SFP-SX                 |
| Xcvr 5     | REV 01 | 740-031851 | AC1108S03LG  | SFP-SX                 |
| MIC 1      | REV 26 | 750-028387 | ABBR9582     | 3D 4x 10GE XFP         |
| PIC 2      |        | BUILTIN    | BUILTIN      | 2x 10GE XFP            |
| Xcvr 0     |        | NON-JNPR   | T10A91703    | XFP-10G-SR             |
| Xcvr 1     |        | NON-JNPR   | T09L42604    | XFP-10G-SR             |
| PIC 3      |        | BUILTIN    | BUILTIN      | 2x 10GE XFP            |
| FPC 9      | REV 11 | 750-036284 | ZL3591       | MPC 3D 16x 10GE EM     |
| CPU        | REV 10 | 711-029089 | ZL0513       | AMPC PMB               |
| PIC 0      |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+      |
| Xcvr 0     | REV 01 | 740-031980 | 1YT517101825 | SFP+-10G-SR            |
| Xcvr 1     | REV 01 | 740-031980 | 1YT517101821 | SFP+-10G-SR            |
| Xcvr 2     | REV 01 | 740-031980 | 1YT517101682 | SFP+-10G-SR            |
| Xcvr 3     | REV 01 | 740-031980 | ALQ13R6      | SFP+-10G-SR            |
| PIC 1      |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+      |
| Xcvr 0     | REV 01 | 740-031980 | 1YT517101828 | SFP+-10G-SR            |
| Xcvr 1     | REV 01 | 740-031980 | 1YT517101716 | SFP+-10G-SR            |
| Xcvr 2     | REV 01 | 740-031980 | 1YT517101732 | SFP+-10G-SR            |
| Xcvr 3     | REV 01 | 740-031980 | ALPOTR1      | SFP+-10G-SR            |
| PIC 2      |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+      |
| Xcvr 0     | REV 01 | 740-031980 | 1YT517101741 | SFP+-10G-SR            |
| Xcvr 1     | REV 01 | 740-031980 | 1YT517101829 | SFP+-10G-SR            |
| Xcvr 2     | REV 01 | 740-031980 | 1YT517101669 | SFP+-10G-SR            |
| Xcvr 3     | REV 01 | 740-031980 | ALQ14E3      | SFP+-10G-SR            |
| PIC 3      |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+      |
| Xcvr 0     | REV 01 | 740-031980 | 1YT517101826 | SFP+-10G-SR            |
| Xcvr 1     | REV 01 | 740-031980 | 1YT517101817 | SFP+-10G-SR            |
| Xcvr 2     | REV 01 | 740-031980 | 1YT517101735 | SFP+-10G-SR            |
| Xcvr 3     | REV 01 | 740-031980 | ALQ159A      | SFP+-10G-SR            |
| ADC 0      | REV 05 | 750-043596 | CAAC2073     | Adapter Card           |
| ADC 1      | REV 01 | 750-043596 | ZV4117       | Adapter Card           |
| ADC 8      | REV 01 | 750-043596 | ZV4107       | Adapter Card           |
| ADC 9      | REV 02 | 750-043596 | ZW1555       | Adapter Card           |
| Fan Tray 0 | REV 2A | 760-046960 | ACAY0015     | 172mm FanTray - 6 Fans |
| Fan Tray 1 | REV 2A | 760-046960 | ACAY0019     | 172mm FanTray - 6 Fans |

|            |        |            |          |                        |
|------------|--------|------------|----------|------------------------|
| Fan Tray 2 | REV 2A | 760-046960 | ACAY0020 | 172mm FanTray - 6 Fans |
| Fan Tray 3 | REV 2A | 760-046960 | ACAY0021 | 172mm FanTray - 6 Fans |

**show chassis hardware detail (MX2010 Router)**

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Hardware inventory:
Item          Version  Part number  Serial number  Description
Chassis                               JN11E233DAFK  MX2010
Midplane      REV 26   750-044636   ABAB9357      Lower Backplane
Midplane 1    REV 01   711-044557   ABAB8643      Upper Backplane
PMP           REV 04   711-032426   ACAJ1677      Power Midplane
FPM Board     REV 08   760-044634   ABBV9726      Front Panel Display
PSM 0         REV 01   740-045050   1E02224000P   DC 52V Power Supply
Module
PSM 1         REV 01   740-045050   1E02224000M   DC 52V Power Supply
Module
PSM 2         REV 01   740-045050   1E022240010   DC 52V Power Supply
Module
PSM 3         REV 01   740-045050   1E02224000G   DC 52V Power Supply
Module
PSM 4         REV 01   740-045050   1E022240013   DC 52V Power Supply
Module
PSM 5         REV 01   740-045050   1E022240007   DC 52V Power Supply
Module
PSM 6         REV 01   740-045050   1E02224001C   DC 52V Power Supply
Module
PSM 7         REV 01   740-045050   1E02224001D   DC 52V Power Supply
Module
PSM 8         REV 01   740-045050   1E02224001B   DC 52V Power Supply
Module
PDM 0         REV 01   740-045234   1E262250067   DC Power Dist Module
Routing Engine 0 REV 02   740-041821   9009099704    RE-S-1800x4
  ad0  3831 MB  UGB30SFA4000T1  SFA4000T1 00000651 Compact Flash
  ad1  30533 MB UGB94BPH32H0S1-KCI 11000019592 Disk 1
  usb0 (addr 1) EHCI root hub 0 Intel uhub0
  usb0 (addr 2) product 0x0020 32 vendor 0x8087 uhub1
  DIMM 0 SGU04G72H1BD2SA-BB DIE REV-52 PCB REV-54 MFR ID-ce80
  DIMM 1 SGU04G72H1BD2SA-BB DIE REV-52 PCB REV-54 MFR ID-ce80
  DIMM 2 SGU04G72H1BD2SA-BB DIE REV-52 PCB REV-54 MFR ID-ce80
  DIMM 3 SGU04G72H1BD2SA-BB DIE REV-52 PCB REV-54 MFR ID-ce80
Routing Engine 1 REV 02   740-041821   9009099706    RE-S-1800x4
  ad0  3998 MB  Virtium - TuffDrive VCF P1T0200262860208 114 Compact Flash
  ad1  30533 MB  UGB94ARF32H0S3-KC  UNIGEN-499551-000404 Disk 1
CB 0         REV 13   750-040257   CAAF8436      Control Board
CB 1         REV 13   750-040257   CAAF8434      Control Board
SPMB 0       REV 02   711-041855   ABBV3825      PMB Board
SPMB 1       REV 02   711-041855   ABBV3833      PMB Board
SFB 0        REV 05   711-044466   ABBX5682      Switch Fabric Board
SFB 1        REV 05   711-044466   ABBX5676      Switch Fabric Board
SFB 2        REV 05   711-044466   ABBX5665      Switch Fabric Board
SFB 3        REV 05   711-044466   ABBX5699      Switch Fabric Board
SFB 4        REV 05   711-044466   ABBX5603      Switch Fabric Board
SFB 5        REV 05   711-044466   ABBX5587      Switch Fabric Board
SFB 6        REV 05   711-044466   ABBX5607      Switch Fabric Board
SFB 7        REV 05   711-044466   ABBX5669      Switch Fabric Board
FPC 0        REV 09   750-037355   CAAF0924      MPC Type 4-2
CPU          REV 08   711-035209   CAAB9842      HMPC PMB 2G
PIC 0        BUILTIN  BUILTIN      4x10GE SFPP
  Xcvr 0      REV 01   740-021308   19T511101656 SFP+-10G-SR
  Xcvr 1      REV 01   740-031980   AMA04RU      SFP+-10G-SR

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|        |        |            |              |                   |
|--------|--------|------------|--------------|-------------------|
| Xcvr 2 | REV 01 | 740-031980 | 193363A00558 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | B10M00202    | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN      | 1X100GE CFP       |
| Xcvr 0 |        | NON-JNPR   | X12J00328    | CFP-100G-SR10     |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x10GE SFPP       |
| Xcvr 0 | REV 01 | 740-031980 | AMA088W      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | B10L04211    | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-021308 | 19T511101602 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | B10L04151    | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN      | 1X100GE CFP       |
| Xcvr 0 |        | NON-JNPR   | X12J00332    | CFP-100G-SR10     |
| FPC 1  | REV 18 | 750-033205 | ZE0128       | MPC Type 3        |
| CPU    | REV 06 | 711-035209 | ZG5431       | HMPD PMB 2G       |
| MIC 0  | REV 15 | 750-033199 | ZP6435       | 1X100GE CFP       |
| PIC 0  |        | BUILTIN    | BUILTIN      | 1X100GE CFP       |
| Xcvr 0 | REV 01 | 740-032210 | J11E46118    | CFP-100G-LR4      |
| MIC 1  | REV 15 | 750-033199 | ZP6442       | 1X100GE CFP       |
| PIC 2  |        | BUILTIN    | BUILTIN      | 1X100GE CFP       |
| Xcvr 0 | REV 01 | 740-032210 | UMN03T4      | CFP-100G-LR4      |
| FPC 2  | REV 16 | 750-037358 | CAAL1001     | MPC Type 4-1      |
| CPU    | REV 08 | 711-035209 | CAAK7927     | HMPD PMB 2G       |
| PIC 0  |        | BUILTIN    | BUILTIN      | 8X10GE SFPP       |
| Xcvr 0 | REV 01 | 740-031980 | 193363A00589 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-021308 | 973152A00028 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 193363A00376 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-021308 | 973152A00016 | SFP+-10G-SR       |
| Xcvr 4 | REV 01 | 740-031980 | 193363A00499 | SFP+-10G-SR       |
| Xcvr 5 | REV 01 | 740-021308 | 973152A00039 | SFP+-10G-SR       |
| Xcvr 6 | REV 01 | 740-031980 | B11E01239    | SFP+-10G-SR       |
| Xcvr 7 | REV 01 | 740-021308 | 973152A00058 | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN      | 8X10GE SFPP       |
| Xcvr 0 | REV 01 | 740-031980 | B10M00075    | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-021308 | 973152A00014 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AMA0638      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-021308 | 973152A00063 | SFP+-10G-SR       |
| Xcvr 4 | REV 01 | 740-031980 | AMA0629      | SFP+-10G-SR       |
| Xcvr 5 | REV 01 | 740-021308 | 973152A00053 | SFP+-10G-SR       |
| Xcvr 6 | REV 01 | 740-031980 | 193363A00344 | SFP+-10G-SR       |
| Xcvr 7 | REV 01 | 740-021308 | 973152A00046 | SFP+-10G-SR       |
| PIC 2  |        | BUILTIN    | BUILTIN      | 8X10GE SFPP       |
| Xcvr 0 | REV 01 | 740-031980 | AMA062M      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-021308 | 973152A00080 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 193363A00580 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-021308 | 973152A00064 | SFP+-10G-SR       |
| Xcvr 4 | REV 01 | 740-031980 | 093363A01494 | SFP+-10G-SR       |
| Xcvr 5 | REV 01 | 740-021308 | 973152A00020 | SFP+-10G-SR       |
| Xcvr 6 | REV 01 | 740-031980 | 123363A00047 | SFP+-10G-SR       |
| Xcvr 7 | REV 01 | 740-021308 | 973152A00072 | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN      | 8X10GE SFPP       |
| Xcvr 0 | REV 01 | 740-021308 | 03DZ06A01033 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-021308 | 973152A00022 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-021308 | 03DZ06A01026 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-021308 | 973152A00013 | SFP+-10G-SR       |
| Xcvr 4 | REV 01 | 740-021308 | 03DZ06A01028 | SFP+-10G-SR       |
| Xcvr 5 | REV 01 | 740-021308 | 973152A00079 | SFP+-10G-SR       |
| Xcvr 6 | REV 01 | 740-021308 | 03DZ06A01018 | SFP+-10G-SR       |
| Xcvr 7 | REV 01 | 740-021308 | 973152A00025 | SFP+-10G-SR       |
| FPC 3  | REV 33 | 750-028467 | CAAF5400     | MPC 3D 16x 10GE   |
| CPU    | REV 11 | 711-029089 | CAAH7626     | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-021308 | 973152A00066 | SFP+-10G-SR       |

|        |        |            |              |                   |
|--------|--------|------------|--------------|-------------------|
| Xcvr 1 | REV 01 | 740-021308 | 973152A00021 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-021308 | 973152A00062 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-021308 | 973152A00027 | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-021308 | 973152A00065 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-021308 | 973152A00069 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-021308 | 973152A00026 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-021308 | 973152A00003 | SFP+-10G-SR       |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-021308 | 973152A00035 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-021308 | 973152A00004 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-021308 | 973152A00049 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-021308 | 973152A00055 | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-021308 | 973152A00010 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-021308 | 973152A00001 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-021308 | 973152A00073 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-021308 | 973152A00012 | SFP+-10G-SR       |
| FPC 4  | REV 21 | 750-033205 | ZG5028       | MPC Type 3        |
| CPU    | REV 05 | 711-035209 | YX3911       | HMPC PMB 2G       |
| MIC 0  | REV 03 | 750-036233 | ZL2036       | 2X40GE QSFP       |
| PIC 0  |        | BUILTIN    | BUILTIN      | 2X40GE QSFP       |
| Xcvr 0 | REV 01 | 740-032986 | QB220708     | QSFP+-40G-SR4     |
| Xcvr 1 | REV 01 | 740-032986 | QB220735     | QSFP+-40G-SR4     |
| MIC 1  | REV 03 | 750-036233 | ZL2028       | 2X40GE QSFP       |
| PIC 2  |        | BUILTIN    | BUILTIN      | 2X40GE QSFP       |
| Xcvr 0 | REV 01 | 740-032986 | QB220727     | QSFP+-40G-SR4     |
| Xcvr 1 | REV 01 | 740-032986 | QB220715     | QSFP+-40G-SR4     |
| FPC 5  | REV 11 | 750-037358 | CAAE2196     | MPC Type 4-1      |
| CPU    | REV 08 | 711-035209 | CAAD9074     | HMPC PMB 2G       |
| PIC 0  |        | BUILTIN    | BUILTIN      | 8X10GE SFPP       |
| Xcvr 0 | REV 01 | 740-031980 | AMA062S      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AMA062P      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AMA052R      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AMA0632      | SFP+-10G-SR       |
| Xcvr 4 | REV 01 | 740-031980 | 193363A00564 | SFP+-10G-SR       |
| Xcvr 5 | REV 01 | 740-031980 | 193363A00229 | SFP+-10G-SR       |
| Xcvr 6 | REV 01 | 740-031980 | 193363A00363 | SFP+-10G-SR       |
| Xcvr 7 | REV 01 | 740-031980 | 193363A00278 | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN      | 8X10GE SFPP       |
| Xcvr 0 | REV 01 | 740-031980 | AMA04CC      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-021308 | AD0927A001W  | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AMA04N2      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AMA062U      | SFP+-10G-SR       |
| Xcvr 4 | REV 01 | 740-031980 | 193363A00491 | SFP+-10G-SR       |
| Xcvr 5 | REV 01 | 740-031980 | 183363A01511 | SFP+-10G-SR       |
| Xcvr 6 | REV 01 | 740-031980 | 193363A00565 | SFP+-10G-SR       |
| Xcvr 7 | REV 01 | 740-031980 | 193363A00405 | SFP+-10G-SR       |
| PIC 2  |        | BUILTIN    | BUILTIN      | 8X10GE SFPP       |
| Xcvr 0 | REV 01 | 740-031980 | AMA07QX      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AMA06MS      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 193363A00318 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 193363A00402 | SFP+-10G-SR       |
| Xcvr 4 | REV 01 | 740-031980 | 193363A00174 | SFP+-10G-SR       |
| Xcvr 5 | REV 01 | 740-031980 | 193363A00388 | SFP+-10G-SR       |
| Xcvr 6 | REV 01 | 740-031980 | 193363A00377 | SFP+-10G-SR       |
| Xcvr 7 | REV 01 | 740-031980 | 193363A00234 | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN      | 8X10GE SFPP       |
| Xcvr 0 | REV 01 | 740-031980 | AMA062T      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 193363A00550 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 193363A00364 | SFP+-10G-SR       |

|        |        |            |              |                   |
|--------|--------|------------|--------------|-------------------|
| Xcvr 3 | REV 01 | 740-031980 | AMA0630      | SFP+-10G-SR       |
| Xcvr 4 | REV 01 | 740-031980 | 193363A00509 | SFP+-10G-SR       |
| Xcvr 5 | REV 01 | 740-031980 | 193363A00459 | SFP+-10G-SR       |
| Xcvr 6 | REV 01 | 740-031980 | 113363A00191 | SFP+-10G-SR       |
| Xcvr 7 | REV 01 | 740-031980 | 193363A00352 | SFP+-10G-SR       |
| FPC 6  | REV 33 | 750-028467 | CAAF5552     | MPC 3D 16x 10GE   |
| CPU    | REV 11 | 711-029089 | CAAH7601     | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-021308 | AD0927A0036  | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-021308 | AD0927A003M  | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-021308 | AD0927A003G  | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-021308 | AD0927A0031  | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 193363A00331 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 193363A00325 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 193363A00417 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 183363A02509 | SFP+-10G-SR       |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-021308 | T09K75140    | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | B11A04356    | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | B11K01952    | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | B11K01914    | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-021308 | T09K75157    | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-021308 | T09K75194    | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | B11K01926    | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | B11K01936    | SFP+-10G-SR       |
| FPC 7  | REV 16 | 750-037358 | CAAL1012     | MPC Type 4-1      |
| CPU    | REV 08 | 711-035209 | CAAJ3851     | HMPC PMB 2G       |
| PIC 0  |        | BUILTIN    | BUILTIN      | 8X10GE SFPP       |
| Xcvr 0 | REV 01 | 740-031980 | AMA04NK      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | B11F00260    | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | B11E02192    | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AMA04CP      | SFP+-10G-SR       |
| Xcvr 4 | REV 01 | 740-031980 | AJ40JJK      | SFP+-10G-SR       |
| Xcvr 5 | REV 01 | 740-031980 | B11F00238    | SFP+-10G-SR       |
| Xcvr 6 | REV 01 | 740-031980 | B10M00275    | SFP+-10G-SR       |
| Xcvr 7 | REV 01 | 740-031980 | 193363A00211 | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN      | 8X10GE SFPP       |
| Xcvr 0 | REV 01 | 740-031980 | B11D05577    | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | B11G00586    | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AMA08B7      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AMA04Q0      | SFP+-10G-SR       |
| Xcvr 4 | REV 01 | 740-031980 | B11D05840    | SFP+-10G-SR       |
| Xcvr 5 | REV 01 | 740-031980 | B11E00467    | SFP+-10G-SR       |
| Xcvr 6 | REV 01 | 740-031980 | B11E00029    | SFP+-10G-SR       |
| Xcvr 7 | REV 01 | 740-021308 | 19T511101712 | SFP+-10G-SR       |
| PIC 2  |        | BUILTIN    | BUILTIN      | 8X10GE SFPP       |
| Xcvr 0 | REV 01 | 740-031980 | 193363A00568 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | B10M00166    | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | B10M00212    | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | B11D05823    | SFP+-10G-SR       |
| Xcvr 4 | REV 01 | 740-021308 | 03DZ06A01005 | SFP+-10G-SR       |
| Xcvr 5 | REV 01 | 740-021308 | 03DZ06A01003 | SFP+-10G-SR       |
| Xcvr 6 | REV 01 | 740-021308 | 03DZ06A01009 | SFP+-10G-SR       |
| Xcvr 7 | REV 01 | 740-021308 | 03DZ06A01004 | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN      | 8X10GE SFPP       |
| Xcvr 0 | REV 01 | 740-021308 | 03DZ06A01017 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-021308 | 03DZ06A01016 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-021308 | 03DZ06A01024 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-021308 | 03DZ06A01008 | SFP+-10G-SR       |

|            |        |            |              |                        |
|------------|--------|------------|--------------|------------------------|
| Xcvr 4     | REV 01 | 740-030658 | AD0946A02UH  | SFP+-10G-USR           |
| Xcvr 5     | REV 01 | 740-021308 | T09J67913    | SFP+-10G-SR            |
| Xcvr 6     | REV 01 | 740-021308 | AD0837ES09G  | SFP+-10G-SR            |
| Xcvr 7     | REV 01 | 740-021308 | 03DZ06A01015 | SFP+-10G-SR            |
| FPC 8      | REV 03 | 750-045372 | CAAD3111     | MPC Type 3             |
| CPU        | REV 08 | 711-035209 | CAAD8033     | HMPC PMB 2G            |
| MIC 0      | REV 03 | 750-036233 | ZL2032       | 2X40GE QSFP            |
| PIC 0      |        | BUILTIN    | BUILTIN      | 2X40GE QSFP            |
| Xcvr 0     | REV 01 | 740-032986 | QB230273     | QSFP+-40G-SR4          |
| Xcvr 1     | REV 01 | 740-032986 | QB230254     | QSFP+-40G-SR4          |
| MIC 1      | REV 03 | 750-036233 | ZL2021       | 2X40GE QSFP            |
| PIC 2      |        | BUILTIN    | BUILTIN      | 2X40GE QSFP            |
| Xcvr 0     | REV 01 | 740-032986 | QB390962     | QSFP+-40G-SR4          |
| Xcvr 1     | REV 01 | 740-032986 | QB390960     | QSFP+-40G-SR4          |
| FPC 9      | REV 09 | 750-037355 | CAAF1531     | MPC Type 4-2           |
| CPU        | REV 08 | 711-035209 | CAAB9927     | HMPC PMB 2G            |
| PIC 0      |        | BUILTIN    | BUILTIN      | 4x10GE SFPP            |
| Xcvr 0     | REV 01 | 740-031980 | 193363A00525 | SFP+-10G-SR            |
| Xcvr 1     | REV 01 | 740-031980 | 193363A00504 | SFP+-10G-SR            |
| Xcvr 2     | REV 01 | 740-031980 | 193363A00368 | SFP+-10G-SR            |
| Xcvr 3     | REV 01 | 740-031980 | AJ40JSS      | SFP+-10G-SR            |
| PIC 1      |        | BUILTIN    | BUILTIN      | 1X100GE CFP            |
| PIC 2      |        | BUILTIN    | BUILTIN      | 4x10GE SFPP            |
| Xcvr 0     | REV 01 | 740-031980 | 123363A00042 | SFP+-10G-SR            |
| Xcvr 1     | REV 01 | 740-031980 | B10M00023    | SFP+-10G-SR            |
| Xcvr 2     | REV 01 | 740-031980 | AJ802EM      | SFP+-10G-SR            |
| Xcvr 3     | REV 01 | 740-031980 | B11E02348    | SFP+-10G-SR            |
| PIC 3      |        | BUILTIN    | BUILTIN      | 1X100GE CFP            |
| ADC 0      | REV 13 | 750-043596 | ABBX5532     | Adapter Card           |
| ADC 1      | REV 13 | 750-043596 | ABBX5550     | Adapter Card           |
| ADC 2      | REV 13 | 750-043596 | ABBX5571     | Adapter Card           |
| ADC 3      | REV 13 | 750-043596 | ABBX5568     | Adapter Card           |
| ADC 4      | REV 13 | 750-043596 | ABBX5556     | Adapter Card           |
| ADC 5      | REV 13 | 750-043596 | ABBX5553     | Adapter Card           |
| ADC 6      | REV 13 | 750-043596 | ABBX5541     | Adapter Card           |
| ADC 7      | REV 13 | 750-043596 | ABBX5578     | Adapter Card           |
| ADC 8      | REV 13 | 750-043596 | ABBX5560     | Adapter Card           |
| ADC 9      | REV 07 | 750-043596 | ABBV7188     | Adapter Card           |
| Fan Tray 0 | REV 03 | 760-046960 | ACAY0127     | 172mm FanTray - 6 Fans |
| Fan Tray 1 | REV 2A | 760-046960 | ACAY0068     | 172mm FanTray - 6 Fans |
| Fan Tray 2 | REV 2A | 760-046960 | ACAY0072     | 172mm FanTray - 6 Fans |
| Fan Tray 3 | REV 2A | 760-046960 | ACAY0070     | 172mm FanTray - 6 Fans |

### show chassis hardware extensive (MX2010 Router)

```
user@host > show chassis hardware extensive
```

```
Hardware inventory:
```

```

Item              Version  Part number  Serial number  Description
Chassis
Jedec Code:      0x7fb0          EEPROM Version: 0x02
                  S/N:              JN11E233DAFK
Assembly ID:     0x0557          Assembly Version: 00.00
Date:            00-00-0000      Assembly Flags:  0x00
ID: MX2010
Board Information Record:
Address 0x00: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
I2C Hex Data:
Address 0x00: 7f b0 02 ff 05 57 00 00 00 00 00 00 00 00 00 00
Address 0x10: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Address 0x20: 4a 4e 31 31 45 32 33 33 44 41 46 4b 00 00 00 00
Address 0x30: 00 00 00 ff 00 00 00 00 00 00 00 00 00 00 00 00

```

```

Address 0x40: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Address 0x50: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Address 0x60: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Address 0x70: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Midplane          REV 26    750-044636    ABAB9357          Lower Backplane
Jedec Code:      0x7fb0          EEPROM Version:    0x02
P/N:             750-044636          S/N:             S/N ABAB9357
Assembly ID:     0x0b66          Assembly Version: 01.26
Date:           08-28-2012        Assembly Flags:   0x00
Version:         REV 26          CLEI Code:       PROTOXCLEI
ID: Lower Backplane          FRU Model Number: PROTO-ASSEMBLY
Board Information Record:
Address 0x00: ad 01 08 00 2c 21 72 70 a0 00 ff ff ff ff ff ff
I2C Hex Data:
Address 0x00: 7f b0 02 ff 0b 66 01 1a 52 45 56 20 32 36 00 00
Address 0x10: 00 00 00 00 37 35 30 2d 30 34 34 36 33 36 00 00
Address 0x20: 53 2f 4e 20 41 42 41 42 39 33 35 37 00 1c 08 07
Address 0x30: dc ff ff ff ad 01 08 00 2c 21 72 70 a0 00 ff ff
Address 0x40: ff ff ff ff 01 50 52 4f 54 4f 58 43 4c 45 49 50
Address 0x50: 52 4f 54 4f 2d 41 53 53 45 4d 42 4c 59 00 00 00
Address 0x60: 00 00 00 00 00 00 41 30 30 ff ff ff ff ff ff ff
Address 0x70: ff ff ff c2 ff ff ff ff ff ff ff ff ff ff ff ff
Midplane 1        REV 01    711-044557    ABAB8643          Upper Backplane
Jedec Code:      0x7fb0          EEPROM Version:    0x01
P/N:             711-044557          S/N:             S/N ABAB8643
Assembly ID:     0x0b65          Assembly Version: 01.01
Date:           07-27-2012        Assembly Flags:   0x00
Version:         REV 01
ID: Upper Backplane
Board Information Record:
Address 0x00: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
I2C Hex Data:
Address 0x00: 7f b0 01 ff 0b 65 01 01 52 45 56 20 30 31 00 00
Address 0x10: 00 00 00 00 37 31 31 2d 30 34 34 35 35 37 00 00
Address 0x20: 53 2f 4e 20 41 42 41 42 38 36 34 33 00 1b 07 07
Address 0x30: dc ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
Address 0x40: ff ff ff ff 00 ff ff ff ff ff ff ff ff ff ff ff
Address 0x50: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
Address 0x60: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
Address 0x70: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
PMP               REV 04    711-032426    ACAJ1677          Power Midplane
Jedec Code:      0x7fb0          EEPROM Version:    0x01
P/N:             711-032426          S/N:             S/N ACAJ1677
Assembly ID:     0x045d          Assembly Version: 01.04
Date:           07-20-2012        Assembly Flags:   0x00
Version:         REV 04
ID: Power Midplane
Board Information Record:
Address 0x00: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
I2C Hex Data:
Address 0x00: 7f b0 01 ff 04 5d 01 04 52 45 56 20 30 34 00 00
Address 0x10: 00 00 00 00 37 31 31 2d 30 33 32 34 32 36 00 00
Address 0x20: 53 2f 4e 20 41 43 41 4a 31 36 37 37 00 14 07 07
Address 0x30: dc ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
Address 0x40: ff ff ff ff 00 ff ff ff ff ff ff ff ff ff ff ff
Address 0x50: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
Address 0x60: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
Address 0x70: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
FPM Board         REV 08    760-044634    ABBV9726          Front Panel Display
Jedec Code:      0x7fb0          EEPROM Version:    0x02
P/N:             760-044634          S/N:             S/N ABBV9726

```

```

Assembly ID: 0x0b64      Assembly Version: 01.08
Date:          09-10-2012    Assembly Flags: 0x00
Version:       REV 08        CLEI Code:      IPMYA4EJRA
ID: Front Panel Display     FRU Model Number: MX2010-CRAFT-S
Board Information Record:
  Address 0x00: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
I2C Hex Data:
  Address 0x00: 7f b0 02 ff 0b 64 01 08 52 45 56 20 30 38 00 00
  Address 0x10: 00 00 00 00 37 36 30 2d 30 34 34 36 33 34 00 00
  Address 0x20: 53 2f 4e 20 41 42 42 56 39 37 32 36 00 0a 09 07
  Address 0x30: dc ff ff ff ff ff ff ff ff ff ff ff ff ff ff
  Address 0x40: ff ff ff ff 01 49 50 4d 59 41 34 45 4a 52 41 4d
  Address 0x50: 58 32 30 31 30 2d 43 52 41 46 54 2d 53 00 00 00
  Address 0x60: 00 00 00 00 00 00 41 00 00 ff ff ff ff ff ff ff
  Address 0x70: ff ff ff 93 ff ff ff ff ff ff ff ff ff ff ff ff
PSM 0          REV 01    740-045050    1E02224000P    DC 52V Power Supply
Module
Jedec Code:    0x7fb0      EEPROM Version: 0x02
P/N:           740-045050   S/N:           1E02224000P
Assembly ID:   0x0478      Assembly Version: 01.01
Date:          12-06-2012   Assembly Flags: 0x00
Version:       REV 01      CLEI Code:     XXXXXXXXXX
ID: DC 52V Power Supply Module FRU Model Number: MX2000-PSM-HC-DC-S-A
Board Information Record:
  Address 0x00: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
I2C Hex Data:
  Address 0x00: 7f b0 02 ff 04 78 01 01 52 45 56 20 30 31 00 00
  Address 0x10: 00 00 00 00 37 34 30 2d 30 34 35 30 35 30 00 00
  Address 0x20: 31 45 30 32 32 32 34 30 30 30 50 00 00 06 0c 07
  Address 0x30: dc ff ff ff ff ff ff ff ff ff ff ff ff ff ff
  Address 0x40: ff ff ff ff 01 58 58 58 58 58 58 58 58 58 58 4d
  Address 0x50: 58 32 30 30 30 2d 50 53 4d 2d 48 43 2d 44 43 2d
  Address 0x60: 53 2d 41 00 00 00 31 30 31 ff ff ff ff ff ff ff
  Address 0x70: ff ff ff 4a 00 00 00 00 00 00 00 00 00 00 00 00
PSM 1          REV 01    740-045050    1E02224000M    DC 52V Power Supply
Module
Jedec Code:    0x7fb0      EEPROM Version: 0x02
P/N:           740-045050   S/N:           1E02224000M
Assembly ID:   0x0478      Assembly Version: 01.01
Date:          12-06-2012   Assembly Flags: 0x00
Version:       REV 01      CLEI Code:     XXXXXXXXXX
ID: DC 52V Power Supply Module FRU Model Number: MX2000-PSM-HC-DC-S-A
Board Information Record:
  Address 0x00: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
I2C Hex Data:
  Address 0x00: 7f b0 02 ff 04 78 01 01 52 45 56 20 30 31 00 00
  Address 0x10: 00 00 00 00 37 34 30 2d 30 34 35 30 35 30 00 00
  Address 0x20: 31 45 30 32 32 32 34 30 30 30 4d 00 00 06 0c 07
  Address 0x30: dc ff ff ff ff ff ff ff ff ff ff ff ff ff ff
  Address 0x40: ff ff ff ff 01 58 58 58 58 58 58 58 58 58 58 4d
  Address 0x50: 58 32 30 30 30 2d 50 53 4d 2d 48 43 2d 44 43 2d
  Address 0x60: 53 2d 41 00 00 00 31 30 31 ff ff ff ff ff ff ff
  Address 0x70: ff ff ff 4a 00 00 00 00 00 00 00 00 00 00 00 00
...
PDM 0          REV 01    740-045234    1E262250067    DC Power Dist Module
Jedec Code:    0x7fb0      EEPROM Version: 0x02
P/N:           740-045234   S/N:           1E262250067
Assembly ID:   0x047b      Assembly Version: 01.01
Date:          06-28-2012   Assembly Flags: 0x00
Version:       REV 01      CLEI Code:     IPUPAJSKAA
ID: DC Power Dist Module   FRU Model Number: MX2000-PDM-DC-S-A

```

```

Board Information Record:
  Address 0x00: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
I2C Hex Data:
  Address 0x00: 7f b0 02 ff 04 7b 01 01 52 45 56 20 30 31 00 00
  Address 0x10: 00 00 00 00 37 34 30 2d 30 34 35 32 33 34 00 00
  Address 0x20: 31 45 32 36 32 32 35 30 30 36 37 00 00 1c 06 07
  Address 0x30: dc ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
  Address 0x40: ff ff ff ff 01 49 50 55 50 41 4a 53 4b 41 41 4d
  Address 0x50: 58 32 30 30 30 2d 50 44 4d 2d 44 43 2d 53 2d 41
  Address 0x60: 00 00 00 00 00 00 31 30 31 ff ff ff ff ff ff ff
  Address 0x70: ff ff ff 89 00 00 00 00 00 00 00 00 00 00 00 00
Routing Engine 0 REV 02 740-041821 9009099704 RE-S-1800x4
Jedec Code: 0x7fb0 EEPROM Version: 0x02
P/N: 740-041821 S/N: 9009099704
Assembly ID: 0x09c0 Assembly Version: 01.02
Date: 03-15-2012 Assembly Flags: 0x00
Version: REV 02
ID: RE-S-1800x4 FRU Model Number: RE-S-1800X4-16G-S
Board Information Record:
  Address 0x00: 54 32 30 32 37 44 41 2d 34 34 47 42 23 41 23 00
I2C Hex Data:
  Address 0x00: 7f b0 02 ff 09 c0 01 02 52 45 56 20 30 32 00 00
  Address 0x10: 00 00 00 00 37 34 30 2d 30 34 31 38 32 31 00 00
  Address 0x20: 39 30 30 39 30 39 39 37 30 34 00 00 00 0f 03 07
  Address 0x30: dc ff ff ff 54 32 30 32 37 44 41 2d 34 34 47 42
  Address 0x40: 23 41 23 00 01 00 00 00 00 00 00 00 00 00 00 52
  Address 0x50: 45 2d 53 2d 31 38 30 30 58 34 2d 31 36 47 2d 53
  Address 0x60: 00 00 00 00 00 00 41 30 30 ff ff ff ff ff ff ff
  Address 0x70: ff ff ff 8c ff ff ff ff ff ff ff ff ff ff ff ff
ad0 3831 MB UGB30SFA4000T1 SFA4000T1 00000651 Compact Flash
ad1 30533 MB UGB94BPH32H0S1-KCI 11000019592 Disk 1
usb0 (addr 1) EHCI root hub 0 Intel uhub0
usb0 (addr 2) product 0x0020 32 vendor 0x8087 uhub1
DIMM 0 SGU04G72H1BD2SA-BB DIE REV-52 PCB REV-54 MFR ID-ce80
DIMM 1 SGU04G72H1BD2SA-BB DIE REV-52 PCB REV-54 MFR ID-ce80
DIMM 2 SGU04G72H1BD2SA-BB DIE REV-52 PCB REV-54 MFR ID-ce80
DIMM 3 SGU04G72H1BD2SA-BB DIE REV-52 PCB REV-54 MFR ID-ce80
Routing Engine 1 REV 02 740-041821 9009099706 RE-S-1800x4
Jedec Code: 0x7fb0 EEPROM Version: 0x02
P/N: 740-041821 S/N: 9009099706
Assembly ID: 0x09c0 Assembly Version: 01.02
Date: 02-23-2012 Assembly Flags: 0x00
Version: REV 02
ID: RE-S-1800x4 FRU Model Number: RE-S-1800X4-16G-S
Board Information Record:
  Address 0x00: 54 32 30 32 37 44 41 2d 34 34 47 42 23 41 23 00
I2C Hex Data:
  Address 0x00: 7f b0 02 ff 09 c0 01 02 52 45 56 20 30 32 00 00
  Address 0x10: 00 00 00 00 37 34 30 2d 30 34 31 38 32 31 00 00
  Address 0x20: 39 30 30 39 30 39 39 37 30 36 00 00 00 17 02 07
  Address 0x30: dc ff ff ff 54 32 30 32 37 44 41 2d 34 34 47 42
  Address 0x40: 23 41 23 00 01 00 00 00 00 00 00 00 00 00 00 52
  Address 0x50: 45 2d 53 2d 31 38 30 30 58 34 2d 31 36 47 2d 53
  Address 0x60: 00 00 00 00 00 00 41 30 30 ff ff ff ff ff ff ff
  Address 0x70: ff ff ff 8c ff ff ff ff ff ff ff ff ff ff ff ff
ad0 3998 MB Virtium - TuffDrive VCF P1T0200262860208 114 Compact Flash
ad1 30533 MB UGB94ARF32H0S3-KC UNIGEN-499551-000404 Disk 1
CB 0 REV 13 750-040257 CAAF8436 Control Board
Jedec Code: 0x7fb0 EEPROM Version: 0x02
P/N: 750-040257 S/N: S/N CAAF8436
Assembly ID: 0x0b26 Assembly Version: 01.13

```

```

Date:          08-29-2012      Assembly Flags:    0x00
Version:       REV 13          CLEI Code:       PROTOXCLEI
ID: Control Board              FRU Model Number:  PROTO-ASSEMBLY

```

## Board Information Record:

```
Address 0x00: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
```

## I2C Hex Data:

```

Address 0x00: 7f b0 02 ff 0b 26 01 0d 52 45 56 20 31 33 00 00
Address 0x10: 00 00 00 00 37 35 30 2d 30 34 30 32 35 37 00 00
Address 0x20: 53 2f 4e 20 43 41 41 46 38 34 33 36 00 1d 08 07
Address 0x30: dc ff ff ff ff ff ff ff ff ff ff ff ff ff ff
Address 0x40: ff ff ff ff 01 50 52 4f 54 4f 58 43 4c 45 49 50
Address 0x50: 52 4f 54 4f 2d 41 53 53 45 4d 42 4c 59 00 00 00
Address 0x60: 00 00 00 00 00 00 41 30 30 ff ff ff ff ff ff ff
Address 0x70: ff ff ff c2 ff ff ff ff ff ff ff ff ff ff ff ff

```

...

```
SPMB 0          REV 02    711-041855    ABBV3825          PMB Board
```

```

Jedec Code:    0x7fb0          EEPROM Version:    0x01
P/N:           711-041855      S/N:              S/N ABBV3825
Assembly ID:   0x0b29          Assembly Version:  01.02
Date:          08-14-2012      Assembly Flags:    0x00
Version:       REV 02
ID: PMB Board

```

## Board Information Record:

```
Address 0x00: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
```

## I2C Hex Data:

```

Address 0x00: 7f b0 01 ff 0b 29 01 02 52 45 56 20 30 32 00 00
Address 0x10: 00 00 00 00 37 31 31 2d 30 34 31 38 35 35 00 00
Address 0x20: 53 2f 4e 20 41 42 42 56 33 38 32 35 00 0e 08 07
Address 0x30: dc ff ff ff ff ff ff ff ff ff ff ff ff ff ff
Address 0x40: ff ff ff ff 00 ff ff ff ff ff ff ff ff ff ff ff
Address 0x50: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
Address 0x60: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
Address 0x70: ff ff ff ff 00 00 00 00 00 00 00 00 00 00 00 00

```

...

```
SFB 0          REV 05    711-044466    ABBX5682          Switch Fabric Board
```

```

Jedec Code:    0x7fb0          EEPROM Version:    0x02
P/N:           711-044466      S/N:              S/N ABBX5682
Assembly ID:   0x0b25          Assembly Version:  01.05
Date:          09-07-2012      Assembly Flags:    0x00
Version:       REV 05          CLEI Code:       PROTOXCLEI
ID: Switch Fabric Board        FRU Model Number:  PROTO-ASSEMBLY

```

## Board Information Record:

```
Address 0x00: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
```

## I2C Hex Data:

```

Address 0x00: 7f b0 02 ff 0b 25 01 05 52 45 56 20 30 35 00 00
Address 0x10: 00 00 00 00 37 31 31 2d 30 34 34 34 36 36 00 00
Address 0x20: 53 2f 4e 20 41 42 42 58 35 36 38 32 00 07 09 07
Address 0x30: dc ff ff ff ff ff ff ff ff ff ff ff ff ff ff
Address 0x40: ff ff ff ff 01 50 52 4f 54 4f 58 43 4c 45 49 50
Address 0x50: 52 4f 54 4f 2d 41 53 53 45 4d 42 4c 59 00 00 00
Address 0x60: 00 00 00 00 00 00 41 30 30 ff ff ff ff ff ff ff
Address 0x70: ff ff ff c2 00 00 00 01 00 00 00 00 00 00 48 00

```

...

```
FPC 0          REV 09    750-037355    CAAF0924          MPC Type 4-2
```

```

Jedec Code:    0x7fb0          EEPROM Version:    0x02
P/N:           750-037355      S/N:              S/N CAAF0924
Assembly ID:   0x0b4e          Assembly Version:  01.09
Date:          05-21-2012      Assembly Flags:    0x00
Version:       REV 09          CLEI Code:       PROTOXCLEI
ID: MPC Type 4-2              FRU Model Number:  MPC4E-2CGE-8XGE
Board Information Record:

```



```

Address 0x00: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
I2C Hex Data:
Address 0x00: 7f b0 02 ff 0b 4e 01 09 52 45 56 20 30 39 00 00
Address 0x10: 00 00 00 00 37 35 30 2d 30 33 37 33 35 35 00 00
Address 0x20: 53 2f 4e 20 43 41 41 46 30 39 32 34 00 15 05 07
Address 0x30: dc ff ff ff ff ff ff ff ff ff ff ff ff ff ff
Address 0x40: ff ff ff ff 01 50 52 4f 54 4f 58 43 4c 45 49 4d
Address 0x50: 50 43 34 45 2d 32 43 47 45 2d 38 58 47 45 00 00
Address 0x60: 00 00 00 00 00 00 30 39 00 ff ff ff ff ff ff ff
Address 0x70: ff ff ff c6 ff ff ff ff ff ff ff ff ff ff ff ff
CPU          REV 08    711-035209    CAAB9842          HMPC PMB 2G
Jedec Code:  0x7fb0          EEPROM Version:  0x01
P/N:         711-035209          S/N:          S/N CAAB9842
Assembly ID: 0x0b04          Assembly Version: 01.08
Date:        05-17-2012          Assembly Flags: 0x00
Version:     REV 08
ID: HMPC PMB 2G
Board Information Record:
Address 0x00: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
I2C Hex Data:
Address 0x00: 7f b0 01 ff 0b 04 01 08 52 45 56 20 30 38 00 00
Address 0x10: 00 00 00 00 37 31 31 2d 30 33 35 32 30 39 00 00
Address 0x20: 53 2f 4e 20 43 41 41 42 39 38 34 32 00 11 05 07
Address 0x30: dc ff ff ff ff ff ff ff ff ff ff ff ff ff ff
Address 0x40: ff ff ff ff 00 ff ff ff ff ff ff ff ff ff ff ff
Address 0x50: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
Address 0x60: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
Address 0x70: ff ff ff ff 00 00 00 00 00 00 00 00 00 00 00 00
PIC 0          BUILTIN          BUILTIN          4x10GE SFPP
Jedec Code:  0x0000          EEPROM Version:  0x00
P/N:         BUILTIN          S/N:          BUILTIN
Assembly ID: 0x0a53          Assembly Version: 00.00
Date:        00-00-0000          Assembly Flags:  0x00
ID: 4x10GE SFPP
Board Information Record:
Address 0x00: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
I2C Hex Data:
Address 0x00: 00 00 00 00 0a 53 00 00 00 00 00 00 00 00 00 00
Address 0x10: 00 00 00 00 42 55 49 4c 54 49 4e 00 4d 58 43 00
Address 0x20: 42 55 49 4c 54 49 4e 00 4d 58 43 00 00 00 00 00
Address 0x30: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Address 0x40: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Address 0x50: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Address 0x60: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Address 0x70: 00 00 00 00 c0 02 ae 64 00 00 00 00 0a 52 00 00
Xcvr 0      REV 01    740-021308    19T511101656      SFP+-10G-SR
Xcvr 1      REV 01    740-031980    AMA04RU           SFP+-10G-SR
Xcvr 2      REV 01    740-031980    193363A00558      SFP+-10G-SR
Xcvr 3      REV 01    740-031980    B10M00202         SFP+-10G-SR
...
ADC 0      REV 13    750-043596    ABBX5532          Adapter Card
Jedec Code:  0x7fb0          EEPROM Version:  0x02
P/N:         750-043596          S/N:          S/N ABBX5532
Assembly ID: 0x0b3d          Assembly Version: 01.13
Date:        09-12-2012          Assembly Flags:  0x00
Version:     REV 13          CLEI Code:      IPUCBA8CAA
ID: Adapter Card          FRU Model Number: MX2000-LC-ADAPTER
Board Information Record:
Address 0x00: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
I2C Hex Data:
Address 0x00: 7f b0 02 ff 0b 3d 01 0d 52 45 56 20 31 33 00 00

```

```

Address 0x10: 00 00 00 00 37 35 30 2d 30 34 33 35 39 36 00 00
Address 0x20: 53 2f 4e 20 41 42 42 58 35 35 33 32 00 0c 09 07
Address 0x30: dc ff ff ff ff ff ff ff ff ff ff ff ff ff ff
Address 0x40: ff ff ff ff 01 49 50 55 43 42 41 38 43 41 41 4d
Address 0x50: 58 32 30 30 30 2d 4c 43 2d 41 44 41 50 54 45 52
Address 0x60: 00 00 00 00 00 00 41 00 00 ff ff ff ff ff ff
Address 0x70: ff ff ff 3a 00 00 00 00 00 00 00 00 00 00 00
...

```

### show chassis hardware models (MX2010 Router)

```

user@host > show chassis hardware models
Hardware inventory:

```

| Item             | Version | Part number | Serial number | FRU model number         |
|------------------|---------|-------------|---------------|--------------------------|
| FPM Board        | REV 06  | 711-032349  | ZX8744        | 711-032349               |
| PSM 4            | REV 0C  | 740-033727  | VK00254       | 000000000000000000000000 |
| PSM 5            | REV 0B  | 740-033727  | VG00015       | 000000000000000000000000 |
| PSM 6            | REV 0B  | 740-033727  | VH00097       | 000000000000000000000000 |
| PSM 7            | REV 0C  | 740-033727  | VJ00151       | 000000000000000000000000 |
| PSM 8            | REV 0C  | 740-033727  | VJ00149       | 000000000000000000000000 |
| PDM 0            | REV 0B  | 740-038109  | WA00008       |                          |
| PDM 1            | REV 0B  | 740-038109  | WA00014       |                          |
| Routing Engine 0 | REV 02  | 740-041821  | 9009094134    | RE-S-1800X4-16G-S        |
| Routing Engine 1 | REV 02  | 740-041821  | 9009094141    | RE-S-1800X4-16G-S        |
| CB 0             | REV 08  | 750-040257  | CAAB3491      | 750-040257               |
| CB 1             | REV 08  | 750-040257  | CAAB3489      | 750-040257               |
| SFB 0            | REV 06  | 711-032385  | ZV1828        | 711-032385               |
| SFB 1            | REV 07  | 711-032385  | ZZ2568        | 711-032385               |
| SFB 2            | REV 07  | 711-032385  | ZZ2563        | 711-032385               |
| SFB 3            | REV 07  | 711-032385  | ZZ2564        | 711-032385               |
| SFB 4            | REV 07  | 711-032385  | ZZ2580        | 711-032385               |
| SFB 5            | REV 07  | 711-032385  | ZZ2579        | 711-0323856              |
| SFB 6            | REV 07  | 711-032385  | CAAB4882      | 711-044170               |
| SFB 7            | REV 07  | 711-032385  | CAAB4898      | 711-044170               |
| FPC 0            | REV 33  | 750-028467  | CAAB1919      | MPC-3D-16XGE-SFPP        |
| FPC 1            | REV 21  | 750-033205  | ZG5027        | MX-MPC3-3D               |
| MIC 0            | REV 03  | 750-033307  | ZV6299        | MIC3-3D-10XGE-SFPP       |
| MIC 1            | REV 03  | 750-033307  | ZV6268        | MIC3-3D-10XGE-SFPP       |
| FPC 8            | REV 22  | 750-031089  | ZT9746        | MX-MPC2-3D               |
| MIC 0            | REV 26  | 750-028392  | ABBS1150      | MIC-3D-20GE-SFP          |
| MIC 1            | REV 26  | 750-028387  | ABBR9582      | MIC-3D-4XGE-XFP          |
| FPC 9            | REV 11  | 750-036284  | ZL3591        | MPCE-3D-16XGE-SFPP       |
| ADC 0            | REV 05  | 750-043596  | CAAC2073      | 750-043596               |
| ADC 1            | REV 01  | 750-043596  | ZV4117        | 750-043596               |
| ADC 8            | REV 01  | 750-043596  | ZV4107        | 750-043596               |
| ADC 9            | REV 02  | 750-043596  | ZW1555        | 750-043596               |
| Fan Tray 0       | REV 2A  | 760-046960  | ACAY0015      |                          |
| Fan Tray 1       | REV 2A  | 760-046960  | ACAY0019      |                          |
| Fan Tray 2       | REV 2A  | 760-046960  | ACAY0020      |                          |
| Fan Tray 3       | REV 2A  | 760-046960  | ACAY0021      |                          |

### show chassis hardware clei-models (MX2010 Routers)

```

user@host > show chassis hardware clei-models
Hardware inventory:

```

| Item      | Version | Part number | CLEI code  | FRU model number         |
|-----------|---------|-------------|------------|--------------------------|
| FPM Board | REV 06  | 711-032349  | PROTOXCLEI | 711-032349               |
| PSM 4     | REV 0C  | 740-033727  | 0000000000 | 000000000000000000000000 |
| PSM 5     | REV 0B  | 740-033727  | 0000000000 | 000000000000000000000000 |
| PSM 6     | REV 0B  | 740-033727  | 0000000000 | 000000000000000000000000 |
| PSM 7     | REV 0C  | 740-033727  | 0000000000 | 000000000000000000000000 |

|                  |        |            |            |                          |
|------------------|--------|------------|------------|--------------------------|
| PSM 8            | REV 0C | 740-033727 | 0000000000 | 000000000000000000000000 |
| PDM 0            | REV 0B | 740-038109 |            |                          |
| PDM 1            | REV 0B | 740-038109 |            |                          |
| Routing Engine 0 | REV 02 | 740-041821 |            | RE-S-1800X4-16G-S        |
| Routing Engine 1 | REV 02 | 740-041821 |            | RE-S-1800X4-16G-S        |
| CB 0             | REV 08 | 750-040257 | PROTOXCLEI | 750-040257               |
| CB 1             | REV 08 | 750-040257 | PROTOXCLEI | 750-040257               |
| SFB 0            | REV 06 | 711-032385 | PROTOXCLEI | 711-032385               |
| SFB 1            | REV 07 | 711-032385 | PROTOXCLEI | 711-032385               |
| SFB 2            | REV 07 | 711-032385 | PROTOXCLEI | 711-032385               |
| SFB 3            | REV 07 | 711-032385 | PROTOXCLEI | 711-032385               |
| SFB 4            | REV 07 | 711-032385 | PROTOXCLEI | 711-032385               |
| SFB 5            | REV 07 | 711-032385 | PROTOXCLEI | 711-0323856              |
| SFB 6            | REV 07 | 711-032385 | PROTOXCLEI | 711-044170               |
| SFB 7            | REV 07 | 711-032385 | PROTOXCLEI | 711-044170               |
| FPC 0            | REV 33 | 750-028467 |            | MPC-3D-16XGE-SFPP        |
| FPC 1            | REV 21 | 750-033205 |            | MX-MPC3-3D               |
| MIC 0            | REV 03 | 750-033307 | PROTOXCLEI | MIC3-3D-10XGE-SFPP       |
| MIC 1            | REV 03 | 750-033307 | PROTOXCLEI | MIC3-3D-10XGE-SFPP       |
| FPC 8            | REV 22 | 750-031089 | COUIBAYBAA | MX-MPC2-3D               |
| MIC 0            | REV 26 | 750-028392 | COUIA15BAA | MIC-3D-20GE-SFP          |
| MIC 1            | REV 26 | 750-028387 | COUIA16BAA | MIC-3D-4XGE-XFP          |
| FPC 9            | REV 11 | 750-036284 | CMUIACGBAA | MPCE-3D-16XGE-SFPP       |
| ADC 0            | REV 05 | 750-043596 | PROTOXCLEI | 750-043596               |
| ADC 1            | REV 01 | 750-043596 | PROTOXCLEI | 750-043596               |
| ADC 8            | REV 01 | 750-043596 | PROTOXCLEI | 750-043596               |
| ADC 9            | REV 02 | 750-043596 | PROTOXCLEI | 750-043596               |
| Fan Tray 0       | REV 2A | 760-046960 |            |                          |
| Fan Tray 1       | REV 2A | 760-046960 |            |                          |
| Fan Tray 2       | REV 2A | 760-046960 |            |                          |
| Fan Tray 3       | REV 2A | 760-046960 |            |                          |

### show chassis hardware (MX2020 Router)

```
user@host > show chassis hardware
```

```
Hardware inventory:
```

| Item       | Version | Part number | Serial number | Description          |
|------------|---------|-------------|---------------|----------------------|
| Chassis    |         |             | JN11E2227AFJ  | MX2020               |
| Midplane   | REV 27  | 750-040240  | ABAB9384      | Lower Power Midplane |
| Midplane 1 | REV 04  | 711-032386  | ABAB9386      | Upper Backplane      |
| PMP 1      | REV 05  | 711-032428  | ACAJ1579      | Upper Power Midplane |
| PMP 0      | REV 04  | 711-032426  | ACAJ1524      | Lower Power Midplane |
| FPM Board  | REV 06  | 760-040242  | ABBT8837      | Front Panel Display  |
| PSM 0      | REV 01  | 740-045050  | 1E022240056   | DC 52V Power Supply  |
| Module     |         |             |               |                      |
| PSM 1      | REV 01  | 740-045050  | 1E022240054   | DC 52V Power Supply  |
| Module     |         |             |               |                      |
| PSM 2      | REV 01  | 740-045050  | 1E02224005H   | DC 52V Power Supply  |
| Module     |         |             |               |                      |
| PSM 3      | REV 01  | 740-045050  | 1E022240053   | DC 52V Power Supply  |
| Module     |         |             |               |                      |
| PSM 4      | REV 01  | 740-045050  | 1E02224004K   | DC 52V Power Supply  |
| Module     |         |             |               |                      |
| PSM 7      | REV 01  | 740-045050  | 1E02224006W   | DC 52V Power Supply  |
| Module     |         |             |               |                      |
| PSM 8      | REV 01  | 740-045050  | 1E022240062   | DC 52V Power Supply  |
| Module     |         |             |               |                      |
| PSM 9      | REV 01  | 740-045050  | 1E02224005B   | DC 52V Power Supply  |
| Module     |         |             |               |                      |
| PSM 10     | REV 01  | 740-045050  | 1E02224005A   | DC 52V Power Supply  |
| Module     |         |             |               |                      |

|                  |        |            |             |                      |
|------------------|--------|------------|-------------|----------------------|
| PSM 11 Module    | REV 01 | 740-045050 | 1E022240052 | DC 52V Power Supply  |
| PSM 12 Module    | REV 01 | 740-045050 | 1E022240051 | DC 52V Power Supply  |
| PSM 13 Module    | REV 01 | 740-045050 | 1E022240058 | DC 52V Power Supply  |
| PSM 14 Module    | REV 01 | 740-045050 | 1E02224004L | DC 52V Power Supply  |
| PSM 15 Module    | REV 01 | 740-045050 | 1E02224005M | DC 52V Power Supply  |
| PSM 16 Module    | REV 01 | 740-045050 | 1E02224006S | DC 52V Power Supply  |
| PSM 17 Module    | REV 01 | 740-045050 | 1E02224005Z | DC 52V Power Supply  |
| PDM 0            | REV 01 | 740-045234 | 1E012150033 | DC Power Dist Module |
| PDM 1            | REV 01 | 740-045234 | 1E012150027 | DC Power Dist Module |
| PDM 2            | REV 01 | 740-045234 | 1E012150028 | DC Power Dist Module |
| PDM 3            | REV 01 | 740-045234 | 1E012150045 | DC Power Dist Module |
| Routing Engine 0 | REV 02 | 740-041821 | 9009089704  | RE-S-1800x4          |
| Routing Engine 1 | REV 02 | 740-041821 | 9009094138  | RE-S-1800x4          |
| CB 0             | REV 14 | 750-040257 | CAAF8430    | Control Board        |
| CB 1             | REV 08 | 750-040257 | CAAB3482    | Control Board        |
| SPMB 0           | REV 01 | 711-041855 | ZS2290      | PMB Board            |
| SPMB 1           | REV 02 | 711-041855 | CAAA6141    | PMB Board            |
| SFB 0            | REV 03 | 711-044466 | ABBV6789    | Switch Fabric Board  |
| SFB 1            | REV 05 | 711-044466 | ABBX5666    | Switch Fabric Board  |
| SFB 2            | REV 05 | 711-044466 | ABBX5678    | Switch Fabric Board  |
| SFB 3            | REV 05 | 711-044466 | ABBX5687    | Switch Fabric Board  |
| SFB 4            | REV 05 | 711-044466 | ABBX5609    | Switch Fabric Board  |
| SFB 5            | REV 05 | 711-044466 | ABBX5675    | Switch Fabric Board  |
| SFB 6            | REV 03 | 711-044466 | ABBV6805    | Switch Fabric Board  |
| SFB 7            | REV 05 | 711-044466 | ABBX5701    | Switch Fabric Board  |
| FPC 0            | REV 30 | 750-028467 | ABBN0284    | MPC 3D 16x 10GE      |
| CPU              | REV 10 | 711-029089 | ABBN0507    | AMPC PMB             |
| PIC 0            |        | BUILTIN    | BUILTIN     | 4x 10GE(LAN) SFP+    |
| Xcvr 0           | REV 01 | 740-030658 | B11E00990   | SFP+-10G-USR         |
| Xcvr 1           | REV 01 | 740-030658 | B11E04357   | SFP+-10G-USR         |
| Xcvr 2           | REV 01 | 740-030658 | B11F01327   | SFP+-10G-USR         |
| Xcvr 3           | REV 01 | 740-030658 | B11E04375   | SFP+-10G-USR         |
| PIC 1            |        | BUILTIN    | BUILTIN     | 4x 10GE(LAN) SFP+    |
| Xcvr 0           | REV 01 | 740-030658 | B11E02760   | SFP+-10G-USR         |
| Xcvr 1           | REV 01 | 740-030658 | B11E02904   | SFP+-10G-USR         |
| Xcvr 2           | REV 01 | 740-030658 | B11E03963   | SFP+-10G-USR         |
| Xcvr 3           | REV 01 | 740-030658 | B11E00756   | SFP+-10G-USR         |
| PIC 2            |        | BUILTIN    | BUILTIN     | 4x 10GE(LAN) SFP+    |
| Xcvr 0           | REV 01 | 740-030658 | B11E04418   | SFP+-10G-USR         |
| Xcvr 1           | REV 01 | 740-030658 | B11E01077   | SFP+-10G-USR         |
| Xcvr 2           | REV 01 | 740-030658 | B11E01128   | SFP+-10G-USR         |
| Xcvr 3           | REV 01 | 740-030658 | B11F01253   | SFP+-10G-USR         |
| PIC 3            |        | BUILTIN    | BUILTIN     | 4x 10GE(LAN) SFP+    |
| Xcvr 0           | REV 01 | 740-030658 | B11E01140   | SFP+-10G-USR         |
| Xcvr 1           | REV 01 | 740-030658 | B11F01626   | SFP+-10G-USR         |
| Xcvr 2           | REV 01 | 740-030658 | B11E01075   | SFP+-10G-USR         |
| Xcvr 3           | REV 01 | 740-030658 | B11E01177   | SFP+-10G-USR         |
| FPC 1            | REV 30 | 750-028467 | ABBN0208    | MPC 3D 16x 10GE      |
| CPU              | REV 10 | 711-029089 | ABBJ1084    | AMPC PMB             |
| PIC 0            |        | BUILTIN    | BUILTIN     | 4x 10GE(LAN) SFP+    |
| Xcvr 0           | REV 01 | 740-030658 | B11E04745   | SFP+-10G-USR         |
| Xcvr 1           | REV 01 | 740-030658 | B11F01570   | SFP+-10G-USR         |
| Xcvr 2           | REV 01 | 740-030658 | B11E04388   | SFP+-10G-USR         |
| Xcvr 3           | REV 01 | 740-030658 | B11F01439   | SFP+-10G-USR         |

|        |        |            |           |                 |                   |
|--------|--------|------------|-----------|-----------------|-------------------|
| PIC 1  |        |            | BUILTIN   | BUILTIN         | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11E04739 | SFP+-10G-USR    |                   |
| Xcvr 1 | REV 01 | 740-030658 | B11F01869 | SFP+-10G-USR    |                   |
| Xcvr 2 | REV 01 | 740-030658 | B11F01675 | SFP+-10G-USR    |                   |
| Xcvr 3 | REV 01 | 740-030658 | B11F01901 | SFP+-10G-USR    |                   |
| PIC 2  |        |            | BUILTIN   | BUILTIN         | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11F01346 | SFP+-10G-USR    |                   |
| Xcvr 1 | REV 01 | 740-030658 | B11F01288 | SFP+-10G-USR    |                   |
| Xcvr 2 | REV 01 | 740-030658 | B11F01824 | SFP+-10G-USR    |                   |
| Xcvr 3 | REV 01 | 740-030658 | B11E04312 | SFP+-10G-USR    |                   |
| PIC 3  |        |            | BUILTIN   | BUILTIN         | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11E02811 | SFP+-10G-USR    |                   |
| Xcvr 1 | REV 01 | 740-030658 | B11E03847 | SFP+-10G-USR    |                   |
| Xcvr 2 | REV 01 | 740-030658 | B11F01495 | SFP+-10G-USR    |                   |
| Xcvr 3 | REV 01 | 740-030658 | B11F01265 | SFP+-10G-USR    |                   |
| FPC 2  | REV 30 | 750-028467 | ZM5111    | MPC 3D 16x 10GE |                   |
| CPU    | REV 10 | 711-029089 | ZP6607    | AMPC PMB        |                   |
| PIC 0  |        |            | BUILTIN   | BUILTIN         | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80LJA   | SFP+-10G-SR     |                   |
| Xcvr 1 | REV 01 | 740-031980 | AK80MFZ   | SFP+-10G-SR     |                   |
| Xcvr 2 | REV 01 | 740-031980 | AK80NKL   | SFP+-10G-SR     |                   |
| Xcvr 3 | REV 01 | 740-031980 | AK80KF4   | SFP+-10G-SR     |                   |
| PIC 1  |        |            | BUILTIN   | BUILTIN         | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80FBJ   | SFP+-10G-SR     |                   |
| Xcvr 1 | REV 01 | 740-031980 | AK80MM2   | SFP+-10G-SR     |                   |
| Xcvr 2 | REV 01 | 740-031980 | AK80LJV   | SFP+-10G-SR     |                   |
| Xcvr 3 | REV 01 | 740-031980 | AK80NXV   | SFP+-10G-SR     |                   |
| PIC 2  |        |            | BUILTIN   | BUILTIN         | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80N1H   | SFP+-10G-SR     |                   |
| Xcvr 1 | REV 01 | 740-031980 | AK80NLS   | SFP+-10G-SR     |                   |
| Xcvr 2 | REV 01 | 740-031980 | AK80FL5   | SFP+-10G-SR     |                   |
| Xcvr 3 | REV 01 | 740-031980 | AK80NL9   | SFP+-10G-SR     |                   |
| PIC 3  |        |            | BUILTIN   | BUILTIN         | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80NG2   | SFP+-10G-SR     |                   |
| Xcvr 1 | REV 01 | 740-031980 | AK80KDU   | SFP+-10G-SR     |                   |
| Xcvr 2 | REV 01 | 740-031980 | AK80MG1   | SFP+-10G-SR     |                   |
| Xcvr 3 | REV 01 | 740-031980 | AK80MM0   | SFP+-10G-SR     |                   |
| FPC 3  | REV 30 | 750-028467 | ABB0302   | MPC 3D 16x 10GE |                   |
| CPU    | REV 10 | 711-029089 | ABB0495   | AMPC PMB        |                   |
| PIC 0  |        |            | BUILTIN   | BUILTIN         | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11F01581 | SFP+-10G-USR    |                   |
| Xcvr 1 | REV 01 | 740-030658 | B11E01176 | SFP+-10G-USR    |                   |
| Xcvr 2 | REV 01 | 740-030658 | B11F01251 | SFP+-10G-USR    |                   |
| Xcvr 3 | REV 01 | 740-030658 | B11E02752 | SFP+-10G-USR    |                   |
| PIC 1  |        |            | BUILTIN   | BUILTIN         | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11E00786 | SFP+-10G-USR    |                   |
| Xcvr 1 | REV 01 | 740-030658 | B11E01020 | SFP+-10G-USR    |                   |
| Xcvr 2 | REV 01 | 740-030658 | B11E01023 | SFP+-10G-USR    |                   |
| Xcvr 3 | REV 01 | 740-030658 | B11E02819 | SFP+-10G-USR    |                   |
| PIC 2  |        |            | BUILTIN   | BUILTIN         | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11E02812 | SFP+-10G-USR    |                   |
| Xcvr 1 | REV 01 | 740-030658 | B11D04437 | SFP+-10G-USR    |                   |
| Xcvr 2 | REV 01 | 740-030658 | B11F01279 | SFP+-10G-USR    |                   |
| Xcvr 3 | REV 01 | 740-030658 | B11F01333 | SFP+-10G-USR    |                   |
| PIC 3  |        |            | BUILTIN   | BUILTIN         | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11E00978 | SFP+-10G-USR    |                   |
| Xcvr 1 | REV 01 | 740-030658 | B11E01018 | SFP+-10G-USR    |                   |
| Xcvr 2 | REV 01 | 740-030658 | B11F01784 | SFP+-10G-USR    |                   |
| Xcvr 3 | REV 01 | 740-031980 | AK80NKP   | SFP+-10G-SR     |                   |
| FPC 4  | REV 30 | 750-028467 | ABB0308   | MPC 3D 16x 10GE |                   |
| CPU    | REV 10 | 711-029089 | ABB11095  | AMPC PMB        |                   |

|        |        |            |           |                 |                   |
|--------|--------|------------|-----------|-----------------|-------------------|
| PIC 0  |        |            | BUILTIN   | BUILTIN         | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11E04305 | SFP+-10G-USR    |                   |
| Xcvr 1 | REV 01 | 740-030658 | B11E01147 | SFP+-10G-USR    |                   |
| Xcvr 2 | REV 01 | 740-030658 | B11E01195 | SFP+-10G-USR    |                   |
| Xcvr 3 | REV 01 | 740-030658 | B11F01743 | SFP+-10G-USR    |                   |
| PIC 1  |        |            | BUILTIN   | BUILTIN         | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11F01892 | SFP+-10G-USR    |                   |
| Xcvr 1 | REV 01 | 740-030658 | B11E02880 | SFP+-10G-USR    |                   |
| Xcvr 2 | REV 01 | 740-030658 | B11E00725 | SFP+-10G-USR    |                   |
| Xcvr 3 | REV 01 | 740-030658 | B11E01057 | SFP+-10G-USR    |                   |
| PIC 2  |        |            | BUILTIN   | BUILTIN         | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11E02816 | SFP+-10G-USR    |                   |
| Xcvr 1 | REV 01 | 740-030658 | B11C04501 | SFP+-10G-USR    |                   |
| Xcvr 2 | REV 01 | 740-030658 | B11E02764 | SFP+-10G-USR    |                   |
| Xcvr 3 | REV 01 | 740-030658 | B11E00789 | SFP+-10G-USR    |                   |
| PIC 3  |        |            | BUILTIN   | BUILTIN         | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11F01250 | SFP+-10G-USR    |                   |
| Xcvr 1 | REV 01 | 740-030658 | B11E02847 | SFP+-10G-USR    |                   |
| Xcvr 2 | REV 01 | 740-030658 | B11E00787 | SFP+-10G-USR    |                   |
| Xcvr 3 | REV 01 | 740-030658 | B11E03803 | SFP+-10G-USR    |                   |
| FPC 5  | REV 30 | 750-028467 | ABBN0316  | MPC 3D 16x 10GE |                   |
| CPU    | REV 10 | 711-029089 | ABB31082  | AMPC PMB        |                   |
| PIC 0  |        |            | BUILTIN   | BUILTIN         | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | B11K00523 | SFP+-10G-SR     |                   |
| Xcvr 1 | REV 01 | 740-031980 | B11K01848 | SFP+-10G-SR     |                   |
| Xcvr 2 | REV 01 | 740-031980 | B11K01865 | SFP+-10G-SR     |                   |
| Xcvr 3 | REV 01 | 740-031980 | B11K00540 | SFP+-10G-SR     |                   |
| PIC 1  |        |            | BUILTIN   | BUILTIN         | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | B11K00422 | SFP+-10G-SR     |                   |
| Xcvr 1 | REV 01 | 740-031980 | B11K00428 | SFP+-10G-SR     |                   |
| Xcvr 2 | REV 01 | 740-031980 | B11K00423 | SFP+-10G-SR     |                   |
| Xcvr 3 | REV 01 | 740-031980 | B11K01855 | SFP+-10G-SR     |                   |
| PIC 2  |        |            | BUILTIN   | BUILTIN         | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | B11K01847 | SFP+-10G-SR     |                   |
| Xcvr 1 | REV 01 | 740-031980 | B11K00526 | SFP+-10G-SR     |                   |
| Xcvr 2 | REV 01 | 740-031980 | B11K00529 | SFP+-10G-SR     |                   |
| Xcvr 3 | REV 01 | 740-031980 | B11K00525 | SFP+-10G-SR     |                   |
| PIC 3  |        |            | BUILTIN   | BUILTIN         | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | B11K00425 | SFP+-10G-SR     |                   |
| Xcvr 1 | REV 01 | 740-031980 | B11K00530 | SFP+-10G-SR     |                   |
| Xcvr 2 | REV 01 | 740-031980 | B11K01851 | SFP+-10G-SR     |                   |
| Xcvr 3 | REV 01 | 740-031980 | B11K00528 | SFP+-10G-SR     |                   |
| FPC 6  | REV 32 | 750-028467 | ABBN6832  | MPC 3D 16x 10GE |                   |
| CPU    | REV 10 | 711-029089 | ABBN6534  | AMPC PMB        |                   |
| PIC 0  |        |            | BUILTIN   | BUILTIN         | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80MB4   | SFP+-10G-SR     |                   |
| Xcvr 1 | REV 01 | 740-031980 | AK80FQ6   | SFP+-10G-SR     |                   |
| Xcvr 2 | REV 01 | 740-031980 | AK80N1F   | SFP+-10G-SR     |                   |
| Xcvr 3 | REV 01 | 740-031980 | AK80NLQ   | SFP+-10G-SR     |                   |
| PIC 1  |        |            | BUILTIN   | BUILTIN         | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80KDR   | SFP+-10G-SR     |                   |
| Xcvr 1 | REV 01 | 740-031980 | AK80FGJ   | SFP+-10G-SR     |                   |
| Xcvr 2 | REV 01 | 740-031980 | AK80N5G   | SFP+-10G-SR     |                   |
| Xcvr 3 | REV 01 | 740-031980 | AK80KD8   | SFP+-10G-SR     |                   |
| PIC 2  |        |            | BUILTIN   | BUILTIN         | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80LET   | SFP+-10G-SR     |                   |
| Xcvr 1 | REV 01 | 740-031980 | AK80N1X   | SFP+-10G-SR     |                   |
| Xcvr 2 | REV 01 | 740-031980 | AK80NRF   | SFP+-10G-SR     |                   |
| Xcvr 3 | REV 01 | 740-031980 | AK80NL2   | SFP+-10G-SR     |                   |
| PIC 3  |        |            | BUILTIN   | BUILTIN         | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80N3D   | SFP+-10G-SR     |                   |

|        |        |            |              |                   |
|--------|--------|------------|--------------|-------------------|
| Xcvr 1 | REV 01 | 740-031980 | AK80MRB      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80LEQ      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80LER      | SFP+-10G-SR       |
| FPC 7  | REV 32 | 750-028467 | ABBN6811     | MPC 3D 16x 10GE   |
| CPU    | REV 10 | 711-029089 | ABBN7288     | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80NK8      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80LJG      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80LBU      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80N21      | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80LEU      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80NLM      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80NL6      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80LES      | SFP+-10G-SR       |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80LEN      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80ME0      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80LMG      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80MM1      | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80MG7      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80KF9      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80NRQ      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80NLE      | SFP+-10G-SR       |
| FPC 8  | REV 23 | 750-028467 | YN2977       | MPC 3D 16x 10GE   |
| CPU    | REV 10 | 711-029089 | YP1856       | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 183363A00875 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 183363A00851 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 183363A00772 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 183363A00882 | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 183363A00735 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 183363A00169 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 183363A00726 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 183363A00077 | SFP+-10G-SR       |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 183363A00168 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 183363A00676 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 183363A00732 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 183363A00091 | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 183363A00725 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 183363A00642 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 183363A00871 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 183363A00853 | SFP+-10G-SR       |
| FPC 9  | REV 32 | 750-028467 | ABBN6798     | MPC 3D 16x 10GE   |
| CPU    | REV 10 | 711-029089 | ABBK6556     | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-021308 | 9ZD06A00055  | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 183363A00239 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-021308 | AD0915E003K  | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-021308 | AD0915E003A  | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80MRC      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80NL5      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80NKN      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80N3U      | SFP+-10G-SR       |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80N1T      | SFP+-10G-SR       |

|        |        |            |              |                   |
|--------|--------|------------|--------------|-------------------|
| Xcvr 1 | REV 01 | 740-031980 | AJ808DJ      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80NG4      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80FND      | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80FKQ      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80NLT      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80NKR      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80LKM      | SFP+-10G-SR       |
| FPC 10 | REV 32 | 750-028467 | ABBN6813     | MPC 3D 16x 10GE   |
| CPU    | REV 10 | 711-029089 | ABBK6542     | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80NA3      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80NLF      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80MRH      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80KE4      | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-021308 | 973152A00030 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80L9H      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80ME8      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80NLR      | SFP+-10G-SR       |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80NG1      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80MCA      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80LFC      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80LEM      | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80N9X      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80LAC      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80LF2      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80N8T      | SFP+-10G-SR       |
| FPC 11 | REV 30 | 750-028467 | ABBN0281     | MPC 3D 16x 10GE   |
| CPU    | REV 10 | 711-029089 | ABBN0526     | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11F01326    | SFP+-10G-USR      |
| Xcvr 1 | REV 01 | 740-030658 | B11E03973    | SFP+-10G-USR      |
| Xcvr 2 | REV 01 | 740-030658 | B11E00950    | SFP+-10G-USR      |
| Xcvr 3 | REV 01 | 740-030658 | B11E00674    | SFP+-10G-USR      |
| PIC 1  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11E00775    | SFP+-10G-USR      |
| Xcvr 1 | REV 01 | 740-030658 | B11E04461    | SFP+-10G-USR      |
| Xcvr 2 | REV 01 | 740-030658 | B11E01074    | SFP+-10G-USR      |
| Xcvr 3 | REV 01 | 740-030658 | B11E02821    | SFP+-10G-USR      |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11E04501    | SFP+-10G-USR      |
| Xcvr 1 | REV 01 | 740-030658 | B11E00757    | SFP+-10G-USR      |
| Xcvr 2 | REV 01 | 740-030658 | B11F01623    | SFP+-10G-USR      |
| Xcvr 3 | REV 01 | 740-030658 | B11E01022    | SFP+-10G-USR      |
| PIC 3  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11E04359    | SFP+-10G-USR      |
| Xcvr 1 | REV 01 | 740-030658 | B11E02751    | SFP+-10G-USR      |
| Xcvr 2 | REV 01 | 740-030658 | B11E02736    | SFP+-10G-USR      |
| Xcvr 3 | REV 01 | 740-030658 | B11E01178    | SFP+-10G-USR      |
| FPC 12 | REV 32 | 750-028467 | ABBN6796     | MPC 3D 16x 10GE   |
| CPU    | REV 10 | 711-029089 | ABBN7259     | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | B11K01856    | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | B11K01853    | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | B11K01863    | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 163363A02863 | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 163363A02668 | SFP+-10G-SR       |



|        |        |            |              |                   |
|--------|--------|------------|--------------|-------------------|
| Xcvr 1 | REV 01 | 740-031980 | 163363A02881 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A01671 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 163363A02627 | SFP+-10G-SR       |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 163363A02725 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 163363A02692 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A02730 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 163363A03081 | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 163363A02736 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 163363A02568 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A02747 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 163363A02579 | SFP+-10G-SR       |
| FPC 13 | REV 30 | 750-028467 | ABBN0270     | MPC 3D 16x 10GE   |
| CPU    | REV 10 | 711-029089 | ABBJ0966     | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80NL1      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80NXW      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80KD2      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80FMD      | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80NKQ      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80MGH      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80N38      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80NL7      | SFP+-10G-SR       |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80LEL      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80NKD      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80KCY      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80LHK      | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80M5J      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80MBE      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80NLG      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80LFH      | SFP+-10G-SR       |
| FPC 14 | REV 32 | 750-028467 | ABBN6790     | MPC 3D 16x 10GE   |
| CPU    | REV 10 | 711-029089 | ABBK6515     | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80LZM      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80MCC      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80KCM      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80KE0      | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-021310 | C10F99155    | SFP+-10G-LRM      |
| Xcvr 1 | REV 01 | 740-021310 | C10F99049    | SFP+-10G-LRM      |
| Xcvr 2 | REV 01 | 740-021310 | C10F99128    | SFP+-10G-LRM      |
| Xcvr 3 | REV 01 | 740-021310 | C10F99169    | SFP+-10G-LRM      |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80LF3      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 163363A02597 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A03060 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 163363A03057 | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80LEX      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80FEU      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80FNM      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-021308 | AJQQQ5G      | SFP+-10G-SR       |
| FPC 15 | REV 32 | 750-028467 | ABBN6791     | MPC 3D 16x 10GE   |
| CPU    | REV 10 | 711-029089 | ABBN7289     | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | B11K00424    | SFP+-10G-SR       |

|        |        |            |              |                   |
|--------|--------|------------|--------------|-------------------|
| Xcvr 1 | REV 01 | 740-031980 | B11K01849    | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | B11K01862    | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | B11K01852    | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | B11K00427    | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | B11K00430    | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | B11K01854    | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | B11K00426    | SFP+-10G-SR       |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | B11K00429    | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | B11K01864    | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | B11K01850    | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | B11K00522    | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11E01144    | SFP+-10G-USR      |
| Xcvr 1 | REV 01 | 740-030658 | B11E00985    | SFP+-10G-USR      |
| Xcvr 2 | REV 01 | 740-030658 | B11E00796    | SFP+-10G-USR      |
| Xcvr 3 | REV 01 | 740-031980 | B11K01866    | SFP+-10G-SR       |
| FPC 16 | REV 30 | 750-028467 | ABBM4592     | MPC 3D 16x 10GE   |
| CPU    | REV 10 | 711-029089 | ABBN0465     | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11F01435    | SFP+-10G-USR      |
| Xcvr 1 | REV 01 | 740-030658 | B11E01052    | SFP+-10G-USR      |
| Xcvr 2 | REV 01 | 740-030658 | B11F01328    | SFP+-10G-USR      |
| Xcvr 3 | REV 01 | 740-030658 | B11F01254    | SFP+-10G-USR      |
| PIC 1  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11E02738    | SFP+-10G-USR      |
| Xcvr 1 | REV 01 | 740-030658 | B11E02881    | SFP+-10G-USR      |
| Xcvr 2 | REV 01 | 740-030658 | B11F01624    | SFP+-10G-USR      |
| Xcvr 3 | REV 01 | 740-030658 | B11E00889    | SFP+-10G-USR      |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11E02883    | SFP+-10G-USR      |
| Xcvr 1 | REV 01 | 740-030658 | B11E00681    | SFP+-10G-USR      |
| Xcvr 2 | REV 01 | 740-030658 | B11E04306    | SFP+-10G-USR      |
| Xcvr 3 | REV 01 | 740-030658 | B11E02813    | SFP+-10G-USR      |
| PIC 3  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11F01801    | SFP+-10G-USR      |
| Xcvr 1 | REV 01 | 740-030658 | B11E02753    | SFP+-10G-USR      |
| Xcvr 2 | REV 01 | 740-030658 | B11E01156    | SFP+-10G-USR      |
| Xcvr 3 | REV 01 | 740-030658 | B11E04324    | SFP+-10G-USR      |
| FPC 17 | REV 32 | 750-028467 | ABBN6810     | MPC 3D 16x 10GE   |
| CPU    | REV 10 | 711-029089 | ABBN7237     | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 163363A02638 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 163363A02082 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A01674 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 163363A03058 | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 163363A03048 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 163363A02729 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A02566 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 163363A02567 | SFP+-10G-SR       |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 163363A02878 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 163363A02739 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A01959 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 163363A02660 | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 163363A02731 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 163363A02588 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A02673 | SFP+-10G-SR       |

|        |        |            |              |                   |
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| Xcvr 3 | REV 01 | 740-031980 | 163363A02654 | SFP+-10G-SR       |
| FPC 18 | REV 30 | 750-028467 | ABBM4739     | MPC 3D 16x 10GE   |
| CPU    | REV 10 | 711-029089 | ABBN0487     | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 163363A02569 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 163363A02886 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A03082 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 133363A00297 | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 163363A02726 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 163363A03050 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A02884 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 163363A03076 | SFP+-10G-SR       |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 163363A02581 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 163363A02873 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A02582 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 163363A03083 | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031981 | UL70BU6      | SFP+-10G-LR       |
| Xcvr 1 | REV 01 | 740-031981 | UL50QC6      | SFP+-10G-LR       |
| Xcvr 2 | REV 01 | 740-031981 | UL708N6      | SFP+-10G-LR       |
| Xcvr 3 | REV 01 | 740-031981 | UL603KK      | SFP+-10G-LR       |
| FPC 19 | REV 32 | 750-028467 | ABBN6827     | MPC 3D 16x 10GE   |
| CPU    | REV 10 | 711-029089 | ABBK6508     | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 163363A01688 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 163363A01724 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A01773 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 163363A02593 | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 163363A03061 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 163363A03056 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A02669 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 163363A03070 | SFP+-10G-SR       |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 163363A02572 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 163363A02697 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A02585 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 163363A03052 | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 163363A02591 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 163363A02649 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A02577 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 163363A02698 | SFP+-10G-SR       |
| ADC 0  | REV 13 | 750-043596 | ABBX5561     | Adapter Card      |
| ADC 1  | REV 13 | 750-043596 | ABBX5546     | Adapter Card      |
| ADC 2  | REV 13 | 750-043596 | ABBX5535     | Adapter Card      |
| ADC 3  | REV 13 | 750-043596 | ABBX5552     | Adapter Card      |
| ADC 4  | REV 13 | 750-043596 | ABBX5581     | Adapter Card      |
| ADC 5  | REV 13 | 750-043596 | ABBX5545     | Adapter Card      |
| ADC 6  | REV 13 | 750-043596 | ABBX5554     | Adapter Card      |
| ADC 7  | REV 07 | 750-043596 | ABBV7194     | Adapter Card      |
| ADC 8  | REV 07 | 750-043596 | ABBV7251     | Adapter Card      |
| ADC 9  | REV 07 | 750-043596 | ABBV7202     | Adapter Card      |
| ADC 10 | REV 13 | 750-043596 | ABBX5538     | Adapter Card      |
| ADC 11 | REV 13 | 750-043596 | ABBX5566     | Adapter Card      |
| ADC 12 | REV 13 | 750-043596 | ABBX5542     | Adapter Card      |
| ADC 13 | REV 13 | 750-043596 | ABBX5539     | Adapter Card      |
| ADC 14 | REV 13 | 750-043596 | ABBX5555     | Adapter Card      |
| ADC 15 | REV 13 | 750-043596 | ABBX5557     | Adapter Card      |

|            |        |            |          |                        |
|------------|--------|------------|----------|------------------------|
| ADC 16     | REV 13 | 750-043596 | ABBX5536 | Adapter Card           |
| ADC 17     | REV 13 | 750-043596 | ABBX5559 | Adapter Card           |
| ADC 18     | REV 13 | 750-043596 | ABBX5537 | Adapter Card           |
| ADC 19     | REV 11 | 750-043596 | ABBW5685 | Adapter Card           |
| Fan Tray 0 | REV 2A | 760-046960 | ACAY0030 | 172mm FanTray - 6 Fans |
| Fan Tray 1 | REV 2A | 760-046960 | ACAY0039 | 172mm FanTray - 6 Fans |
| Fan Tray 2 | REV 2A | 760-046960 | ACAY0033 | 172mm FanTray - 6 Fans |
| Fan Tray 3 | REV 2A | 760-046960 | ACAY0062 | 172mm FanTray - 6 Fans |

### show chassis hardware detail (MX2020 Router)

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user@host> show chassis hardware detail
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Hardware inventory:
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| Item             | Version  | Part number                                          | Serial number             | Description          |
|------------------|----------|------------------------------------------------------|---------------------------|----------------------|
| Chassis          |          |                                                      | JN11E2227AFJ              | MX2020               |
| Midplane         | REV 27   | 750-040240                                           | ABAB9384                  | Lower Power Midplane |
| Midplane 1       | REV 04   | 711-032386                                           | ABAB9386                  | Upper Backplane      |
| PMP 1            | REV 05   | 711-032428                                           | ACAJ1821                  | Upper Power Midplane |
| PMP 0            | REV 04   | 711-032426                                           | ACAJ1524                  | Lower Power Midplane |
| FPM Board        | REV 06   | 760-040242                                           | ABBT8837                  | Front Panel Display  |
| PSM 0            | REV 01   | 740-045050                                           | 1E02224006G               | DC 52V Power Supply  |
| Module           |          |                                                      |                           |                      |
| PSM 1            | REV 01   | 740-045050                                           | 1E022240053               | DC 52V Power Supply  |
| Module           |          |                                                      |                           |                      |
| PSM 2            | REV 01   | 740-045050                                           | 1E02224004K               | DC 52V Power Supply  |
| Module           |          |                                                      |                           |                      |
| PSM 3            | REV 01   | 740-045050                                           | 1E022240056               | DC 52V Power Supply  |
| Module           |          |                                                      |                           |                      |
| PSM 4            | REV 01   | 740-045050                                           | 1E022240054               | DC 52V Power Supply  |
| Module           |          |                                                      |                           |                      |
| PSM 5            | REV 01   | 740-045050                                           | 1E02224005H               | DC 52V Power Supply  |
| Module           |          |                                                      |                           |                      |
| PSM 6            | REV 01   | 740-045050                                           | 1E02224006S               | DC 52V Power Supply  |
| Module           |          |                                                      |                           |                      |
| PSM 7            | REV 01   | 740-045050                                           | 1E02224005M               | DC 52V Power Supply  |
| Module           |          |                                                      |                           |                      |
| PSM 8            | REV 01   | 740-045050                                           | 1E022240062               | DC 52V Power Supply  |
| Module           |          |                                                      |                           |                      |
| PSM 9            | REV 03   | 740-045050                                           | 1EDB2350095               | DC 52V Power Supply  |
| Module           |          |                                                      |                           |                      |
| PSM 10           | REV 03   | 740-045050                                           | 1EDB235009L               | DC 52V Power Supply  |
| Module           |          |                                                      |                           |                      |
| PSM 11           | REV 03   | 740-045050                                           | 1EDB2350092               | DC 52V Power Supply  |
| Module           |          |                                                      |                           |                      |
| PSM 12           | REV 03   | 740-045050                                           | 1EDB23500AT               | DC 52V Power Supply  |
| Module           |          |                                                      |                           |                      |
| PSM 13           | REV 03   | 740-045050                                           | 1EDB2350094               | DC 52V Power Supply  |
| Module           |          |                                                      |                           |                      |
| PSM 15           | REV 03   | 740-045050                                           | 1EDB235008X               | DC 52V Power Supply  |
| Module           |          |                                                      |                           |                      |
| PDM 0            | REV 01   | 740-045234                                           | 1E012150033               | DC Power Dist Module |
| PDM 1            | REV 01   | 740-045234                                           | 1E012150027               | DC Power Dist Module |
| PDM 2            | REV 01   | 740-045234                                           | 1E262250072               | DC Power Dist Module |
| Routing Engine 0 | REV 02   | 740-041821                                           | 9009094138                | RE-S-1800x4          |
| ad0              | 3998 MB  | Virtium - TuffDisk                                   | VCF3 20110825A021D0000064 | Compact Flash        |
| ad1              | 30533 MB | UGB94ARF32H0S3-KC                                    | UNIGEN-499551-000347      | Disk 1               |
| usb0 (addr 1)    |          | EHCI root hub 0                                      | Intel                     | uhub0                |
| usb0 (addr 2)    |          | product 0x0020 32                                    | vendor 0x8087             | uhub1                |
| DIMM 0           |          | SGU04G72H1BD2SA-BB DIE REV-52 PCB REV-54 MFR ID-ce80 |                           |                      |
| DIMM 1           |          | SGU04G72H1BD2SA-BB DIE REV-52 PCB REV-54 MFR ID-ce80 |                           |                      |
| DIMM 2           |          | SGU04G72H1BD2SA-BB DIE REV-52 PCB REV-54 MFR ID-ce80 |                           |                      |

|                  |          |                    |            |                      |                     |
|------------------|----------|--------------------|------------|----------------------|---------------------|
| DIMM 3           |          | SGU04G72H1BD2SA-BB | DIE REV-52 | PCB REV-54           | MFR ID-ce80         |
| Routing Engine 1 |          | REV 02             | 740-041821 | 9009089709           | RE-S-1800x4         |
| ad0              | 3831 MB  | UGB30SFA4000T1     |            | SFA4000T1 00000113   | Compact Flash       |
| ad1              | 30533 MB | UGB94ARF32H0S3-KC  |            | UNIGEN-478612-001044 | Disk 1              |
| CB 0             |          | REV 08             | 750-040257 | CAAB3482             | Control Board       |
| CB 1             |          | REV 04             | 750-040257 | ZT2864               | Control Board       |
| SPMB 0           |          | REV 02             | 711-041855 | CAAA6141             | PMB Board           |
| SPMB 1           |          | REV 01             | 711-041855 | ZS2275               | PMB Board           |
| SFB 0            |          | REV 05             | 711-044466 | ABBT2161             | Switch Fabric Board |
| SFB 1            |          | REV 05             | 711-044466 | ABBT2159             | Switch Fabric Board |
| SFB 2            |          | REV 05             | 711-044466 | ABBX3718             | Switch Fabric Board |
| SFB 3            |          | REV 05             | 711-044466 | ABBT2152             | Switch Fabric Board |
| SFB 4            |          | REV 05             | 711-044466 | ABBT2160             | Switch Fabric Board |
| SFB 5            |          | REV 05             | 711-044466 | ABBT2145             | Switch Fabric Board |
| SFB 6            |          | REV 05             | 711-044466 | ABBT2150             | Switch Fabric Board |
| SFB 7            |          | REV 05             | 711-044466 | ABBT2163             | Switch Fabric Board |
| FPC 0            |          | REV 30             | 750-028467 | ABBN0284             | MPC 3D 16x 10GE     |
| CPU              |          | REV 10             | 711-029089 | ABBN0507             | AMPC PMB            |
| PIC 0            |          |                    | BUILTIN    | BUILTIN              | 4x 10GE(LAN) SFP+   |
| Xcvr 0           |          | REV 01             | 740-030658 | B11E00990            | SFP+-10G-USR        |
| Xcvr 1           |          | REV 01             | 740-030658 | B11E04357            | SFP+-10G-USR        |
| Xcvr 2           |          | REV 01             | 740-030658 | B11F01327            | SFP+-10G-USR        |
| Xcvr 3           | REV 01   | 740-030658         | B11E04375  |                      | SFP+-10G-USR        |
| PIC 1            |          |                    | BUILTIN    | BUILTIN              | 4x 10GE(LAN) SFP+   |
| Xcvr 0           |          | REV 01             | 740-030658 | B11E02760            | SFP+-10G-USR        |
| Xcvr 1           |          | REV 01             | 740-030658 | B11E02904            | SFP+-10G-USR        |
| Xcvr 2           |          | REV 01             | 740-030658 | B11E03963            | SFP+-10G-USR        |
| Xcvr 3           |          | REV 01             | 740-030658 | B11E00756            | SFP+-10G-USR        |
| PIC 2            |          |                    | BUILTIN    | BUILTIN              | 4x 10GE(LAN) SFP+   |
| Xcvr 0           |          | REV 01             | 740-030658 | B11E04418            | SFP+-10G-USR        |
| Xcvr 1           |          | REV 01             | 740-030658 | B11E01077            | SFP+-10G-USR        |
| Xcvr 2           |          | REV 01             | 740-030658 | B11E01128            | SFP+-10G-USR        |
| Xcvr 3           |          | REV 01             | 740-030658 | B11F01253            | SFP+-10G-USR        |
| PIC 3            |          |                    | BUILTIN    | BUILTIN              | 4x 10GE(LAN) SFP+   |
| Xcvr 0           |          | REV 01             | 740-030658 | B11E01140            | SFP+-10G-USR        |
| Xcvr 1           |          | REV 01             | 740-030658 | B11F01626            | SFP+-10G-USR        |
| Xcvr 2           |          | REV 01             | 740-030658 | B11E01075            | SFP+-10G-USR        |
| Xcvr 3           |          | REV 01             | 740-030658 | B11E01177            | SFP+-10G-USR        |
| FPC 1            |          | REV 30             | 750-028467 | ABBN0308             | MPC 3D 16x 10GE     |
| CPU              |          | REV 10             | 711-029089 | ABBN1095             | AMPC PMB            |
| PIC 0            |          |                    | BUILTIN    | BUILTIN              | 4x 10GE(LAN) SFP+   |
| Xcvr 0           |          | REV 01             | 740-030658 | B11E04305            | SFP+-10G-USR        |
| Xcvr 1           |          | REV 01             | 740-030658 | B11E01147            | SFP+-10G-USR        |
| Xcvr 2           |          | REV 01             | 740-030658 | B11E01195            | SFP+-10G-USR        |
| Xcvr 3           |          | REV 01             | 740-030658 | B11F01743            | SFP+-10G-USR        |
| PIC 1            |          |                    | BUILTIN    | BUILTIN              | 4x 10GE(LAN) SFP+   |
| Xcvr 0           |          | REV 01             | 740-030658 | B11F01892            | SFP+-10G-USR        |
| Xcvr 1           |          | REV 01             | 740-030658 | B11E02880            | SFP+-10G-USR        |
| Xcvr 2           |          | REV 01             | 740-030658 | B11E00725            | SFP+-10G-USR        |
| Xcvr 3           |          | REV 01             | 740-030658 | B11E01057            | SFP+-10G-USR        |
| PIC 2            |          |                    | BUILTIN    | BUILTIN              | 4x 10GE(LAN) SFP+   |
| Xcvr 0           |          | REV 01             | 740-030658 | B11E02816            | SFP+-10G-USR        |
| Xcvr 1           |          | REV 01             | 740-030658 | B11C04501            | SFP+-10G-USR        |
| Xcvr 2           |          | REV 01             | 740-030658 | B11E02764            | SFP+-10G-USR        |
| Xcvr 3           |          | REV 01             | 740-030658 | B11E00789            | SFP+-10G-USR        |
| PIC 3            |          |                    | BUILTIN    | BUILTIN              | 4x 10GE(LAN) SFP+   |
| Xcvr 0           |          | REV 01             | 740-030658 | B11F01250            | SFP+-10G-USR        |
| Xcvr 1           |          | REV 01             | 740-030658 | B11E02847            | SFP+-10G-USR        |
| Xcvr 2           |          | REV 01             | 740-030658 | B11E00787            | SFP+-10G-USR        |
| Xcvr 3           |          | REV 01             | 740-030658 | B11E03803            | SFP+-10G-USR        |
| FPC 2            |          | REV 30             | 750-028467 | ABBN0316             | MPC 3D 16x 10GE     |

|        |        |            |           |                   |
|--------|--------|------------|-----------|-------------------|
| CPU    | REV 10 | 711-029089 | ABB11082  | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN   | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | B11K00523 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | B11K01848 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | B11K01865 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | B11K00540 | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN   | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | B11K00422 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | B11K00428 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | B11K00423 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | B11K01855 | SFP+-10G-SR       |
| PIC 2  |        | BUILTIN    | BUILTIN   | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | B11K01847 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | B11K00526 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | B11K00529 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | B11K00525 | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN   | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | B11K00425 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | B11K00530 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | B11K01851 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | B11K00528 | SFP+-10G-SR       |
| FPC 3  | REV 32 | 750-028467 | ABBN6832  | MPC 3D 16x 10GE   |
| CPU    | REV 10 | 711-029089 | ABBN6534  | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN   | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80MB4   | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80FQ6   | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80N1F   | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80NLQ   | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN   | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80KDR   | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80FGJ   | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80N5G   | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80KD8   | SFP+-10G-SR       |
| PIC 2  |        | BUILTIN    | BUILTIN   | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80LET   | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80N1X   | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80NRF   | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80NL2   | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN   | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80N3D   | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80MRB   | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80LEQ   | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80LER   | SFP+-10G-SR       |
| FPC 4  | REV 32 | 750-028467 | ABBN6811  | MPC 3D 16x 10GE   |
| CPU    | REV 10 | 711-029089 | ABBN7288  | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN   | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80NK8   | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80LJG   | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80LBU   | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80N21   | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN   | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80LEU   | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80NLM   | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80NL6   | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80LES   | SFP+-10G-SR       |
| PIC 2  |        | BUILTIN    | BUILTIN   | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80LEN   | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80ME0   | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80LMG   | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80MM1   | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN   | 4x 10GE(LAN) SFP+ |

|        |        |            |              |                   |
|--------|--------|------------|--------------|-------------------|
| Xcvr 0 | REV 01 | 740-031980 | AK80MG7      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80KF9      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80NRQ      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80NLE      | SFP+-10G-SR       |
| FPC 5  | REV 32 | 750-028467 | ABBN6791     | MPC 3D 16x 10GE   |
| CPU    | REV 10 | 711-029089 | ABBN7289     | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | B11K00424    | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | B11K01849    | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | B11K01862    | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | B11K01852    | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP  |
| Xcvr 0 | REV 01 | 740-031980 | B11K00427    | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | B11K00430    | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | B11K01854    | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | B11K00426    | SFP+-10G-SR       |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | B11K00429    | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | B11K01864    | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | B11K01850    | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | B11K00522    | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11E01144    | SFP+-10G-USR      |
| Xcvr 1 | REV 01 | 740-030658 | B11E00985    | SFP+-10G-USR      |
| Xcvr 2 | REV 01 | 740-030658 | B11E00796    | SFP+-10G-USR      |
| Xcvr 3 | REV 01 | 740-031980 | B11K01866    | SFP+-10G-SR       |
| FPC 6  | REV 30 | 750-028467 | ABBM4592     | MPC 3D 16x 10GE   |
| CPU    | REV 10 | 711-029089 | ABBN0465     | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11F01435    | SFP+-10G-USR      |
| Xcvr 1 | REV 01 | 740-030658 | B11E01052    | SFP+-10G-USR      |
| Xcvr 2 | REV 01 | 740-030658 | B11F01328    | SFP+-10G-USR      |
| Xcvr 3 | REV 01 | 740-030658 | B11F01254    | SFP+-10G-USR      |
| PIC 1  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11E02738    | SFP+-10G-USR      |
| Xcvr 1 | REV 01 | 740-030658 | B11E02881    | SFP+-10G-USR      |
| Xcvr 2 | REV 01 | 740-030658 | B11F01624    | SFP+-10G-USR      |
| Xcvr 3 | REV 01 | 740-030658 | B11E00889    | SFP+-10G-USR      |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11E02883    | SFP+-10G-USR      |
| Xcvr 1 | REV 01 | 740-030658 | B11E00681    | SFP+-10G-USR      |
| Xcvr 2 | REV 01 | 740-030658 | B11E04306    | SFP+-10G-USR      |
| Xcvr 3 | REV 01 | 740-030658 | B11E02813    | SFP+-10G-USR      |
| PIC 3  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11F01801    | SFP+-10G-USR      |
| Xcvr 1 | REV 01 | 740-030658 | B11E02753    | SFP+-10G-USR      |
| Xcvr 2 | REV 01 | 740-030658 | B11E01156    | SFP+-10G-USR      |
| Xcvr 3 | REV 01 | 740-030658 | B11E04324    | SFP+-10G-USR      |
| FPC 7  | REV 32 | 750-028467 | ABBN6810     | MPC 3D 16x 10GE   |
| CPU    | REV 10 | 711-029089 | ABBN7237     | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 163363A03058 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 163363A02082 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A01674 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 163363A02638 | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 163363A03048 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 163363A02729 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A02566 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 163363A02567 | SFP+-10G-SR       |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |

|        |        |            |              |                   |
|--------|--------|------------|--------------|-------------------|
| Xcvr 0 | REV 01 | 740-031980 | 163363A02878 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 163363A02739 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A01959 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 163363A02660 | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 163363A02731 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 163363A02588 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A02673 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 163363A02654 | SFP+-10G-SR       |
| FPC 8  | REV 30 | 750-028467 | ABBM4739     | MPC 3D 16x 10GE   |
| CPU    | REV 10 | 711-029089 | ABBN0487     | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 163363A02569 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 163363A02886 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A03082 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 133363A00297 | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 163363A02726 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 163363A03050 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A02884 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 163363A03076 | SFP+-10G-SR       |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 163363A02581 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 163363A02873 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A02582 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 163363A03083 | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031981 | UL70BU6      | SFP+-10G-LR       |
| Xcvr 1 | REV 01 | 740-031981 | UL50QC6      | SFP+-10G-LR       |
| Xcvr 2 | REV 01 | 740-031981 | UL708N6      | SFP+-10G-LR       |
| Xcvr 3 | REV 01 | 740-031981 | UL603KK      | SFP+-10G-LR       |
| FPC 9  | REV 32 | 750-028467 | ABBN6827     | MPC 3D 16x 10GE   |
| CPU    | REV 10 | 711-029089 | ABBK6508     | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 163363A01688 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 163363A01724 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A01773 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 163363A02593 | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 163363A03061 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 163363A03056 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A02669 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 163363A03070 | SFP+-10G-SR       |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 163363A02572 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 163363A02697 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A02585 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 163363A03052 | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 163363A02591 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 163363A02649 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A02577 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 163363A02698 | SFP+-10G-SR       |
| FPC 10 | REV 30 | 750-028467 | ABBN0302     | MPC 3D 16x 10GE   |
| CPU    | REV 10 | 711-029089 | ABBN0495     | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11F01581    | SFP+-10G-USR      |
| Xcvr 1 | REV 01 | 740-030658 | B11E01176    | SFP+-10G-USR      |
| Xcvr 2 | REV 01 | 740-030658 | B11F01251    | SFP+-10G-USR      |
| Xcvr 3 | REV 01 | 740-030658 | B11E02752    | SFP+-10G-USR      |
| PIC 1  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |



|        |        |            |              |                   |
|--------|--------|------------|--------------|-------------------|
| Xcvr 0 | REV 01 | 740-030658 | B11E00786    | SFP+-10G-USR      |
| Xcvr 1 | REV 01 | 740-030658 | B11E01020    | SFP+-10G-USR      |
| Xcvr 2 | REV 01 | 740-030658 | B11E01023    | SFP+-10G-USR      |
| Xcvr 3 | REV 01 | 740-030658 | B11E02819    | SFP+-10G-USR      |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11E02812    | SFP+-10G-USR      |
| Xcvr 1 | REV 01 | 740-030658 | B11D04437    | SFP+-10G-USR      |
| Xcvr 2 | REV 01 | 740-030658 | B11F01279    | SFP+-10G-USR      |
| Xcvr 3 | REV 01 | 740-030658 | B11F01333    | SFP+-10G-USR      |
| PIC 3  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11E00978    | SFP+-10G-USR      |
| Xcvr 1 | REV 01 | 740-030658 | B11E01018    | SFP+-10G-USR      |
| Xcvr 2 | REV 01 | 740-030658 | B11F01784    | SFP+-10G-USR      |
| Xcvr 3 | REV 01 | 740-031980 | AK80NKP      | SFP+-10G-SR       |
| FPC 11 | REV 32 | 750-028467 | ABBN6790     | MPC 3D 16x 10GE   |
| CPU    | REV 10 | 711-029089 | ABBK6515     | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80LZM      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80MCC      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80KCM      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80KE0      | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-021310 | C10F99155    | SFP+-10G-LRM      |
| Xcvr 1 | REV 01 | 740-021310 | C10F99049    | SFP+-10G-LRM      |
| Xcvr 2 | REV 01 | 740-021310 | C10F99128    | SFP+-10G-LRM      |
| Xcvr 3 | REV 01 | 740-021310 | C10F99169    | SFP+-10G-LRM      |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80LF3      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 163363A02597 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A03060 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 163363A03057 | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80LEX      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80FEU      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80FNM      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-021308 | AJQQQ5G      | SFP+-10G-SR       |
| FPC 12 | REV 30 | 750-028467 | ZM5111       | MPC 3D 16x 10GE   |
| CPU    | REV 10 | 711-029089 | ZP6607       | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80LJA      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80MFZ      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80NKL      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80KF4      | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80FBJ      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80MM2      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80LJV      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80NXV      | SFP+-10G-SR       |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80N1H      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80NLS      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80FL5      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80NL9      | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80NG2      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80KDU      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80MG1      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80MM0      | SFP+-10G-SR       |
| FPC 13 | REV 30 | 750-028467 | ABBN0208     | MPC 3D 16x 10GE   |
| CPU    | REV 10 | 711-029089 | ABBJ1084     | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |

|        |        |            |              |                   |
|--------|--------|------------|--------------|-------------------|
| Xcvr 0 | REV 01 | 740-030658 | B11E04745    | SFP+-10G-USR      |
| Xcvr 1 | REV 01 | 740-030658 | B11F01570    | SFP+-10G-USR      |
| Xcvr 2 | REV 01 | 740-030658 | B11E04388    | SFP+-10G-USR      |
| Xcvr 3 | REV 01 | 740-030658 | B11F01439    | SFP+-10G-USR      |
| PIC 1  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11E04739    | SFP+-10G-USR      |
| Xcvr 1 | REV 01 | 740-030658 | B11F01869    | SFP+-10G-USR      |
| Xcvr 2 | REV 01 | 740-030658 | B11F01675    | SFP+-10G-USR      |
| Xcvr 3 | REV 01 | 740-030658 | B11F01901    | SFP+-10G-USR      |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11F01346    | SFP+-10G-USR      |
| Xcvr 1 | REV 01 | 740-030658 | B11F01288    | SFP+-10G-USR      |
| Xcvr 2 | REV 01 | 740-030658 | B11F01824    | SFP+-10G-USR      |
| Xcvr 3 | REV 01 | 740-030658 | B11E04312    | SFP+-10G-USR      |
| PIC 3  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11E02811    | SFP+-10G-USR      |
| Xcvr 1 | REV 01 | 740-030658 | B11E03847    | SFP+-10G-USR      |
| Xcvr 2 | REV 01 | 740-030658 | B11F01495    | SFP+-10G-USR      |
| Xcvr 3 | REV 01 | 740-030658 | B11F01265    | SFP+-10G-USR      |
| FPC 14 | REV 23 | 750-028467 | YN2977       | MPC 3D 16x 10GE   |
| CPU    | REV 10 | 711-029089 | YP1856       | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 183363A00875 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 183363A00851 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 183363A00772 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 183363A00882 | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 183363A00735 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 183363A00169 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 183363A00726 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 183363A00077 | SFP+-10G-SR       |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 183363A00168 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 183363A00676 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 183363A00732 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 183363A00091 | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 183363A00725 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 183363A00642 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 183363A00871 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 183363A00853 | SFP+-10G-SR       |
| FPC 15 | REV 32 | 750-028467 | ABBN6798     | MPC 3D 16x 10GE   |
| CPU    | REV 10 | 711-029089 | ABBK6556     | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-021308 | 9ZDZ06A00055 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 183363A00239 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-021308 | AD0915E003K  | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-021308 | AD0915E003A  | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80MRC      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80NL5      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80NKN      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80N3U      | SFP+-10G-SR       |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80N1T      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AJ808DJ      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80NG4      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80FND      | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80FKQ      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80NLT      | SFP+-10G-SR       |

|        |        |            |              |                   |
|--------|--------|------------|--------------|-------------------|
| Xcvr 2 | REV 01 | 740-031980 | AK80NKR      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80LKM      | SFP+-10G-SR       |
| FPC 16 | REV 30 | 750-028467 | ABBN0270     | MPC 3D 16x 10GE   |
| CPU    | REV 10 | 711-029089 | ABBJ0966     | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80NL1      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80NXW      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80KD2      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80FMD      | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80NKQ      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80MGH      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80N38      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80NL7      | SFP+-10G-SR       |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80M5J      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80NKD      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80KCY      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80LHK      | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | AK80LEL      | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | AK80MBE      | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | AK80NLG      | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | AK80LFH      | SFP+-10G-SR       |
| FPC 17 | REV 32 | 750-028467 | ABBN6796     | MPC 3D 16x 10GE   |
| CPU    | REV 10 | 711-029089 | ABBN7259     | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | B11K01856    | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | B11K01853    | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | B11K01863    | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 163363A02863 | SFP+-10G-SR       |
| PIC 1  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 163363A02668 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 163363A02881 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A01671 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 163363A02627 | SFP+-10G-SR       |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 163363A02725 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 163363A02692 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A02730 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 163363A03081 | SFP+-10G-SR       |
| PIC 3  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-031980 | 163363A02736 | SFP+-10G-SR       |
| Xcvr 1 | REV 01 | 740-031980 | 163363A02568 | SFP+-10G-SR       |
| Xcvr 2 | REV 01 | 740-031980 | 163363A02747 | SFP+-10G-SR       |
| Xcvr 3 | REV 01 | 740-031980 | 163363A02579 | SFP+-10G-SR       |
| FPC 18 | REV 30 | 750-028467 | ABBN0281     | MPC 3D 16x 10GE   |
| CPU    | REV 10 | 711-029089 | ABBN0526     | AMPC PMB          |
| PIC 0  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11F01326    | SFP+-10G-USR      |
| Xcvr 1 | REV 01 | 740-030658 | B11E03973    | SFP+-10G-USR      |
| Xcvr 2 | REV 01 | 740-030658 | B11E00950    | SFP+-10G-USR      |
| Xcvr 3 | REV 01 | 740-030658 | B11E00674    | SFP+-10G-USR      |
| PIC 1  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11E00775    | SFP+-10G-USR      |
| Xcvr 1 | REV 01 | 740-030658 | B11E04461    | SFP+-10G-USR      |
| Xcvr 2 | REV 01 | 740-030658 | B11E01074    | SFP+-10G-USR      |
| Xcvr 3 | REV 01 | 740-030658 | B11E02821    | SFP+-10G-USR      |
| PIC 2  |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+ |
| Xcvr 0 | REV 01 | 740-030658 | B11E04501    | SFP+-10G-USR      |
| Xcvr 1 | REV 01 | 740-030658 | B11E00757    | SFP+-10G-USR      |

|            |        |            |              |                        |
|------------|--------|------------|--------------|------------------------|
| Xcvr 2     | REV 01 | 740-030658 | B11F01623    | SFP+-10G-USR           |
| Xcvr 3     | REV 01 | 740-030658 | B11E01022    | SFP+-10G-USR           |
| PIC 3      |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+      |
| Xcvr 0     | REV 01 | 740-030658 | B11E04359    | SFP+-10G-USR           |
| Xcvr 1     | REV 01 | 740-030658 | B11E02751    | SFP+-10G-USR           |
| Xcvr 2     | REV 01 | 740-030658 | B11E02736    | SFP+-10G-USR           |
| Xcvr 3     | REV 01 | 740-030658 | B11E01178    | SFP+-10G-USR           |
| FPC 19     | REV 32 | 750-028467 | ABBN6813     | MPC 3D 16x 10GE        |
| CPU        | REV 10 | 711-029089 | ABBK6542     | AMPC PMB               |
| PIC 0      |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+      |
| Xcvr 0     | REV 01 | 740-031980 | AK80NA3      | SFP+-10G-SR            |
| Xcvr 1     | REV 01 | 740-031980 | AK80NLF      | SFP+-10G-SR            |
| Xcvr 2     | REV 01 | 740-031980 | AK80MRH      | SFP+-10G-SR            |
| Xcvr 3     | REV 01 | 740-031980 | AK80KE4      | SFP+-10G-SR            |
| PIC 1      |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+      |
| Xcvr 0     | REV 01 | 740-021308 | 973152A00030 | SFP+-10G-SR            |
| Xcvr 1     | REV 01 | 740-031980 | AK80L9H      | SFP+-10G-SR            |
| Xcvr 2     | REV 01 | 740-031980 | AK80ME8      | SFP+-10G-SR            |
| Xcvr 3     | REV 01 | 740-031980 | AK80NLR      | SFP+-10G-SR            |
| PIC 2      |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+      |
| Xcvr 0     | REV 01 | 740-031980 | AK80NG1      | SFP+-10G-SR            |
| Xcvr 1     | REV 01 | 740-031980 | AK80MCA      | SFP+-10G-SR            |
| Xcvr 2     | REV 01 | 740-031980 | AK80LFC      | SFP+-10G-SR            |
| Xcvr 3     | REV 01 | 740-031980 | AK80LEM      | SFP+-10G-SR            |
| PIC 3      |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+      |
| Xcvr 0     | REV 01 | 740-031980 | AK80N9X      | SFP+-10G-SR            |
| Xcvr 1     | REV 01 | 740-031980 | AK80LAC      | SFP+-10G-SR            |
| Xcvr 2     | REV 01 | 740-031980 | AK80LF2      | SFP+-10G-SR            |
| Xcvr 3     | REV 01 | 740-031980 | AK80N8T      | SFP+-10G-SR            |
| ADC 0      | REV 13 | 750-043596 | ABBX5561     | Adapter Card           |
| ADC 1      | REV 13 | 750-043596 | ABBX5546     | Adapter Card           |
| ADC 2      | REV 13 | 750-043596 | ABBX5535     | Adapter Card           |
| ADC 3      | REV 13 | 750-043596 | ABBX5552     | Adapter Card           |
| ADC 4      | REV 13 | 750-043596 | ABBX5581     | Adapter Card           |
| ADC 5      | REV 13 | 750-043596 | ABBX5545     | Adapter Card           |
| ADC 6      | REV 13 | 750-043596 | ABBX5554     | Adapter Card           |
| ADC 7      | REV 07 | 750-043596 | ABBV7194     | Adapter Card           |
| ADC 8      | REV 07 | 750-043596 | ABBV7251     | Adapter Card           |
| ADC 9      | REV 07 | 750-043596 | ABBV7202     | Adapter Card           |
| ADC 10     | REV 13 | 750-043596 | ABBX5579     | Adapter Card           |
| ADC 11     | REV 13 | 750-043596 | ABBX5548     | Adapter Card           |
| ADC 12     | REV 13 | 750-043596 | ABBX5575     | Adapter Card           |
| ADC 13     | REV 13 | 750-043596 | ABBX5539     | Adapter Card           |
| ADC 14     | REV 13 | 750-043596 | ABBX5555     | Adapter Card           |
| ADC 15     | REV 13 | 750-043596 | ABBX5557     | Adapter Card           |
| ADC 16     | REV 13 | 750-043596 | ABBX5536     | Adapter Card           |
| ADC 17     | REV 13 | 750-043596 | ABBX5559     | Adapter Card           |
| ADC 18     | REV 13 | 750-043596 | ABBX5537     | Adapter Card           |
| ADC 19     | REV 11 | 750-043596 | ABBW5685     | Adapter Card           |
| Fan Tray 0 | REV 04 | 760-046960 | ACAY0090     | 172mm FanTray - 6 Fans |
| Fan Tray 1 | REV 04 | 760-046960 | ACAY0088     | 172mm FanTray - 6 Fans |
| Fan Tray 2 | REV 04 | 760-046960 | ACAY0089     | 172mm FanTray - 6 Fans |
| Fan Tray 3 | REV 04 | 760-046960 | ACAY0108     | 172mm FanTray - 6 Fans |

### show chassis hardware models (MX2020 Router)

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user@host > show chassis hardware models
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Hardware inventory:
```

| Item      | Version | Part number | Serial number | FRU model number |
|-----------|---------|-------------|---------------|------------------|
| Midplane  | REV 27  | 750-040240  | ABAB9384      | 750-040240       |
| FPM Board | REV 06  | 760-040242  | ABBT8837      | 760-040242       |

|                  |        |            |             |                      |
|------------------|--------|------------|-------------|----------------------|
| PSM 0            | REV 01 | 740-045050 | 1E02224006G | MX2000-PSM-HC-DC-S-A |
| PSM 1            | REV 01 | 740-045050 | 1E022240053 | MX2000-PSM-HC-DC-S-A |
| PSM 2            | REV 01 | 740-045050 | 1E02224004K | MX2000-PSM-HC-DC-S-A |
| PSM 3            | REV 01 | 740-045050 | 1E022240056 | MX2000-PSM-HC-DC-S-A |
| PSM 4            | REV 01 | 740-045050 | 1E022240054 | MX2000-PSM-HC-DC-S-A |
| PSM 5            | REV 01 | 740-045050 | 1E02224005H | MX2000-PSM-HC-DC-S-A |
| PSM 6            | REV 01 | 740-045050 | 1E02224006S | MX2000-PSM-HC-DC-S-A |
| PSM 7            | REV 01 | 740-045050 | 1E02224005M | MX2000-PSM-HC-DC-S-A |
| PSM 8            | REV 01 | 740-045050 | 1E022240062 | MX2000-PSM-HC-DC-S-A |
| PSM 9            | REV 03 | 740-045050 | 1EDB2350095 | MX2000-PSM-DC-S-A    |
| PSM 10           | REV 03 | 740-045050 | 1EDB235009L | MX2000-PSM-DC-S-A    |
| PSM 11           | REV 03 | 740-045050 | 1EDB2350092 | MX2000-PSM-DC-S-A    |
| PSM 12           | REV 03 | 740-045050 | 1EDB23500AT | MX2000-PSM-DC-S-A    |
| PSM 13           | REV 03 | 740-045050 | 1EDB2350094 | MX2000-PSM-DC-S-A    |
| PSM 15           | REV 03 | 740-045050 | 1EDB235008X | MX2000-PSM-DC-S-A    |
| PDM 0            | REV 01 | 740-045234 | 1E012150033 |                      |
| PDM 1            | REV 01 | 740-045234 | 1E012150027 |                      |
| PDM 2            | REV 01 | 740-045234 | 1E262250072 | MX2000-PDM-DC-S-A    |
| Routing Engine 0 | REV 02 | 740-041821 | 9009094138  | RE-S-1800X4-16G-S    |
| Routing Engine 1 | REV 02 | 740-041821 | 9009089709  | RE-S-1800X4-16G-S    |
| CB 0             | REV 08 | 750-040257 | CAAB3482    | 750-040257           |
| CB 1             | REV 04 | 750-040257 | ZT2864      | 750-040257           |
| SFB 0            | REV 05 | 711-044466 | ABBT2161    | MX2000-SFB-S         |
| SFB 1            | REV 05 | 711-044466 | ABBT2159    | MX2000-SFB-S         |
| SFB 2            | REV 05 | 711-044466 | ABBX3718    | MX2000-SFB-S         |
| SFB 4            | REV 05 | 711-044466 | ABBT2160    | MX2000-SFB-S         |
| SFB 5            | REV 05 | 711-044466 | ABBT2145    | MX2000-SFB-S         |
| SFB 7            | REV 05 | 711-044466 | ABBT2163    | MX2000-SFB-S         |
| FPC 0            | REV 30 | 750-028467 | ABBN0284    | MPC-3D-16XGE-SFPP    |
| FPC 1            | REV 30 | 750-028467 | ABBN0308    | MPC-3D-16XGE-SFPP    |
| FPC 2            | REV 30 | 750-028467 | ABBN0316    | MPC-3D-16XGE-SFPP    |
| FPC 3            | REV 32 | 750-028467 | ABBN6832    | MPC-3D-16XGE-SFPP    |
| FPC 4            | REV 32 | 750-028467 | ABBN6811    | MPC-3D-16XGE-SFPP    |
| FPC 5            | REV 32 | 750-028467 | ABBN6791    | MPC-3D-16XGE-SFPP    |
| FPC 6            | REV 30 | 750-028467 | ABBM4592    | MPC-3D-16XGE-SFPP    |
| FPC 7            | REV 32 | 750-028467 | ABBN6810    | MPC-3D-16XGE-SFPP    |
| FPC 8            | REV 30 | 750-028467 | ABBM4739    | MPC-3D-16XGE-SFPP    |
| FPC 9            | REV 32 | 750-028467 | ABBN6827    | MPC-3D-16XGE-SFPP    |
| FPC 10           | REV 30 | 750-028467 | ABBN0302    | MPC-3D-16XGE-SFPP    |
| FPC 11           | REV 32 | 750-028467 | ABBN6790    | MPC-3D-16XGE-SFPP    |
| FPC 12           | REV 30 | 750-028467 | ZM5111      | MPC-3D-16XGE-SFPP    |
| FPC 13           | REV 30 | 750-028467 | ABBN0208    | MPC-3D-16XGE-SFPP    |
| FPC 14           | REV 23 | 750-028467 | YN2977      | MPC-3D-16XGE-SFPP    |
| FPC 15           | REV 32 | 750-028467 | ABBN6798    | MPC-3D-16XGE-SFPP    |
| FPC 16           | REV 30 | 750-028467 | ABBN0270    | MPC-3D-16XGE-SFPP    |
| FPC 17           | REV 32 | 750-028467 | ABBN6796    | MPC-3D-16XGE-SFPP    |
| FPC 18           | REV 30 | 750-028467 | ABBN0281    | MPC-3D-16XGE-SFPP    |
| FPC 19           | REV 32 | 750-028467 | ABBN6813    | MPC-3D-16XGE-SFPP    |
| ADC 0            | REV 13 | 750-043596 | ABBX5561    | PROTO-ASSEMBLY       |
| ADC 1            | REV 13 | 750-043596 | ABBX5546    | PROTO-ASSEMBLY       |
| ADC 2            | REV 13 | 750-043596 | ABBX5535    | MX2000-LC-ADAPTER    |
| ADC 3            | REV 13 | 750-043596 | ABBX5552    | MX2000-LC-ADAPTER    |
| ADC 4            | REV 13 | 750-043596 | ABBX5581    | MX2000-LC-ADAPTER    |
| ADC 5            | REV 13 | 750-043596 | ABBX5545    | PROTO-ASSEMBLY       |
| ADC 6            | REV 13 | 750-043596 | ABBX5554    | PROTO-ASSEMBLY       |
| ADC 7            | REV 07 | 750-043596 | ABBV7194    | MX2000-LC-ADAPTER    |
| ADC 8            | REV 07 | 750-043596 | ABBV7251    | MX2000-LC-ADAPTER    |
| ADC 9            | REV 07 | 750-043596 | ABBV7202    | MX2000-LC-ADAPTER    |
| ADC 10           | REV 13 | 750-043596 | ABBX5579    | MX2000-LC-ADAPTER    |
| ADC 12           | REV 13 | 750-043596 | ABBX5575    | MX2000-LC-ADAPTER    |
| ADC 13           | REV 13 | 750-043596 | ABBX5539    | PROTO-ASSEMBLY       |

|            |        |            |          |                   |
|------------|--------|------------|----------|-------------------|
| ADC 14     | REV 13 | 750-043596 | ABBX5555 | PROTO-ASSEMBLY    |
| ADC 15     | REV 13 | 750-043596 | ABBX5557 | MX2000-LC-ADAPTER |
| ADC 16     | REV 13 | 750-043596 | ABBX5536 | PROTO-ASSEMBLY    |
| ADC 17     | REV 13 | 750-043596 | ABBX5559 | PROTO-ASSEMBLY    |
| ADC 18     | REV 13 | 750-043596 | ABBX5537 | PROTO-ASSEMBLY    |
| ADC 19     | REV 11 | 750-043596 | ABBW5685 | PROTO-ASSEMBLY    |
| Fan Tray 0 | REV 04 | 760-046960 | ACAY0090 |                   |
| Fan Tray 1 | REV 04 | 760-046960 | ACAY0088 |                   |
| Fan Tray 2 | REV 04 | 760-046960 | ACAY0089 |                   |
| Fan Tray 3 | REV 04 | 760-046960 | ACAY0108 |                   |

### show chassis hardware clei-models (MX2020 Router)

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user@ host > show chassis hardware clei-models
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Hardware inventory:
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| Item             | Version | Part number | CLEI code  | FRU model number     |
|------------------|---------|-------------|------------|----------------------|
| Midplane         | REV 27  | 750-040240  | PROTOXCLEI | 750-040240           |
| FPM Board        | REV 06  | 760-040242  | PROTOXCLEI | 760-040242           |
| PSM 0            | REV 01  | 740-045050  | IPUPAJMKAA | MX2000-PSM-HC-DC-S-A |
| PSM 1            | REV 01  | 740-045050  | IPUPAJMKAA | MX2000-PSM-HC-DC-S-A |
| PSM 2            | REV 01  | 740-045050  | IPUPAJMKAA | MX2000-PSM-HC-DC-S-A |
| PSM 3            | REV 01  | 740-045050  | IPUPAJMKAA | MX2000-PSM-HC-DC-S-A |
| PSM 4            | REV 01  | 740-045050  | IPUPAJMKAA | MX2000-PSM-HC-DC-S-A |
| PSM 5            | REV 01  | 740-045050  | IPUPAJMKAA | MX2000-PSM-HC-DC-S-A |
| PSM 6            | REV 01  | 740-045050  | IPUPAJMKAA | MX2000-PSM-HC-DC-S-A |
| PSM 7            | REV 01  | 740-045050  | IPUPAJMKAA | MX2000-PSM-HC-DC-S-A |
| PSM 8            | REV 01  | 740-045050  | IPUPAJMKAA | MX2000-PSM-HC-DC-S-A |
| PSM 9            | REV 03  | 740-045050  | IPUPAJMKAA | MX2000-PSM-DC-S-A    |
| PSM 10           | REV 03  | 740-045050  | IPUPAJMKAA | MX2000-PSM-DC-S-A    |
| PSM 11           | REV 03  | 740-045050  | IPUPAJMKAA | MX2000-PSM-DC-S-A    |
| PSM 12           | REV 03  | 740-045050  | IPUPAJMKAA | MX2000-PSM-DC-S-A    |
| PSM 13           | REV 03  | 740-045050  | IPUPAJMKAA | MX2000-PSM-DC-S-A    |
| PSM 15           | REV 03  | 740-045050  | IPUPAJMKAA | MX2000-PSM-DC-S-A    |
| PDM 0            | REV 01  | 740-045234  |            |                      |
| PDM 1            | REV 01  | 740-045234  |            |                      |
| PDM 2            | REV 01  | 740-045234  | IPUPAJSKAA | MX2000-PDM-DC-S-A    |
| Routing Engine 0 | REV 02  | 740-041821  |            | RE-S-1800X4-16G-S    |
| Routing Engine 1 | REV 02  | 740-041821  |            | RE-S-1800X4-16G-S    |
| CB 0             | REV 08  | 750-040257  | PROTOXCLEI | 750-040257           |
| CB 1             | REV 04  | 750-040257  | PROTOXCLEI | 750-040257           |
| SFB 0            | REV 05  | 711-044466  | IPUCBA6CAA | MX2000-SFB-S         |
| SFB 1            | REV 05  | 711-044466  | IPUCBA6CAA | MX2000-SFB-S         |
| SFB 2            | REV 05  | 711-044466  | IPUCBA6CAA | MX2000-SFB-S         |
| SFB 4            | REV 05  | 711-044466  | IPUCBA6CAA | MX2000-SFB-S         |
| SFB 5            | REV 05  | 711-044466  | IPUCBA6CAA | MX2000-SFB-S         |
| SFB 7            | REV 05  | 711-044466  | IPUCBA6CAA | MX2000-SFB-S         |
| FPC 0            | REV 30  | 750-028467  |            | MPC-3D-16XGE-SFPP    |
| FPC 1            | REV 30  | 750-028467  |            | MPC-3D-16XGE-SFPP    |
| FPC 2            | REV 30  | 750-028467  |            | MPC-3D-16XGE-SFPP    |
| FPC 3            | REV 32  | 750-028467  |            | MPC-3D-16XGE-SFPP    |
| FPC 4            | REV 32  | 750-028467  |            | MPC-3D-16XGE-SFPP    |
| FPC 5            | REV 32  | 750-028467  |            | MPC-3D-16XGE-SFPP    |
| FPC 6            | REV 30  | 750-028467  |            | MPC-3D-16XGE-SFPP    |
| FPC 7            | REV 32  | 750-028467  |            | MPC-3D-16XGE-SFPP    |
| FPC 8            | REV 30  | 750-028467  |            | MPC-3D-16XGE-SFPP    |
| FPC 9            | REV 32  | 750-028467  |            | MPC-3D-16XGE-SFPP    |
| FPC 10           | REV 30  | 750-028467  |            | MPC-3D-16XGE-SFPP    |
| FPC 11           | REV 32  | 750-028467  |            | MPC-3D-16XGE-SFPP    |
| FPC 12           | REV 30  | 750-028467  |            | MPC-3D-16XGE-SFPP    |
| FPC 13           | REV 30  | 750-028467  |            | MPC-3D-16XGE-SFPP    |
| FPC 14           | REV 23  | 750-028467  |            | MPC-3D-16XGE-SFPP    |

|            |        |            |            |                   |
|------------|--------|------------|------------|-------------------|
| FPC 15     | REV 32 | 750-028467 |            | MPC-3D-16XGE-SFPP |
| FPC 16     | REV 30 | 750-028467 |            | MPC-3D-16XGE-SFPP |
| FPC 17     | REV 32 | 750-028467 |            | MPC-3D-16XGE-SFPP |
| FPC 18     | REV 30 | 750-028467 |            | MPC-3D-16XGE-SFPP |
| FPC 19     | REV 32 | 750-028467 |            | MPC-3D-16XGE-SFPP |
| ADC 0      | REV 13 | 750-043596 | PROTOXCLEI | PROTO-ASSEMBLY    |
| ADC 1      | REV 13 | 750-043596 | PROTOXCLEI | PROTO-ASSEMBLY    |
| ADC 2      | REV 13 | 750-043596 | IPUCBA8CAA | MX2000-LC-ADAPTER |
| ADC 3      | REV 13 | 750-043596 | IPUCBA8CAA | MX2000-LC-ADAPTER |
| ADC 4      | REV 13 | 750-043596 | IPUCBA8CAA | MX2000-LC-ADAPTER |
| ADC 5      | REV 13 | 750-043596 | PROTOXCLEI | PROTO-ASSEMBLY    |
| ADC 6      | REV 13 | 750-043596 | PROTOXCLEI | PROTO-ASSEMBLY    |
| ADC 7      | REV 07 | 750-043596 | PROTOXCLEI | MX2000-LC-ADAPTER |
| ADC 8      | REV 07 | 750-043596 | PROTOXCLEI | MX2000-LC-ADAPTER |
| ADC 9      | REV 07 | 750-043596 | PROTOXCLEI | MX2000-LC-ADAPTER |
| ADC 10     | REV 13 | 750-043596 | IPUCBA8CAA | MX2000-LC-ADAPTER |
| ADC 12     | REV 13 | 750-043596 | IPUCBA8CAA | MX2000-LC-ADAPTER |
| ADC 13     | REV 13 | 750-043596 | PROTOXCLEI | PROTO-ASSEMBLY    |
| ADC 14     | REV 13 | 750-043596 | PROTOXCLEI | PROTO-ASSEMBLY    |
| ADC 15     | REV 13 | 750-043596 | IPUCBA8CAA | MX2000-LC-ADAPTER |
| ADC 16     | REV 13 | 750-043596 | PROTOXCLEI | PROTO-ASSEMBLY    |
| ADC 17     | REV 13 | 750-043596 | PROTOXCLEI | PROTO-ASSEMBLY    |
| ADC 18     | REV 13 | 750-043596 | PROTOXCLEI | PROTO-ASSEMBLY    |
| ADC 19     | REV 11 | 750-043596 | PROTOXCLEI | PROTO-ASSEMBLY    |
| Fan Tray 0 | REV 04 | 760-046960 |            |                   |
| Fan Tray 1 | REV 04 | 760-046960 |            |                   |
| Fan Tray 2 | REV 04 | 760-046960 |            |                   |
| Fan Tray 3 | REV 04 | 760-046960 |            |                   |

#### show chassis hardware (MX Series routers with ATM MIC)

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Hardware inventory:

| Item             | Version | Part number | Serial number | Description            |
|------------------|---------|-------------|---------------|------------------------|
| Chassis          |         |             | JN115736EAFc  | MX240                  |
| Midplane         | REV 07  | 760-021404  | ABAA5038      | MX240 Backplane        |
| FPM Board        | REV 03  | 760-021392  | ABBA2758      | Front Panel Display    |
| PEM 0            | Rev 01  | 740-022697  | QCS0937C07K   | PS 1.2-1.7kW; 100-240V |
| AC in            |         |             |               |                        |
| PEM 1            | Rev 01  | 740-022697  | QCS0939C04X   | PS 1.2-1.7kW; 100-240V |
| AC in            |         |             |               |                        |
| PEM 2            | Rev 01  | 740-022697  | QCS0937C06B   | PS 1.2-1.7kW; 100-240V |
| AC in            |         |             |               |                        |
| PEM 3            | Rev 01  | 740-022697  | QCS0937C07U   | PS 1.2-1.7kW; 100-240V |
| AC in            |         |             |               |                        |
| Routing Engine 0 | REV 12  | 740-013063  | 9009042291    | RE-S-2000              |
| Routing Engine 1 | REV 12  | 740-013063  | 9009042266    | RE-S-2000              |
| CB 0             | REV 06  | 710-021523  | ABBC1435      | MX SCB                 |
| CB 1             | REV 06  | 710-021523  | ABBC1497      | MX SCB                 |
| FPC 2            | REV 14  | 750-031088  | YH8446        | MPC Type 2 3D Q        |
| CPU              | REV 06  | 711-030884  | YH9612        | MPC PMB 2G             |
| MIC 0            |         |             |               |                        |
| MIC 1            | REV 10  | 750-036132  | ZP7062        | 2xOC12/8xOC3 CC-CE     |
| PIC 2            |         | BUILTIN     | BUILTIN       | 2xOC12/8xOC3 CC-CE     |
| Xcvr 0           |         | NON-JNPR    | 23393-00492   | UNKNOWN                |
| Xcvr 1           |         | NON-JNPR    | 23393-00500   | UNKNOWN                |
| Xcvr 2           |         | NON-JNPR    | 23393-00912   | UNKNOWN                |
| Xcvr 3           | REV 01  | 740-015638  | 22216-00575   | Load SFP               |
| Xcvr 4           | REV 01  | 740-015638  | 24145-00110   | Load SFP               |
| Xcvr 5           | REV 01  | 740-015638  | 24145-00016   | Load SFP               |

|            |        |            |             |                |
|------------|--------|------------|-------------|----------------|
| Xcvr 6     | REV 01 | 740-015638 | 24145-00175 | Load SFP       |
| Xcvr 7     |        | NON-JNPR   | 23393-00627 | UNKNOWN        |
| QXM 0      | REV 05 | 711-028408 | YF4681      | MPC QXM        |
| QXM 1      | REV 05 | 711-028408 | YF4817      | MPC QXM        |
| Fan Tray 0 | REV 01 | 710-021113 | XL3645      | MX240 Fan Tray |

### show chassis hardware (MX240, MX480, MX960 routers with Application Services Modular Line Card)

```

user@host>show chassis hardware
Hardware inventory:
Item             Version  Part number  Serial number  Description
Chassis                               JN11D969BAFA  MX960
Midplane         REV 03   710-013698   ACAA2362      MX960 Backplane
FPM Board        REV 03   710-014974   ZR0639        Front Panel Display
PDM              Rev 03   740-013110   QCS152250SX   Power Distribution Module
PEM 0            Rev 10   740-013683   QCS1512718W   DC Power Entry Module
PEM 1            Rev 10   740-013683   QCS1512702Y   DC Power Entry Module
Routing Engine 0 REV 15   740-013063   9012024667    RE-S-2000
Routing Engine 1 REV 15   740-013063   9012024649    RE-S-2000
CB 0             REV 14   750-031391   ZJ7749        Enhanced MX SCB
CB 1             REV 14   750-031391   ZJ7750        Enhanced MX SCB
CB 2             REV 14   750-031391   ZY9233        Enhanced MX SCB
FPC 0            REV 17   750-031089   YR7434        MPC Type 2 3D
CPU
FPC 1            REV 11   750-037207   ZW9727        AS-MCC
CPU              REV 04   711-038173   ZW4817        AS-MCC-PMB
MIC 0            REV 01   750-037214   ZH3764        AS-MSC
PIC 0            BUILTIN BUILTIN      AS-MSC
MIC 1            REV 01   711-028408   JZ9200        AS-MXC
PIC 2            BUILTIN BUILTIN      AS-MXC
FPC 4            REV 30   750-028467   ABBN0232      MPC 3D 16x 10GE
CPU
FPC 5            REV 04   750-037207   ZK9074        AS-MCC
CPU
Fan Tray 0       REV 05   740-014971   VT5683        Fan Tray
Fan Tray 1       REV 05   740-014971   VT5684        Fan Tray

```

### show chassis hardware extensive (MX240, MX480, MX960 routers with Application Services Modular Line Card)

```

user@host> show chassis hardware extensive

ID: AS-MCC                                FRU Model Number: 750-037207
Board Information Record:
Address 0x00: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff I2C Hex Data:
Address 0x00: 7f b0 02 ff 0b 37 01 0b 52 45 56 20 31 31 00 00
Address 0x10: 00 00 00 00 37 35 30 2d 30 33 37 32 30 37 00 00
Address 0x20: 53 2f 4e 20 5a 57 39 37 32 37 00 00 00 11 02 0f
Address 0x30: dc ff ff ff ff ff ff ff ff ff ff ff ff ff ff
Address 0x40: ff ff ff ff 01 50 52 4f 54 4f 58 43 4c 45 49 37
Address 0x50: 35 30 2d 30 33 37 32 30 37 00 00 00 00 00 00 00
Address 0x60: 00 00 00 00 00 00 31 31 00 ff ff ff ff ff ff ff
Address 0x70: ff ff ff 5e ff ff ff ff ff ff ff ff ff ff ff ff
CPU              REV 04   711-038173   ZW4817        AS-MCC-PMB
Jedec Code:      0x7fb0          EEPROM Version: 0x02
P/N:             711-038173      S/N:          S/N ZW4817
Assembly ID:     0x0b38          Assembly Version: 01.04
Date:           12-30-2011      Assembly Flags: 0x00
Version:         REV 04
ID: AS-MCC-PMB

```



## Board Information Record:

Address 0x00: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff I2C Hex Data:  
 Address 0x00: 7f b0 02 ff 0b 38 01 04 52 45 56 20 30 34 00 00  
 Address 0x10: 00 00 00 00 37 31 31 2d 30 33 38 31 37 33 00 00  
 Address 0x20: 53 2f 4e 20 5a 57 34 38 31 37 00 00 00 00 1e 0c 07  
 Address 0x30: db ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff  
 Address 0x40: ff ff ff ff 00 50 52 4f 54 4f 58 43 4c 45 49 37  
 Address 0x50: 31 31 2d 30 33 38 31 37 33 00 00 00 00 00 00 00  
 Address 0x60: 00 00 00 00 00 00 30 34 00 ff ff ff ff ff ff ff  
 Address 0x70: ff ff ff 60 00 00 00 00 00 00 00 00 00 00 00 00  
 MIC 0 REV 01 750-037214 ZH3764 AS-MSC  
 Jedec Code: 0x7fb0 EEPROM Version: 0x02  
 P/N: 750-037214 S/N: S/N ZH3764  
 Assembly ID: 0x0a44 Assembly Version: 01.01  
 Date: 07-04-2011 Assembly Flags: 0x00  
 Version: REV 01  
 ID: AS-MSC

## Board Information Record:

Address 0x00: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff I2C Hex Data:  
 Address 0x00: 7f b0 02 ff 0a 44 01 01 52 45 56 20 30 31 00 00  
 Address 0x10: 00 00 00 00 37 35 30 2d 30 33 37 32 31 34 00 00  
 Address 0x20: 53 2f 4e 20 5a 48 33 37 36 34 00 00 00 04 07 07  
 Address 0x30: db ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff  
 Address 0x40: ff ff ff ff 00 00 00 00 00 00 00 00 00 00 00 00  
 Address 0x50: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  
 Address 0x60: 00 00 00 00 00 00 00 00 ff ff ff ff ff ff ff  
 Address 0x70: ff ff ff f6 c0 03 e1 bc 00 00 00 00 00 00 00 00  
 PIC 0 BUILTIN BUILTIN AS-MSC  
 FPC 4 REV 30 750-028467 ABBN0232 MPC 3D 16x 10GE  
 Jedec Code: 0x7fb0 EEPROM Version: 0x01

## show chassis hardware (MX480 Router with MPC4E)

user@host> show chassis hardware

## Hardware inventory:

| Item             | Version | Part number | Serial number | Description            |
|------------------|---------|-------------|---------------|------------------------|
| Chassis          |         |             | JN10FF57BAFB  | MX480                  |
| Midplane         | REV 05  | 750-047849  | Good          | MX480 Midplane         |
| FPM Board        | REV 02  | 710-017254  | KG2066        | Front Panel Display    |
| PEM 0            | Rev 03  | 740-017330  | QCS081590BJ   | PS 1.2-1.7kW; 100-240V |
| AC in            |         |             |               |                        |
| PEM 1            | Rev 03  | 740-017330  | QCS0815908Z   | PS 1.2-1.7kW; 100-240V |
| AC in            |         |             |               |                        |
| PEM 2            | Rev 03  | 740-029970  | QCS1001U001   | PS 1.4-2.52kW; 90-264V |
| AC in            |         |             |               |                        |
| Routing Engine 0 | REV 05  | 740-031116  | 9009089502    | RE-S-1800x4            |
| Routing Engine 1 | REV 05  | 740-031116  | 9009089624    | RE-S-1800x4            |
| CB 0             | REV 02  | 750-031391  | YE8506        | Enhanced MX SCB        |
| CB 1             | REV 14  | 750-031391  | ZK8265        | Enhanced MX SCB        |
| FPC 2            | REV 05  | 750-037358  | ZT0638        | MPC4E 3D 32XGE         |
| CPU              | REV 07  | 711-035209  | ZK3187        | HMPC PMB 2G            |
| PIC 0            |         | BUILTIN     | BUILTIN       | 8X10GE SFPP            |
| PIC 1            |         | BUILTIN     | BUILTIN       | 8X10GE SFPP            |
| PIC 2            |         | BUILTIN     | BUILTIN       | 8X10GE SFPP            |
| PIC 3            |         | BUILTIN     | BUILTIN       | 8X10GE SFPP            |
| FPC 3            | REV 06  | 750-037355  | CAAB1144      | MPC4E 3D 2CGE+8XGE     |
| CPU              | REV 08  | 711-035209  | CAAB1278      | HMPC PMB 2G            |
| PIC 0            |         | BUILTIN     | BUILTIN       | 4x10GE SFPP            |
| Xcvr 0           | REV 01  | 740-031980  | B11E01439     | SFP+-10G-SR            |
| Xcvr 1           | REV 01  | 740-031980  | B11D05809     | SFP+-10G-SR            |
| PIC 1            |         | BUILTIN     | BUILTIN       | 1X100GE CFP            |

|          |             |            |                        |
|----------|-------------|------------|------------------------|
| Xcvr 0   | NON-JNPR    | D5418      | UNKNOWN                |
| PIC 2    | BUILTIN     | BUILTIN    | 4x10GE SFPP            |
| PIC 3    | BUILTIN     | BUILTIN    | 1X100GE CFP            |
| Xcvr 0   | NON-JNPR    | X12J00362  | CFP-100G-SR10          |
| FPC 4    | REV 12.3.10 | 750-033205 | YR9445                 |
| CPU      |             |            | MPCE Type 3 3D         |
| Fan Tray |             |            | Enhanced Left Fan Tray |

### show chassis hardware (MX2020 Router with MPC4E)

```
user@host> show chassis hardware
```

```
Hardware inventory:
```

| Item             | Version | Part number | Serial number | Description          |
|------------------|---------|-------------|---------------|----------------------|
| Chassis          |         |             | JN11E188CAFJ  | MX2020               |
| Midplane         | REV 04  | 711-032387  | ABAC7474      | Lower Backplane      |
| Midplane 1       | REV 04  | 711-032386  | ABAC7408      | Upper Backplane      |
| PMP 1            | REV 03  | 711-032428  | ACAJ1137      | Upper Power Midplane |
| PMP 0            | REV 03  | 711-032426  | ACAJ1016      | Lower Power Midplane |
| FPM Board        | REV 06  | 760-040242  | ABBT8832      | Front Panel Display  |
| PSM 3            | REV 0C  | 740-033727  | VK00255       | DC 52V Power Supply  |
| Module           |         |             |               |                      |
| PSM 4            | REV 0C  | 740-033727  | VJ00148       | DC 52V Power Supply  |
| Module           |         |             |               |                      |
| PSM 5            | REV 0C  | 740-033727  | VK00207       | DC 52V Power Supply  |
| Module           |         |             |               |                      |
| PSM 6            | REV 0C  | 740-033727  | VK00319       | DC 52V Power Supply  |
| Module           |         |             |               |                      |
| PSM 7            | REV 0C  | 740-033727  | VK00264       | DC 52V Power Supply  |
| Module           |         |             |               |                      |
| PSM 8            | REV 0B  | 740-033727  | VG00025       | DC 52V Power Supply  |
| Module           |         |             |               |                      |
| PSM 13           | REV 0C  | 740-033727  | VK00274       | DC 52V Power Supply  |
| Module           |         |             |               |                      |
| PSM 14           | REV 0C  | 740-033727  | VJ00167       | DC 52V Power Supply  |
| Module           |         |             |               |                      |
| PSM 15           | REV 0C  | 740-033727  | VK00299       | DC 52V Power Supply  |
| Module           |         |             |               |                      |
| PSM 16           | REV 0C  | 740-033727  | VK00213       | DC 52V Power Supply  |
| Module           |         |             |               |                      |
| PSM 17           | REV 0C  | 740-033727  | VK00253       | DC 52V Power Supply  |
| Module           |         |             |               |                      |
| PDM 0            | REV 0B  | 740-038109  | VJ00040       | DC Power Dist Module |
| PDM 2            | REV 0B  | 740-038109  | VJ00025       | DC Power Dist Module |
| Routing Engine 0 | REV 02  | 740-041821  | 9009089735    | RE-S-1800x4          |
| Routing Engine 1 | REV 02  | 740-041821  | 9009089731    | RE-S-1800x4          |
| CB 0             | REV 04  | 750-040257  | ZT2846        | Control Board        |
| CB 1             | REV 04  | 750-040257  | ZT2877        | Control Board        |
| SPMB 0           | REV 01  | 711-041855  | ZS2282        | PMB Board            |
| SPMB 1           | REV 01  | 711-041855  | ZS2261        | PMB Board            |
| SFB 0            | REV 07  | 711-032385  | ZZ2582        | Switch Fabric Board  |
| SFB 1            | REV 04  | 711-032385  | ZV4229        | Switch Fabric Board  |
| SFB 2            | REV 07  | 711-032385  | CAAB4902      | Switch Fabric Board  |
| SFB 3            | REV 07  | 711-032385  | CAAB4891      | Switch Fabric Board  |
| SFB 4            | REV 07  | 711-032385  | CAAB4883      | Switch Fabric Board  |
| SFB 5            | REV 07  | 711-032385  | CAAB4889      | Switch Fabric Board  |
| SFB 6            | REV 06  | 711-032385  | ZV1818        | Switch Fabric Board  |
| SFB 7            | REV 07  | 711-032385  | CAAB4897      | Switch Fabric Board  |
| FPC 0            | REV 34  | 750-031090  | ZT9799        | MPC Type 2 3D EQ     |
| CPU              | REV 06  | 711-030884  | ZS1122        | MPC PMB 2G           |
| MIC 0            | REV 11  | 750-033535  | CAAD7674      | MIC-3D-10C192-XFP    |
| PIC 0            |         | BUILTIN     | BUILTIN       | MIC-3D-10C192-XFP    |

|            |        |            |              |                        |
|------------|--------|------------|--------------|------------------------|
| Xcvr 0     | REV 01 | 740-014279 | 753019A00404 | XFP-OC192-SR           |
| MIC 1      | REV 14 | 750-031967 | ZM6103       | MIC-3D-80C30C12-40C48  |
| PIC 2      |        | BUILTIN    | BUILTIN      | MIC-3D-80C30C12-40C48  |
| Xcvr 0     | REV 01 | 740-011615 | PEF1AZP      | SFP-IR                 |
| Xcvr 1     | REV 01 | 740-011615 | PEF1AZN      | SFP-IR                 |
| Xcvr 2     | REV 01 | 740-021308 | ANA0N8S      | SFP+-10G-SR            |
| QXM 0      | REV 06 | 711-028408 | ZT9339       | MPC QXM                |
| QXM 1      | REV 06 | 711-028408 | ZT9237       | MPC QXM                |
| FPC 9      | REV 34 | 750-031090 | ZT9770       | MPC Type 2 3D EQ       |
| CPU        | REV 06 | 711-030884 | ZS1302       | MPC PMB 2G             |
| MIC 0      | REV 24 | 750-028387 | YJ3950       | 3D 4x 10GE XFP         |
| PIC 0      |        | BUILTIN    | BUILTIN      | 2x 10GE XFP            |
| Xcvr 0     |        | NON-JNPR   | T09M52516    | XFP-10G-SR             |
| Xcvr 1     |        | NON-JNPR   | CA49BK095    | XFP-10G-SR             |
| PIC 1      |        | BUILTIN    | BUILTIN      | 2x 10GE XFP            |
| Xcvr 0     | REV 02 | 740-014289 | C834XU01T    | XFP-10G-SR             |
| Xcvr 1     |        | NON-JNPR   | T09M52515    | XFP-10G-SR             |
| MIC 1      | REV 11 | 750-033535 | CAAD7681     | MIC-3D-10C192-XFP      |
| PIC 2      |        | BUILTIN    | BUILTIN      | MIC-3D-10C192-XFP      |
| Xcvr 0     | REV 01 | 740-014279 | KBQ02BE      | XFP-OC192-SR           |
| QXM 0      | REV 06 | 711-028408 | ZT9151       | MPC QXM                |
| QXM 1      | REV 06 | 711-028408 | ZT9116       | MPC QXM                |
| FPC 10     | REV 27 | 750-033205 | ZL6215       | MPCE Type 3 3D         |
| CPU        | REV 07 | 711-035209 | ZK9038       | HMPC PMB 2G            |
| MIC 0      | REV 18 | 750-028380 | YG6885       | 3D 2x 10GE XFP         |
| PIC 0      |        | BUILTIN    | BUILTIN      | 1x 10GE XFP            |
| Xcvr 0     | REV 01 | 740-014289 | C706XU0AG    | XFP-10G-SR             |
| PIC 1      |        | BUILTIN    | BUILTIN      | 1x 10GE XFP            |
| Xcvr 0     | REV 02 | 740-014289 | T08L84366    | XFP-10G-SR             |
| FPC 14     | REV 09 | 750-037355 | CAAF1534     | MPC4E 3D 2CGE+8XGE     |
| CPU        | REV 08 | 711-035209 | CAAB9879     | HMPC PMB 2G            |
| PIC 0      |        | BUILTIN    | BUILTIN      | 4x10GE SFPP            |
| Xcvr 0     | REV 01 | 740-021308 | 21T511100436 | SFP+-10G-SR            |
| Xcvr 1     | REV 01 | 740-031980 | AHPOGPM      | SFP+-10G-SR            |
| Xcvr 2     | REV 01 | 740-031980 | 123363A00032 | SFP+-10G-SR            |
| Xcvr 3     | REV 01 | 740-021308 | 19T511100477 | SFP+-10G-SR            |
| PIC 1      |        | BUILTIN    | BUILTIN      | 1X100GE CFP            |
| Xcvr 0     |        | NON-JNPR   | X12J00260    | CFP-100G-SR10          |
| PIC 2      |        | BUILTIN    | BUILTIN      | 4x10GE SFPP            |
| Xcvr 0     | REV 01 | 740-021308 | 21T511104086 | SFP+-10G-SR            |
| Xcvr 1     | REV 01 | 740-021308 | 21T511104627 | SFP+-10G-SR            |
| Xcvr 3     | REV 01 | 740-021308 | 21T511104644 | SFP+-10G-SR            |
| PIC 3      |        | BUILTIN    | BUILTIN      | 1X100GE CFP            |
| FPC 19     | REV 32 | 750-028467 | ZR2008       | MPC 3D 16x 10GE        |
| CPU        | REV 10 | 711-029089 | ZT6933       | AMPC PMB               |
| PIC 0      |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+      |
| Xcvr 0     | REV 01 | 740-021308 | 19T511100291 | SFP+-10G-SR            |
| Xcvr 1     | REV 01 | 740-021308 | AMH02VE      | SFP+-10G-SR            |
| PIC 1      |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+      |
| Xcvr 0     | REV 01 | 740-021308 | 23T511102128 | SFP+-10G-SR            |
| PIC 2      |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+      |
| Xcvr 0     | REV 01 | 740-021308 | AMS15PP      | SFP+-10G-SR            |
| PIC 3      |        | BUILTIN    | BUILTIN      | 4x 10GE(LAN) SFP+      |
| Xcvr 0     | REV 01 | 740-031980 | 123363A00716 | SFP+-10G-SR            |
| ADC 0      | REV 05 | 750-043596 | CAAC2072     | Adapter Card           |
| ADC 9      | REV 01 | 750-043596 | ZV4111       | Adapter Card           |
| ADC 10     | REV 05 | 750-043596 | CAAC2058     | Adapter Card           |
| ADC 14     | REV 02 | 750-043596 | ZW1561       | Adapter Card           |
| ADC 19     | REV 01 | 750-043596 | ZV4127       | Adapter Card           |
| Fan Tray 0 | REV 03 | 760-046960 | ACAY0124     | 172mm FanTray - 6 Fans |
| Fan Tray 1 | REV 2A | 760-046960 | ACAY0022     | 172mm FanTray - 6 Fans |

|            |        |            |          |                        |
|------------|--------|------------|----------|------------------------|
| Fan Tray 2 | REV 2A | 760-046960 | ACAY0023 | 172mm FanTray - 6 Fans |
| Fan Tray 3 | REV 2A | 760-046960 | ACAY0025 | 172mm FanTray - 6 Fans |

**show chassis hardware (T320 Router)**

```

user@host> show chassis hardware
Hardware inventory:
Item              Version  Part number  Serial number  Description
Chassis                               19093          T320
Midplane          REV 04    710-004339   BC1436         T320 Backplane
FPM GBUS          REV 03    710-004461   BC1407         T320 FPM Board
FPM Display       REV 04    710-002897   BE0763         FPM Display
CIP               REV 05    710-002895   BB2311         T Series CIP
PEM 0            Rev 01    740-004359   NB12546        Power Entry Module
SCG 0            REV 06    710-004455   AY4522         T320 Sonet
Clock Gen.
Routing Engine 0
CB 0              REV 13    710-002728   BC1577         unknown
Control Board
CB 1              REV 13    710-002728   BC1595         T Series
Control Board
FPC 1             REV 09    710-007531   HS1572         FPC Type 2
CPU              REV 15    710-001726   HR8763         FPC CPU
PIC 0            REV 01    750-010618   CB5579         4x G/E SFP,
1000 BASE
SFP 0            REV 01    740-007326   P5809Z1        SFP-SX
SFP 1            REV 01    740-007326   P4Q10XU        SFP-SX
SFP 2            NON-JNPR   RA45020031     SFP-SX
SFP 3            NON-JNPR   RA45020032     SFP-SX
PIC 1            REV 01    750-010618   CD9587         4x G/E SFP,
1000 BASE
SFP 0            NON-JNPR   P5A08QZ        SFP-T
SFP 1            REV 01    740-007326   P4Q133K        SFP-SX
SFP 2            REV 01    740-007326   P5809YY        SFP-SX
SFP 3            REV 01    740-007327   4C81704        SFP-LX
MMB 1            REV 03    710-005555   HR9401         MMB-288mbit
PPB 0            REV 04    710-003758   HR2886        PPB Type 2
FPC 2             REV 07    710-005860   HP2392         FPC Type 1
CPU              REV 14    710-001726   HP7797         FPC CPU
PIC 0            REV 02    750-007643   HM0853         1x G/E QPP,
1000 BASE
SFP 0            REV 01    740-007326   P11E9JJ        SFP-SX
MMB 1            REV 02    710-005555   HN2379         MMB-288mbit
PPB 0            REV 04    710-003758   HP8092        PPB Type 2
FPC 3             REV 07    710-005860   HP2393         FPC Type 1
CPU              REV 14    710-001726   HP0968         FPC CPU
PIC 0            REV 01    750-010240   CB5363         1x G/E SFP,
1000 BASE
SFP 0            REV 01    740-007326   P4R0PNH        SFP-SX
PIC 1            REV 03    750-003034   HD2832         4x OC-3 SONET,
SMIR
MMB 1            REV 02    710-005555   HN6307         MMB-288mbit
PPB 0            REV 04    710-003758   HP5051        PPB Type 2
FPC 4             REV 01    710-010845   JD3872         FPC Type 4
CPU              REV 02    710-011481   JB6042         FPC CPU
5                REV 01    710-005802   BC1566         FPC Type 2
CPU              REV 09    710-001726   AY4922         FPC CPU
PIC 0            REV 02    750-008155   BE2114         2x G/E QPP,
1000 BASE
SFP 0            REV 01    740-007326   P4R0PMQ        SFP-SX
SFP 1            REV 01    740-007326   P4R0PN9        SFP-SX

```

|           |        |            |         |             |
|-----------|--------|------------|---------|-------------|
| PIC 1     | REV 01 | 750-008155 | BE2116  | 2x G/E QPP, |
| 1000 BASE |        |            |         |             |
| SFP 0     | REV 01 | 740-007326 | P4R0PNZ | SFP-SX      |
| SFP 1     |        | NON-JNPR   | 2908    | SFP-T       |
| MMB 1     | REV 01 | 710-005555 | AZ2246  | MMB-288mbit |
| PPB 0     | REV 03 | 710-003758 | AY4839  | PPB Type 2  |
| FPC 7     | REV 01 | 710-005803 | AZ2123  | FPC Type 3  |
| ...       |        |            |         |             |

### show chassis hardware (T640 Router)

```
user@host> show chassis hardware
Hardware inventory:
```

| Item             | Version | Part number | Serial number | Description            |
|------------------|---------|-------------|---------------|------------------------|
| Chassis          |         |             | 19182         | T640                   |
| Midplane         | REV 04  | 710-002726  | AX5608        | T640 Backplane         |
| FPM GBUS         | REV 02  | 710-002901  | HE3064        | T640 FPM Board         |
| FPM Display      | REV 02  | 710-002897  | HE7864        | FPM Display            |
| CIP              | REV 05  | 710-002895  | HA5024        | T Series CIP           |
| PEM 0            | Rev 02  | 740-029522  | VH26235       | AC PEM 10kW US         |
| PEM 1            | Rev 02  | 740-029522  | VH26230       | AC PEM 10kW US         |
| SCG 0            | REV 03  | 710-003423  | HA4508        | T640 Sonet Clock Gen.  |
| Routing Engine 0 | REV 02  | 740-005022  | 210865700483  | RE-3.0 (RE-600)        |
| CB 0             | REV 01  | 710-002728  | HD3044        | T Series Control Board |
| FPC 2            | REV 04  | 710-001721  | HD5572        | FPC Type 3             |
| CPU              | REV 06  | 710-001726  | HA4712        | FPC CPU                |
| PIC 1            | REV 03  | 750-009567  | HV2331        | 1x 10GE(LAN),XENPAK    |
| SFP 0            | REV 01  | 740-009898  | USC202R103    | XENPAK-SR              |
| PIC 2            | REV 03  | 750-009567  | HV2332        | 1x 10GE(LAN),XENPAK    |
| SFP 0            | REV 01  | 740-011268  | USC202R112    | XENPAK-ZR              |
| PIC 3            | REV 03  | 750-009567  | HX4416        | 1x 10GE(LAN),XENPAK    |
| SFP 0            | REV 01  | 740-012056  | 434TC004      | XENPAK-CX4             |
| PIC 4            | REV 03  | 750-009567  | HX4420        | 1x 10GE(LAN),XENPAK    |
| SFP 0            | REV 01  | 740-012058  | 434TC124      | XENPAK-LX4             |
| FPC 5            | REV 01  | 710-013553  | JE4839        | E2-FPC Type 1          |
| CPU              | REV 01  | 710-013569  | JW9163        | FPC CPU                |
| PIC 0            | REV 01  | 750-009567  | HX4419        | 1x 10GE(LAN),XENPAK    |
| SFP 0            | REV 01  | 740-009898  | USC202RT05    | XENPAK-LR              |
| PIC 1            | REV 03  | 750-009567  | HN7426        | 1x 10GE(LAN),XENPAK    |
| SFP 0            | REV 01  | 740-009550  | 03L90051      | XENPAK-ER              |
| PIC 2            | REV 03  | 750-009467  | HT7423        | 1x 10GE(LAN),XENPAK    |
| SFP 0            |         | NON-JNPR    |               | UNKNOWN                |
| PIC 3            | REV 04  | 750-005100  | AY4850        | 1x 10GE(LAN),DWDM      |
| FPC 4            | REV 01  | 710-010845  | JD3872        | FPC Type 4             |
| CPU              | REV 02  | 710-011481  | JB6042        | FPC CPU                |
| Fan Tray 0       |         |             |               | Front Top Fan Tray     |
| Fan Tray 1       |         |             |               | Front Bottom Fan Tray  |
| Fan Tray 2       |         |             |               | Rear Fan Tray          |

### show chassis hardware models (T640 Router)

```
user@host> show chassis hardware models
Hardware inventory:
```

| Item             | Version | Part number | CLEI code | FRU model number |
|------------------|---------|-------------|-----------|------------------|
| Midplane         | REV 04  | 710-002726  |           | CHAS-BP-T640-S   |
| FPM Display      | REV 02  | 710-002897  |           | CRAFT-T640-S     |
| CIP              | REV 05  | 710-002895  |           | CIP-L-T640-S     |
| PEM 0            | Rev 01  | 740-002595  |           | PWR-T-DC-S       |
| SCG 0            | REV 04  | 710-003423  |           | SCG-T-S          |
| SCG 1            | REV 04  | 710-003423  |           | SCG-T-S          |
| Routing Engine 0 | REV 01  | 740-005022  |           | RE-600-2048-S    |

|                  |        |            |                    |
|------------------|--------|------------|--------------------|
| Routing Engine 1 | REV 07 | 740-005022 | RE-600-2048-S      |
| CB 0             | REV 06 | 710-002726 | CHAS-BP-T640-S     |
| CB 1             | REV 06 | 710-002728 | CB-L-T-S           |
| FPC 5            | REV 05 | 710-007527 | T640-FPC2          |
| PIC 0            | REV 05 | 750-002510 | PB-2GE-SX          |
| PIC 1            | REV 05 | 750-001901 | PB-40C12-SON-SMIR  |
| FPC 6            | REV 03 | 710-001721 | T640-FPC3          |
| PIC 1            | REV 01 | 750-009553 | PC-40C48-SON-SFP   |
| SIB 4            | REV 02 | 750-005486 | SIB-I-T640-S       |
| Fan Tray 0       |        |            | FANTRAY-T-S        |
| Fan Tray 1       |        |            | FANTRAY-T-S        |
| Fan Tray 2       |        |            | FAN-REAR-TX-T640-S |

### show chassis hardware extensive (T640 Router)

```

user@host> show chassis hardware extensive
Hardware inventory:
Item              Version  Part number  Serial number  Description
Chassis
Jedec Code:      0x7fb0          EEPROM Version: 0x01
P/N:             .....          S/N:           .....
Assembly ID:     0x0507          Assembly Version: 00.00
Date:           00-00-0000       Assembly Flags:  0x00
Version:         .....
ID: Gibson LCC Chassis
Board Information Record:
Address 0x00: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
I2C Hex Data:
Address 0x00: 7f b0 01 ff 05 07 00 00 00 00 00 00 00 00 00 00
Address 0x10: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Address 0x20: ff ff ff ff ff ff ff ff ff ff ff ff ff 00 00 00
Address 0x30: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Address 0x40: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Midplane          REV 04      710-002726  AX5633
Jedec Code:      0x7fb0          EEPROM Version: 0x01
P/N:             710-002726.      S/N:           S/N AX5633.
Assembly ID:     0x0127          Assembly Version: 01.04
Date:           06-27-2001       Assembly Flags:  0x00
Version:         REV 04.....
ID: Gibson Backplane
Board Information Record:
Address 0x00: ad 01 08 00 00 90 69 0e f8 00 ff ff ff ff ff ff
I2C Hex Data:
Address 0x00: 7f b0 01 ff 01 27 01 04 52 45 56 20 30 34 00 00
Address 0x10: 00 00 00 00 37 31 30 2d 30 30 32 37 32 36 00 00
Address 0x20: 53 2f 4e 20 41 58 35 36 33 33 00 00 00 1b 06 07
Address 0x30: d1 ff ff ff ad 01 08 00 00 90 69 0e f8 00 ff ff
Address 0x40: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
FPM GBUS          REV 02      710-002901  HE3245
...
FPM Display       REV 02      710-002897  HA4873
...
CIP               REV 05      710-002895  HA4729
...
PEM 1             RevX02     740-002595  MD21815      Power Entry Module
...
SCG 0             REV 04      710-003423  HF6023
...
SCG 1             REV 04      710-003423  HF6061
...
Routing Engine 0 REV 01      740-005022  210865700292 RE-3.0

```

```

...
CB 0          REV 06  710-002728  HE3614
...
FPC 1          REV 01  710-002385  HE3009          FPC Type 1
...
              REV 06  710-001726  HC0010

```

### show chassis hardware (T4000 Router)

```

user@host> show chassis hardware
Hardware inventory:
Item              Version  Part number  Serial number  Description
Chassis                               JN1172F25AHA  T4000
Midplane          REV 01  710-027486  RC8355        T-series Backplane
FPM GBUS          REV 13  710-002901  BBAE0927      T640 FPM Board
FPM Display       REV 01  710-021387  EF6764        T1600 FPM Display
CIP               REV 06  710-002895  BBAD9210      T-series CIP
PEM 0            REV 01  740-036442  VA00016       Power Entry Module 6x60
SCG 0            REV 18  710-003423  BBAD7248      T640 Sonet Clock Gen.
SCG 1            REV 18  710-003423  BBAE3874      T640 Sonet Clock Gen.
Routing Engine 0  REV 05  740-026941  P737F-002248  RE-DUO-1800
Routing Engine 1  REV 06  740-026941  P737F-002653  RE-DUO-1800
CB 0             REV 09  710-022597  ED0295        LCC Control Board
CB 1             REV 09  710-022597  EA6050        LCC Control Board
FPC 0            REV 26  750-032819  EK1173        FPC Type 5-3D
  CPU            REV 12  711-030686  EJ8584        SNG PMB
  PIC 0          REV 07  750-034624  EF6837        12x10GE (LAN/WAN) SFPP
    Xcvr 0       REV 01  740-031980  123363A01145  SFP+-10G-SR
    Xcvr 1       REV 01  740-031980  123363A01147  SFP+-10G-SR
    Xcvr 2       REV 01  740-031980  AJJ01P3       SFP+-10G-SR
    Xcvr 3       REV 01  740-031980  B10M03256     SFP+-10G-SR
    Xcvr 4       REV 01  740-031980  AJJ01M2       SFP+-10G-SR
    Xcvr 5       REV 01  740-031980  123363A01137  SFP+-10G-SR
    Xcvr 6       REV 01  740-031980  AJJ01PN       SFP+-10G-SR
    Xcvr 7       REV 01  740-031980  AJJ01NW       SFP+-10G-SR
    Xcvr 8       REV 01  740-031980  123363A01139  SFP+-10G-SR
    Xcvr 9       REV 01  740-031980  AJJ01KE       SFP+-10G-SR
    Xcvr 10      REV 01  740-031980  123363A01336  SFP+-10G-SR
    Xcvr 11      REV 01  740-031980  B10M01325     SFP+-10G-SR
  PIC 1          REV 07  750-034624  EF6800        12x10GE (LAN/WAN) SFPP
    Xcvr 0       REV 01  740-031980  AJJ01SA       SFP+-10G-SR
    Xcvr 1       REV 01  740-031980  AJJ01QZ       SFP+-10G-SR
    Xcvr 2       REV 01  740-031980  AJH0217       SFP+-10G-SR
    Xcvr 3       REV 01  740-031980  AJJ01TE       SFP+-10G-SR
    Xcvr 4       REV 01  740-031980  AJJ01KV       SFP+-10G-SR
    Xcvr 5       REV 01  740-031980  AJJ01MU       SFP+-10G-SR
    Xcvr 6       REV 01  740-031980  AJJ01R0       SFP+-10G-SR
    Xcvr 7       REV 01  740-031980  AJJ01TC       SFP+-10G-SR
    Xcvr 8       REV 01  740-031980  AJJ0364       SFP+-10G-SR
    Xcvr 9       REV 01  740-031980  AJD0GV3       SFP+-10G-SR
    Xcvr 10      REV 01  740-031980  B10M03343     SFP+-10G-SR
    Xcvr 11      REV 01  740-031980  AJJ01QJ       SFP+-10G-SR
  LMB 0          REV 05  711-034381  EJ8490        Type-0 LMB
  LMB 1          REV 04  711-035774  EJ8517        Type-1 LMB
  LMB 2          REV 05  711-034381  EJ8489        Type-0 LMB
FPC 3            REV 07  750-032819  EG3637        FPC Type 5-3D
  CPU            REV 09  711-030686  EG0150        SNG PMB
  PIC 0          REV 08  750-035293  EF3657        1x100GE
    Xcvr 0       REV 01  740-032210  C22CQNJ       CFP-100G-LR4
  PIC 1          REV 10  750-034624  BBAN4098      12x10GE (LAN/WAN) SFPP
    Xcvr 0       REV 01  740-031980  B11J04902     SFP+-10G-SR
    Xcvr 1       REV 01  740-031980  B11J04891     SFP+-10G-SR

```

|            |        |            |              |                        |
|------------|--------|------------|--------------|------------------------|
| Xcvr 2     | REV 01 | 740-031980 | AJJ01MX      | SFP+-10G-SR            |
| Xcvr 3     | REV 01 | 740-031980 | B11J04183    | SFP+-10G-SR            |
| Xcvr 4     | REV 01 | 740-031980 | B11J04894    | SFP+-10G-SR            |
| Xcvr 5     | REV 01 | 740-031980 | B11J04184    | SFP+-10G-SR            |
| Xcvr 6     | REV 01 | 740-031980 | B11J04897    | SFP+-10G-SR            |
| Xcvr 7     | REV 01 | 740-031980 | B11J04899    | SFP+-10G-SR            |
| Xcvr 8     | REV 01 | 740-031980 | AJJ01TV      | SFP+-10G-SR            |
| Xcvr 9     | REV 01 | 740-031980 | B11J04057    | SFP+-10G-SR            |
| Xcvr 10    | REV 01 | 740-031980 | AJJ01M4      | SFP+-10G-SR            |
| Xcvr 11    | REV 01 | 740-031980 | B11J04905    | SFP+-10G-SR            |
| LMB 0      | REV 04 | 711-034381 | EG1524       | Type-0 LMB             |
| LMB 1      | REV 03 | 711-035774 | EG0345       | Type-1 LMB             |
| LMB 2      | REV 04 | 711-034381 | EG1522       | Type-0 LMB             |
| FPC 5      | REV 03 | 710-033871 | BBAJ0768     | FPC Type 4-ES          |
| CPU        | REV 11 | 710-016744 | BBAH9342     | ST-PMB2                |
| PIC 0      | REV 09 | 750-029262 | EE6789       | 100GE                  |
| PIC 1      | REV 03 | 750-034781 | EE6655       | 100GE CFP              |
| Xcvr 0     | REV 01 | 740-032210 | J11A22334    | CFP-100G-LR4           |
| BRIDGE 0   | REV 03 | 711-029995 | EE6572       | 100GE Bridge Board     |
| MMB 0      | REV 07 | 710-025563 | BBAJ4657     | ST-MMB2                |
| MMB 1      | REV 07 | 710-025563 | BBAJ3073     | ST-MMB2                |
| FPC 6      | REV 05 | 750-010153 | EF4936       | FPC Type 5-3D          |
| CPU        | REV 06 | 711-030686 | EF4189       | SNG PMB                |
| PIC 0      | REV 10 | 750-034624 | BBAN4109     | 12x10GE (LAN/WAN) SFPP |
| Xcvr 0     | REV 01 | 740-031980 | B11J04895    | SFP+-10G-SR            |
| Xcvr 1     | REV 01 | 740-031980 | B11J04898    | SFP+-10G-SR            |
| Xcvr 2     | REV 01 | 740-031980 | B11J04021    | SFP+-10G-SR            |
| Xcvr 3     | REV 01 | 740-031980 | B11J04903    | SFP+-10G-SR            |
| Xcvr 4     | REV 01 | 740-031980 | B11J04311    | SFP+-10G-SR            |
| Xcvr 5     | REV 01 | 740-031980 | B11J04059    | SFP+-10G-SR            |
| Xcvr 6     | REV 01 | 740-031980 | B11J04016    | SFP+-10G-SR            |
| Xcvr 7     | REV 01 | 740-031980 | B11J04017    | SFP+-10G-SR            |
| Xcvr 8     | REV 01 | 740-031980 | B11J04887    | SFP+-10G-SR            |
| Xcvr 9     | REV 01 | 740-031980 | B11J04297    | SFP+-10G-SR            |
| Xcvr 10    | REV 01 | 740-031980 | B11J04893    | SFP+-10G-SR            |
| Xcvr 11    | REV 01 | 740-031980 | B11J04022    | SFP+-10G-SR            |
| PIC 1      | REV 02 | 750-034624 | EE3711       | 12x10GE (LAN/WAN) SFPP |
| Xcvr 0     | REV 01 | 740-031980 | AJH033X      | SFP+-10G-SR            |
| Xcvr 1     | REV 01 | 740-031980 | AJJ01N0      | SFP+-10G-SR            |
| Xcvr 2     | REV 01 | 740-031980 | AJJ01SV      | SFP+-10G-SR            |
| Xcvr 3     | REV 01 | 740-031980 | AJJ032L      | SFP+-10G-SR            |
| Xcvr 4     | REV 01 | 740-031980 | B10M01593    | SFP+-10G-SR            |
| Xcvr 5     | REV 01 | 740-031980 | AJD0FF1      | SFP+-10G-SR            |
| Xcvr 6     | REV 01 | 740-031980 | AJJ01NU      | SFP+-10G-SR            |
| Xcvr 7     | REV 01 | 740-031980 | 123363A01305 | SFP+-10G-SR            |
| Xcvr 8     | REV 01 | 740-031980 | B10M00361    | SFP+-10G-SR            |
| Xcvr 9     | REV 01 | 740-031980 | AJJ01M7      | SFP+-10G-SR            |
| Xcvr 10    | REV 01 | 740-031980 | AJJ032X      | SFP+-10G-SR            |
| Xcvr 11    | REV 01 | 740-031980 | AJJ01PG      | SFP+-10G-SR            |
| LMB 0      | REV 04 | 711-034381 | EF3838       | Type-0 LMB             |
| LMB 1      | REV 03 | 711-035774 | EF3821       | Type-1 LMB             |
| LMB 2      | REV 04 | 711-034381 | EF3834       | Type-0 LMB             |
| SPMB 0     | REV 05 | 710-023321 | ED1990       | LCC Switch CPU         |
| SPMB 1     | REV 05 | 710-023321 | EA2768       | LCC Switch CPU         |
| SIB 0      | REV 02 | 711-036340 | EF8802       | SIB-HC-3D              |
| SIB 1      | REV 07 | 711-036340 | EG2286       | SIB-HC-3D              |
| SIB 2      | REV 07 | 711-036340 | EG2252       | SIB-HC-3D              |
| SIB 3      | REV 02 | 711-036340 | EF1358       | SIB-HC-3D              |
| SIB 4      | REV 02 | 711-036340 | EF8806       | SIB-HC-3D              |
| Fan Tray 0 |        |            |              | Front Top Fan Tray     |
| Fan Tray 1 |        |            |              | Front Bottom Fan Tray  |



-- Rev 2  
Fan Tray 2

Rear Fan Tray -- Rev 3

### show chassis hardware (T4000 Router with 16 GB line card chassis (LCC) Routing Engine)

```
user@host> show chassis hardware
Hardware inventory:
Item             Version  Part number  Serial number  Description
Chassis          REV 01   710-027486   JN11BDF2CAHA   T1600
Midplane         REV 01   710-027486   ACAJ0774       T640 Backplane
FPM GBUS         REV 13   710-002901   BBAL6812       T640 FPM Board
FPM Display      REV 04   710-021387   BBAP2679       T1600 FPM Display
CIP              REV 06   710-002895   BBAP4758       T-series CIP
PEM 0            Rev 03   740-026384   XF86421        Power Entry Module 3x80
PEM 1            Rev 03   740-026384   XF86429        Power Entry Module 3x80
SCG 0            REV 18   710-003423   BBAP1896       T640 Sonet Clock Gen.
SCG 1            REV 18   710-003423   BBAN8659       T640 Sonet Clock Gen.
Routing Engine 0 REV 01   740-042243   737F-002238    RE-DUO-1800-16G
Routing Engine 1 REV 01   740-042243   737F-002403    RE-DUO-1800-16G
CB 1             REV 11   710-022597   EK4526         LCC Control Board
CB 1             REV 11   710-022597   EK4527         LCC Control Board
FPC 0            REV 05   710-033871   EK5644         FPC Type 4-ES
CPU              REV 11   710-016744   EK3428         ST-PMB2
PIC 0            REV 20   750-017405   EJ3041         4x 10GE (LAN/WAN) XFP
PIC 1            REV 17   750-026962   EH7536         10x10GE(LAN/WAN) SFPP
MMB 0            REV 07   710-025563   EK6039         ST-MMB2
MMB 1            REV 07   710-025563   EK6086         ST-MMB2
FPC 1            REV 05   710-033871   EK6583         FPC Type 4-ES
CPU              REV 11   710-016744   EK3401         ST-PMB2
PIC 0            REV 17   750-026962   EJ8948         10x10GE(LAN/WAN) SFPP
MMB 0            REV 07   710-025563   EK6202         ST-MMB2
MMB 1            REV 07   710-025563   EK6112         ST-MMB2
SPMB 1           REV 05   710-023321   EK4900         LCC Switch CPU
SIB 0            REV 11   710-013074   EK5958         SIB-I8-SF
SIB 1            REV 11   710-013074   EK4606         SIB-I8-SF
SIB 2            REV 11   710-013074   EK5971         SIB-I8-SF
SIB 3            REV 11   710-013074   EK4609         SIB-I8-SF
SIB 4            REV 11   710-013074   EK4602         SIB-I8-SF
Fan Tray 0       Front Top Fan Tray
Fan Tray 1       Front Bottom Fan Tray
Fan Tray 2       Rear Fan Tray -- Rev 2
```

### show chassis hardware (T4000 Router with LSR FPC)

```
user@switch> show chassis hardware
Hardware inventory:
Item             Version  Part number  Serial number  Description
Chassis          REV 01   750-048373   JN1173A24AHA   T4000
FPC 3            REV 01   711-030686   AN7797         FPC Type 5-LSR
CPU              REV 10   711-030686   AN6649         SNG PMB
PIC 0            REV 07   750-034624   EF6830         12x10GE (LAN/WAN) SFPP
```

### show chassis hardware clei-models (T4000 Router)

```
user@host> show chassis hardware clei-models
Hardware inventory:
Item             Version  Part number  CLEI code      FRU model number
Midplane         REV 01   710-027486   IPMJ700DRD     CHAS-BP-T1600-S
FPM Display      REV 01   710-021387   CRAFT-T1600-S  CRAFT-T1600-S
CIP              REV 06   710-002895   CIP-L-T640-S   CIP-L-T640-S
PEM 0            REV 01   740-036442   IPUPAG6KAA     PWR-T-6-60-DC
SCG 0            REV 18   710-003423   SCG-T-S        SCG-T-S
```

|                  |        |            |            |                   |
|------------------|--------|------------|------------|-------------------|
| SCG 1            | REV 18 | 710-003423 |            | SCG-T-S           |
| Routing Engine 0 | REV 05 | 740-026941 |            | RE-DUO-C1800-8G-S |
| Routing Engine 1 | REV 06 | 740-026941 |            | RE-DUO-C1800-8G-S |
| CB 0             | REV 09 | 710-022597 |            | CB-LCC-S          |
| CB 1             | REV 09 | 710-022597 |            | CB-LCC-S          |
| FPC 3            |        |            |            |                   |
| PIC 0            | REV 08 | 750-035293 | XXXXXXXXBB | PF-1CGE-CFP       |
| PIC 1            | REV 10 | 750-034624 | XXXXXXXXCC | PF-12XGE-SFPP     |
| FPC 5            | REV 03 | 710-033871 | IPUCAMBCTD | T1600-FPC4-ES     |
| PIC 1            | REV 03 | 750-034781 | IPUIBKLMMA | PD-1CE-CFP-FPC4   |
| FPC 6            |        |            |            |                   |
| PIC 0            | REV 10 | 750-034624 | XXXXXXXXCC | PF-12XGE-SFPP     |
| Fan Tray 0       |        |            |            | FANTRAY-T-S       |
| Fan Tray 1       |        |            |            | FANTRAY-T4000-S   |
| Fan Tray 2       |        |            |            | FANTRAY-TXP-R-S   |

### show chassis hardware detail (T4000 Router)

```

user@host> show chassis hardware detail
Hardware inventory:
Item          Version  Part number  Serial number  Description
Chassis                               JN1172F25AHA  T4000
Midplane      REV 01    710-027486   RC8355        T-series Backplane
FPM GBUS      REV 13    710-002901   BBAE0927      T640 FPM Board
FPM Display   REV 01    710-021387   EF6764        T1600 FPM Display
CIP           REV 06    710-002895   BBAD9210      T-series CIP
PEM 0         REV 01    740-036442   VA00016       Power Entry Module 6x60
SCG 0         REV 18    710-003423   BBAD7248      T640 Sonet Clock Gen.
SCG 1         REV 18    710-003423   BBAE3874      T640 Sonet Clock Gen.
Routing Engine 0 REV 05    740-026941   P737F-002248  RE-DUO-1800
  ad0 3823 MB SMART CF      2009121602A661576157 Compact Flash
  ad1 59690 MB STEC MACH-8 SSD STM000103FDB   Disk 1
Routing Engine 1 REV 06    740-026941   P737F-002653  RE-DUO-1800
  ad0 3823 MB SMART CF      201011150153F52CF52C Compact Flash
  ad1 62720 MB SMART Lite SATA Drive 2010110900150A880A88 Disk 1
CB 0          REV 09    710-022597   ED0295        LCC Control Board
CB 1          REV 09    710-022597   EA6050        LCC Control Board
FPC 0         REV 26    750-032819   EK1173        FPC Type 5-3D
CPU          REV 12    711-030686   EJ8584        SNG PMB
PIC 0         REV 07    750-034624   EF6837        12x10GE (LAN/WAN) SFPP
  Xcvr 0      REV 01    740-031980   123363A01145  SFP+-10G-SR
  Xcvr 1      REV 01    740-031980   123363A01147  SFP+-10G-SR
  Xcvr 2      REV 01    740-031980   AJJ01P3       SFP+-10G-SR
  Xcvr 3      REV 01    740-031980   B10M03256     SFP+-10G-SR
  Xcvr 4      REV 01    740-031980   AJJ01M2       SFP+-10G-SR
  Xcvr 5      REV 01    740-031980   123363A01137  SFP+-10G-SR
  Xcvr 6      REV 01    740-031980   AJJ01PN       SFP+-10G-SR
  Xcvr 7      REV 01    740-031980   AJJ01NW       SFP+-10G-SR
  Xcvr 8      REV 01    740-031980   123363A01139  SFP+-10G-SR
  Xcvr 9      REV 01    740-031980   AJJ01KE       SFP+-10G-SR
  Xcvr 10     REV 01    740-031980   123363A01336  SFP+-10G-SR
  Xcvr 11     REV 01    740-031980   B10M01325     SFP+-10G-SR
PIC 1         REV 07    750-034624   EF6800        12x10GE (LAN/WAN) SFPP
  Xcvr 0      REV 01    740-031980   AJJ01SA       SFP+-10G-SR
  Xcvr 1      REV 01    740-031980   AJJ01QZ       SFP+-10G-SR
  Xcvr 2      REV 01    740-031980   AJH0217       SFP+-10G-SR
  Xcvr 3      REV 01    740-031980   AJJ01TE       SFP+-10G-SR
  Xcvr 4      REV 01    740-031980   AJJ01KV       SFP+-10G-SR
  Xcvr 5      REV 01    740-031980   AJJ01MU       SFP+-10G-SR
  Xcvr 6      REV 01    740-031980   AJJ01R0       SFP+-10G-SR
  Xcvr 7      REV 01    740-031980   AJJ01TC       SFP+-10G-SR

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|          |        |            |              |                        |
|----------|--------|------------|--------------|------------------------|
| Xcvr 8   | REV 01 | 740-031980 | AJJ0364      | SFP+-10G-SR            |
| Xcvr 9   | REV 01 | 740-031980 | AJD0GV3      | SFP+-10G-SR            |
| Xcvr 10  | REV 01 | 740-031980 | B10M03343    | SFP+-10G-SR            |
| Xcvr 11  | REV 01 | 740-031980 | AJJ01QJ      | SFP+-10G-SR            |
| LMB 0    | REV 05 | 711-034381 | EJ8490       | Type-0 LMB             |
| LMB 1    | REV 04 | 711-035774 | EJ8517       | Type-1 LMB             |
| LMB 2    | REV 05 | 711-034381 | EJ8489       | Type-0 LMB             |
| FPC 3    | REV 07 | 750-032819 | EG3637       | FPC Type 5-3D          |
| CPU      | REV 09 | 711-030686 | EG0150       | SNG PMB                |
| PIC 0    | REV 08 | 750-035293 | EF3657       | 1x100GE                |
| Xcvr 0   | REV 01 | 740-032210 | C22CQNJ      | CFP-100G-LR4           |
| PIC 1    | REV 10 | 750-034624 | BBAN4098     | 12x10GE (LAN/WAN) SFPP |
| Xcvr 0   | REV 01 | 740-031980 | B11J04902    | SFP+-10G-SR            |
| Xcvr 1   | REV 01 | 740-031980 | B11J04891    | SFP+-10G-SR            |
| Xcvr 2   | REV 01 | 740-031980 | AJJ01MX      | SFP+-10G-SR            |
| Xcvr 3   | REV 01 | 740-031980 | B11J04183    | SFP+-10G-SR            |
| Xcvr 4   | REV 01 | 740-031980 | B11J04894    | SFP+-10G-SR            |
| Xcvr 5   | REV 01 | 740-031980 | B11J04184    | SFP+-10G-SR            |
| Xcvr 6   | REV 01 | 740-031980 | B11J04897    | SFP+-10G-SR            |
| Xcvr 7   | REV 01 | 740-031980 | B11J04899    | SFP+-10G-SR            |
| Xcvr 8   | REV 01 | 740-031980 | AJJ01TV      | SFP+-10G-SR            |
| Xcvr 9   | REV 01 | 740-031980 | B11J04057    | SFP+-10G-SR            |
| Xcvr 10  | REV 01 | 740-031980 | AJJ01M4      | SFP+-10G-SR            |
| Xcvr 11  | REV 01 | 740-031980 | B11J04905    | SFP+-10G-SR            |
| LMB 0    | REV 04 | 711-034381 | EG1524       | Type-0 LMB             |
| LMB 1    | REV 03 | 711-035774 | EG0345       | Type-1 LMB             |
| LMB 2    | REV 04 | 711-034381 | EG1522       | Type-0 LMB             |
| FPC 5    | REV 03 | 710-033871 | BBAJ0768     | FPC Type 4-ES          |
| CPU      | REV 11 | 710-016744 | BBAH9342     | ST-PMB2                |
| PIC 0    | REV 09 | 750-029262 | EE6789       | 100GE                  |
| PIC 1    | REV 03 | 750-034781 | EE6655       | 100GE CFP              |
| Xcvr 0   | REV 01 | 740-032210 | J11A22334    | CFP-100G-LR4           |
| BRIDGE 0 | REV 03 | 711-029995 | EE6572       | 100GE Bridge Board     |
| MMB 0    | REV 07 | 710-025563 | BBAJ4657     | ST-MMB2                |
| MMB 1    | REV 07 | 710-025563 | BBAJ3073     | ST-MMB2                |
| FPC 6    | REV 05 | 750-010153 | EF4936       | FPC Type 5-3D          |
| CPU      | REV 06 | 711-030686 | EF4189       | SNG PMB                |
| PIC 0    | REV 10 | 750-034624 | BBAN4109     | 12x10GE (LAN/WAN) SFPP |
| Xcvr 0   | REV 01 | 740-031980 | B11J04895    | SFP+-10G-SR            |
| Xcvr 1   | REV 01 | 740-031980 | B11J04898    | SFP+-10G-SR            |
| Xcvr 2   | REV 01 | 740-031980 | B11J04021    | SFP+-10G-SR            |
| Xcvr 3   | REV 01 | 740-031980 | B11J04903    | SFP+-10G-SR            |
| Xcvr 4   | REV 01 | 740-031980 | B11J04311    | SFP+-10G-SR            |
| Xcvr 5   | REV 01 | 740-031980 | B11J04059    | SFP+-10G-SR            |
| Xcvr 6   | REV 01 | 740-031980 | B11J04016    | SFP+-10G-SR            |
| Xcvr 7   | REV 01 | 740-031980 | B11J04017    | SFP+-10G-SR            |
| Xcvr 8   | REV 01 | 740-031980 | B11J04887    | SFP+-10G-SR            |
| Xcvr 9   | REV 01 | 740-031980 | B11J04297    | SFP+-10G-SR            |
| Xcvr 10  | REV 01 | 740-031980 | B11J04893    | SFP+-10G-SR            |
| Xcvr 11  | REV 01 | 740-031980 | B11J04022    | SFP+-10G-SR            |
| PIC 1    | REV 02 | 750-034624 | EE3711       | 12x10GE (LAN/WAN) SFPP |
| Xcvr 0   | REV 01 | 740-031980 | AJH033X      | SFP+-10G-SR            |
| Xcvr 1   | REV 01 | 740-031980 | AJJ01N0      | SFP+-10G-SR            |
| Xcvr 2   | REV 01 | 740-031980 | AJJ01SV      | SFP+-10G-SR            |
| Xcvr 3   | REV 01 | 740-031980 | AJJ032L      | SFP+-10G-SR            |
| Xcvr 4   | REV 01 | 740-031980 | B10M01593    | SFP+-10G-SR            |
| Xcvr 5   | REV 01 | 740-031980 | AJD0FF1      | SFP+-10G-SR            |
| Xcvr 6   | REV 01 | 740-031980 | AJJ01NU      | SFP+-10G-SR            |
| Xcvr 7   | REV 01 | 740-031980 | 123363A01305 | SFP+-10G-SR            |
| Xcvr 8   | REV 01 | 740-031980 | B10M00361    | SFP+-10G-SR            |
| Xcvr 9   | REV 01 | 740-031980 | AJJ01M7      | SFP+-10G-SR            |

|            |        |            |         |                        |
|------------|--------|------------|---------|------------------------|
| Xcvr 10    | REV 01 | 740-031980 | AJJ032X | SFP+-10G-SR            |
| Xcvr 11    | REV 01 | 740-031980 | AJJ01PG | SFP+-10G-SR            |
| LMB 0      | REV 04 | 711-034381 | EF3838  | Type-0 LMB             |
| LMB 1      | REV 03 | 711-035774 | EF3821  | Type-1 LMB             |
| LMB 2      | REV 04 | 711-034381 | EF3834  | Type-0 LMB             |
| SPMB 0     | REV 05 | 710-023321 | ED1990  | LCC Switch CPU         |
| SPMB 1     | REV 05 | 710-023321 | EA2768  | LCC Switch CPU         |
| SIB 0      | REV 02 | 711-036340 | EF8802  | SIB-HC-3D              |
| SIB 1      | REV 07 | 711-036340 | EG2286  | SIB-HC-3D              |
| SIB 2      | REV 07 | 711-036340 | EG2252  | SIB-HC-3D              |
| SIB 3      | REV 02 | 711-036340 | EF1358  | SIB-HC-3D              |
| SIB 4      | REV 02 | 711-036340 | EF8806  | SIB-HC-3D              |
| Fan Tray 0 |        |            |         | Front Top Fan Tray     |
| Fan Tray 1 |        |            |         | Front Bottom Fan Tray  |
| -- Rev 2   |        |            |         |                        |
| Fan Tray 2 |        |            |         | Rear Fan Tray -- Rev 3 |

### show chassis hardware models (T4000 Router)

user@host> show chassis hardware models

Hardware inventory:

| Item             | Version | Part number | Serial number | FRU model number  |
|------------------|---------|-------------|---------------|-------------------|
| Midplane         | REV 01  | 710-027486  | RC8355        | CHAS-BP-T1600-S   |
| FPM Display      | REV 01  | 710-021387  | EF6764        | CRAFT-T1600-S     |
| CIP              | REV 06  | 710-002895  | BBAD9210      | CIP-L-T640-S      |
| PEM 0            | REV 01  | 740-036442  | VA00016       | PWR-T-6-60-DC     |
| SCG 0            | REV 18  | 710-003423  | BBAD7248      | SCG-T-S           |
| SCG 1            | REV 18  | 710-003423  | BBAE3874      | SCG-T-S           |
| Routing Engine 0 | REV 05  | 740-026941  | P737F-002248  | RE-DUO-C1800-8G-S |
| Routing Engine 1 | REV 06  | 740-026941  | P737F-002653  | RE-DUO-C1800-8G-S |
| CB 0             | REV 09  | 710-022597  | ED0295        | CB-LCC-S          |
| CB 1             | REV 09  | 710-022597  | EA6050        | CB-LCC-S          |
| FPC 3            |         |             |               |                   |
| PIC 0            | REV 08  | 750-035293  | EF3657        | PF-1CGE-CFP       |
| PIC 1            | REV 10  | 750-034624  | BBAN4098      | PF-12XGE-SFPP     |
| FPC 5            | REV 03  | 710-033871  | BBAJ0768      | T1600-FPC4-ES     |
| PIC 1            | REV 03  | 750-034781  | EE6655        | PD-1CE-CFP-FPC4   |
| FPC 6            |         |             |               |                   |
| PIC 0            | REV 10  | 750-034624  | BBAN4109      | PF-12XGE-SFPP     |
| Fan Tray 0       |         |             |               | FANTRAY-T-S       |
| Fan Tray 1       |         |             |               | FANTRAY-T4000-S   |
| Fan Tray 2       |         |             |               | FAN-REAR-TXP-LCC  |

### show chassis hardware lcc (TX Matrix Router)

user@host> show chassis hardware lcc 0

lcc0-re0:

Hardware inventory:

| Item             | Version | Part number | Serial number | Description           |
|------------------|---------|-------------|---------------|-----------------------|
| Chassis          |         |             | 65751         | T640                  |
| Midplane         | REV 03  | 710-005608  | RA1408        | T640 Backplane        |
| FPM GBUS         | REV 09  | 710-002901  | RA2784        | T640 FPM Board        |
| FPM Display      | REV 05  | 710-002897  | RA2825        | FPM Display           |
| CIP              | REV 06  | 710-002895  | HT0684        | T Series CIP          |
| PEM 0            | Rev 11  | 740-002595  | PM18483       | Power Entry Module    |
| PEM 1            | Rev 11  | 740-002595  | qb13984       | Power Entry Module    |
| SCG 0            | REV 11  | 710-003423  | HT0022        | T640 Sonet Clock Gen. |
| Routing Engine 0 | REV 13  | 740-005022  | 210865700363  | RE-3.0 (RE-600)       |
| CB 0             | REV 03  | 710-007655  | HW1195        | Control Board (CB-T)  |

|         |        |            |            |                         |
|---------|--------|------------|------------|-------------------------|
| FPC 1   | REV 05 | 710-007527 | HM3245     | FPC Type 2              |
| CPU     | REV 14 | 710-001726 | HM1084     | FPC CPU                 |
| PIC 0   | REV 02 | 750-007218 | AZ1112     | 2x OC-12 ATM2 IQ, SMIR  |
| PIC 1   | REV 02 | 750-007745 | HG3462     | 4x OC-3 SONET, SMIR     |
| PIC 2   | REV 14 | 750-001901 | BA5390     | 4x OC-12 SONET, SMIR    |
| PIC 3   | REV 09 | 750-008155 | HS3012     | 2x G/E IQ, 1000 BASE    |
| SFP 0   |        | NON-JNPR   | P1186TY    | SFP-S                   |
| SFP 1   | REV 01 | 740-007326 | P11WLTF    | SFP-SX                  |
| MMB 1   | REV 02 | 710-005555 | HL7514     | MMB-288mbit             |
| PPB 0   | REV 04 | 710-003758 | HM4405     | PPB Type 2              |
| PPB 1   | REV 04 | 710-003758 | AV1960     | PPB Type 2              |
| FPC 2   | REV 08 | 710-010154 | HZ3578     | E-FPC Type 3            |
| CPU     | REV 05 | 710-010169 | HZ3219     | FPC CPU-Enhanced        |
| PIC 0   | REV 02 | 750-009567 | HX2882     | 1x 10GE(LAN), XENPAK    |
| SFP 0   | REV 01 | 740-009898 | USC202U709 | XENPAK-LR               |
| PIC 1   | REV 03 | 750-003336 | HJ9954     | 4x OC-48 SONET, SMSR    |
| PIC 2   | REV 01 | 750-004535 | HC0235     | 1x OC-192 SM SR1        |
| PIC 3   | REV 07 | 750-007141 | HX1699     | 10x 1GE(LAN), 1000 BASE |
| SFP 0   | REV 01 | 740-007326 | 2441042    | SFP-SX                  |
| SFP 1   | REV 01 | 740-007326 | 2441027    | SFP-SX                  |
| MMB 0   | REV 03 | 710-010171 | HV2365     | MMB-5M3-288mbit         |
| MMB 1   | REV 03 | 710-010171 | HZ3888     | MMB-5M3-288mbit         |
| SPMB 0  | REV 09 | 710-003229 | HW5245     | T Series Switch CPU     |
| SIB 3   | REV 07 | 710-005781 | HR5927     | SIB-L8-F16              |
| B Board | REV 06 | 710-005782 | HR5971     | SIB-L8-F16 (B)          |
| SIB 4   | REV 07 | 710-005781 | HR5903     | SIB-L8-F16              |
| B Board | REV 06 | 710-005782 | HZ5275     | SIB-L8-F16 (B)          |

#### show chassis hardware scc (TX Matrix Router)

```
user@host> show chassis hardware scc
scc-re0:
```

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```

| Hardware inventory: |         |             |               |                       |
|---------------------|---------|-------------|---------------|-----------------------|
| Item                | Version | Part number | Serial number | Description           |
| Chassis             |         |             |               | TX Matrix             |
| Midplane            | REV 04  | 710-004396  | RB0014        | SCC Midplane          |
| FPM GBUS            | REV 04  | 710-004617  | HW9141        | SCC FPM Board         |
| FPM Display         | REV 04  | 710-004619  | HS5950        | SCC FPM               |
| CIP 0               | REV 01  | 710-010218  | HV9151        | SCC CIP               |
| CIP 1               | REV 01  | 710-010218  | HV9152        | SCC CIP               |
| PEM 1               | Rev 11  | 740-002595  | QB13977       | Power Entry Module    |
| Routing Engine 0    | REV 05  | 740-008883  | P11123900153  | RE-4.0 (RE-1600)      |
| CB 0                | REV 01  | 710-011709  | HR5964        | Control Board (CB-TX) |
| SPMB 0              | REV 09  | 710-003229  | HW5293        | T Series Switch CPU   |
| SIB 3               |         |             |               |                       |
| SIB 4               | REV 01  | 710-005839  | HW1177        | SIB-S8-F16            |
| B Board             | REV 01  | 710-005840  | HW1202        | SIB-S8-F16 (B)        |

#### show chassis hardware (T1600 Router)

```
user@host> show chassis hardware
```

```
Hardware inventory:
```

| Item        | Version | Part number | Serial number | Description             |
|-------------|---------|-------------|---------------|-------------------------|
| Chassis     |         |             | B2703         | T1600                   |
| Midplane    | REV 03  | 710-005608  | RC4137        | T640 Backplane          |
| FPM GBUS    | REV 10  | 710-002901  | DT7062        | T640 FPM Board          |
| FPM Display | REV 05  | 710-002897  | DS3067        | FPM Display             |
| CIP         | REV 06  | 710-002895  | DT3386        | T-series CIP            |
| PEM 0       | Rev 07  | 740-017906  | UA26344       | Power Entry Module 3x80 |

|                  |        |            |             |                          |
|------------------|--------|------------|-------------|--------------------------|
| PEM 1            | Rev 18 | 740-002595 | UF38441     | Power Entry Module       |
| SCG 0            | REV 15 | 710-003423 | DV0941      | T640 Sonet Clock Gen.    |
| Routing Engine 0 | REV 08 | 740-014082 | 9009014502  | RE-A-2000                |
| Routing Engine 1 | REV 07 | 740-014082 | 9009009591  | RE-A-2000                |
| CB 0             | REV 05 | 710-007655 | JA9360      | Control Board (CB-T)     |
| CB 1             | REV 03 | 710-017707 | DT3251      | Control Board (CB-T)     |
| FPC 0            | REV 07 | 710-013558 | DR4253      | E2-FPC Type 2            |
| CPU              | REV 05 | 710-013563 | DS3902      | FPC CPU-Enhanced         |
| PIC 0            | REV 01 | 750-010618 | CB5446      | 4x G/E SFP, 1000 BASE    |
| Xcvr 0           | REV 01 | 740-011613 | P9F11CW     | SFP-SX                   |
| Xcvr 1           | REV 01 | 740-011613 | P9F15C2     | SFP-SX                   |
| Xcvr 2           | REV 01 | 740-011782 | PB94K0L     | SFP-SX                   |
| PIC 1            | REV 06 | 750-001900 | HB6399      | 1x OC-48 SONET, SMSR     |
| PIC 2            | REV 14 | 750-001901 | AP1092      | 4x OC-12 SONET, SMIR     |
| PIC 3            | REV 07 | 750-001900 | AR8275      | 1x OC-48 SONET, SMSR     |
| MMB 1            | REV 07 | 710-010171 | DS1524      | MMB-5M3-288mbit          |
| FPC 1            | REV 06 | 710-013553 | DL9067      | E2-FPC Type 1            |
| CPU              | REV 04 | 710-013563 | DM1685      | FPC CPU-Enhanced         |
| PIC 0            | REV 08 | 750-001072 | AB1688      | 1x G/E, 1000 BASE-SX     |
| PIC 1            | REV 10 | 750-012266 | JX5519      | 4x 1GE(LAN), IQ2         |
| Xcvr 0           | REV 01 | 740-011613 | AM0812S8UK6 | SFP-SX                   |
| Xcvr 2           | REV 01 | 740-011613 | AM0812S8UK1 | SFP-SX                   |
| Xcvr 3           | REV 01 | 740-011782 | P8N1YHG     | SFP-SX                   |
| PIC 2            | REV 22 | 750-005634 | DP0083      | 1x CHOC12 IQ SONET, SMIR |
| MMB 1            | REV 07 | 710-008923 | DN1862      | MMB 3M 288-bit           |
| FPC 2            | REV 01 | 710-005548 | HJ9899      | FPC Type 3               |
| CPU              | REV 06 | 710-001726 | HC0586      | FPC CPU                  |
| PIC 0            | REV 16 | 750-007141 | NC9660      | 10x 1GE(LAN), 1000 BASE  |
| Xcvr 0           | REV 01 | 740-011613 | AM0812S8XAR | SFP-SX                   |
| Xcvr 1           | REV 01 | 740-011782 | P920E7B     | SFP-SX                   |
| Xcvr 2           | REV 01 | 740-011613 | AM0812S8XAU | SFP-SX                   |
| Xcvr 4           | REV 01 | 740-011613 | AM0812S8XAK | SFP-SX                   |
| Xcvr 5           | REV 01 | 740-011613 | AM0812S8XAA | SFP-SX                   |
| Xcvr 6           | REV 01 | 740-011613 | PAJ4NKY     | SFP-SX                   |
| Xcvr 7           | REV 01 | 740-011613 | AM0812S8UJW | SFP-SX                   |
| Xcvr 8           | REV 01 | 740-011782 | PB81X89     | SFP-SX                   |
| Xcvr 9           | REV 01 | 740-011613 | AM0812S8UJX | SFP-SX                   |
| PIC 1            | REV 06 | 750-015217 | DK3280      | 8x 1GE(TYPE3), IQ2       |
| Xcvr 0           | REV 01 | 740-011782 | P8P0A3T     | SFP-SX                   |
| Xcvr 1           | REV 01 | 740-013111 | 5090002     | SFP-T                    |
| Xcvr 2           | REV 01 | 740-011613 | AM0814S93BQ | SFP-SX                   |
| Xcvr 4           |        | NON-JNPR   | PDE0FAN     | SFP-SX                   |
| Xcvr 5           | REV 01 | 740-011782 | P8Q20XY     | SFP-SX                   |
| Xcvr 6           | REV 01 | 740-011613 | AM0812S8UJV | SFP-SX                   |
| Xcvr 7           | REV 01 | 740-011613 | AM0812S8UP7 | SFP-SX                   |
| PIC 2            | REV 05 | 750-004695 | HT4383      | 1x Tunnel                |
| PIC 3            | REV 17 | 750-009553 | RL0204      | 4x OC-48 SONET           |
| Xcvr 0           | REV 01 | 740-011785 | PDS3T23     | SFP-SR                   |
| Xcvr 1           | REV 01 | 740-011785 | P6Q0F3E     | SFP-SR                   |
| MMB 0            | REV 03 | 710-004047 | HD5843      | MMB-288mbit              |
| MMB 1            | REV 03 | 710-004047 | HE3208      | MMB-288mbit              |
| PPB 0            | REV 02 | 710-002845 | HA4524      | PPB Type 3               |
| PPB 1            | REV 02 | 710-002845 | HA4766      | PPB Type 3               |
| FPC 3            | REV 01 | 710-010154 | HR0863      | E-FPC Type 3             |
| CPU              | REV 01 | 710-010169 | HN3422      | FPC CPU-Enhanced         |
| PIC 0            | REV 07 | 750-012793 | WF5096      | 1x 10GE(LAN/WAN) IQ2     |
| Xcvr 0           |        | NON-JNPR   | M64294TP    | XFP-10G-LR               |
| PIC 1            | REV 25 | 750-007141 | DV2127      | 10x 1GE(LAN), 1000 BASE  |

|          |        |            |             |                       |
|----------|--------|------------|-------------|-----------------------|
| Xcvr 0   | REV 01 | 740-011613 | PFA6LTJ     | SFP-SX                |
| Xcvr 1   | REV 01 | 740-011782 | P9POXV4     | SFP-SX                |
| Xcvr 2   | REV 01 | 740-011782 | P9M0TNX     | SFP-SX                |
| Xcvr 4   | REV 01 | 740-011782 | P9B0TTP     | SFP-SX                |
| Xcvr 5   |        | NON-JNPR   | PBS4LED     | SFP-SX                |
| PIC 2    | REV 17 | 750-009553 | RL0212      | 4x OC-48 SONET        |
| Xcvr 0   | REV 01 | 740-011785 | PDS3T8G     | SFP-SR                |
| PIC 3    | REV 32 | 750-003700 | DL1279      | 1x OC-192 12xMM VSR   |
| MMB 0    | REV 01 | 710-010171 | HR0821      | MMB-288mbit           |
| MMB 1    | REV 01 | 710-010171 | HR0818      | MMB-288mbit           |
| FPC 4    | REV 16 | 710-013037 | EB4919      | FPC Type 4-ES         |
| CPU      | REV 09 | 710-016744 | BBAA4382    | ST-PMB2               |
| PIC 0    | REV 03 | 711-029996 | EB1569      | 100GE                 |
| PIC 1    | REV 05 | 711-029999 | EB9983      | 100GE CFP             |
| Xcvr 0   | REV 0  | 740-032210 | J10G80746   | CFP-100G-LR4          |
| BRIDGE 0 | REV 02 | 711-029995 | EB2235      | 100GE Bridge Board    |
| MMB 0    | REV 04 | 710-025563 | BBAA7112    | ST-MMB2               |
| MMB 1    | REV 04 | 710-025563 | BBAA7149    | ST-MMB2               |
| FPC 5    | REV 02 | 710-013037 | DE3407      | FPC Type 4-ES         |
| CPU      | REV 04 | 710-016744 | DA2124      | ST-PMB2               |
| PIC 0    | REV 16 | 750-012518 | DF2554      | 4x OC-192 SONET XFP   |
| Xcvr 0   | REV 01 | 740-014279 | AA0745N1FX8 | XFP-OC192-SR          |
| Xcvr 1   | REV 01 | 740-014279 | AA0748N1HN5 | XFP-OC192-SR          |
| Xcvr 2   | REV 01 | 740-014279 | AA0748N1HT6 | XFP-OC192-SR          |
| Xcvr 3   | REV 01 | 740-014279 | AA0744N1EC9 | XFP-OC192-SR          |
| PIC 1    | REV 01 | 750-010850 | JA0329      | 1x OC-768 SONET SR    |
| MMB 0    | REV 04 | 710-016036 | DE9577      | ST-MMB2               |
| MMB 1    | REV 04 | 710-016036 | DK4060      | ST-MMB2               |
| FPC 6    | REV 14 | 710-013037 | DV1431      | FPC Type 4-ES         |
| CPU      | REV 09 | 710-016744 | DT9020      | ST-PMB2               |
| PIC 0    | REV 11 | 750-017405 | DM6261      | 4x 10GE (LAN/WAN) XFP |
| Xcvr 0   | REV 01 | 740-014289 | C701XU05Q   | XFP-10G-SR            |
| Xcvr 1   | REV 01 | 740-014279 | AA0748N1HPT | XFP-10G-LR            |
| Xcvr 2   | REV 01 | 740-014289 | T08E19189   | XFP-10G-SR            |
| Xcvr 3   | REV 01 | 740-014289 | C715XU058   | XFP-10G-SR            |
| PIC 1    | REV 13 | 750-017405 | DP8772      | 4x 10GE (LAN/WAN) XFP |
| Xcvr 0   | REV 02 | 740-011571 | C850XJ037   | XFP-10G-SR            |
| Xcvr 1   | REV 02 | 740-014289 | C839XU0L9   | XFP-10G-SR            |
| Xcvr 2   | REV 02 | 740-014289 | C834XU05A   | XFP-10G-SR            |
| Xcvr 3   | REV 02 | 740-014289 | C810XU0CE   | XFP-10G-SR            |
| MMB 0    | REV 01 | 710-025563 | DT8454      | ST-MMB2               |
| MMB 1    | REV 01 | 710-025563 | DT8366      | ST-MMB2               |
| FPC 7    | REV 09 | 710-007529 | HZ7624      | FPC Type 3            |
| CPU      | REV 15 | 710-001726 | HZ1413      | FPC CPU               |
| PIC 0    | REV 10 | 750-012793 | DM5627      | 1x 10GE(LAN/WAN) IQ2  |
| Xcvr 0   | REV 02 | 740-011571 | C831XJ062   | XFP-10G-SR            |
| PIC 1    | REV 01 | 750-015217 | JT6762      | 8x 1GE(TYPE3), IQ2    |
| Xcvr 0   | REV 01 | 740-011782 | P8Q25JU     | SFP-SX                |
| Xcvr 1   | REV 01 | 740-011782 | P9B0U0K     | SFP-SX                |
| PIC 2    | REV 01 | 750-015217 | JS4268      | 8x 1GE(TYPE3), IQ2    |
| Xcvr 0   | REV 01 | 740-011613 | AM0812S8XBZ | SFP-SX                |
| Xcvr 1   | REV 01 | 740-011613 | AM0812S8XAP | SFP-SX                |
| Xcvr 2   | REV 01 | 740-011613 | AM0812S8XBY | SFP-SX                |
| Xcvr 3   | REV 01 | 740-011613 | AM0812S8XBX | SFP-SX                |
| Xcvr 4   | REV 01 | 740-011613 | P9F1652     | SFP-SX                |
| Xcvr 5   | REV 01 | 740-011782 | P8Q21YC     | SFP-SX                |
| Xcvr 6   | REV 01 | 740-011782 | P8Q27HQ     | SFP-SX                |
| Xcvr 7   | REV 01 | 740-011613 | P8E2SSU     | SFP-SX                |
| PIC 3    | REV 15 | 750-009450 | NB6790      | 1x OC-192 SM SR2      |
| MMB 0    | REV 03 | 710-005555 | HZ3450      | MMB-288mbit           |
| MMB 1    | REV 03 | 710-005555 | HZ3415      | MMB-288mbit           |

|            |        |            |        |                        |
|------------|--------|------------|--------|------------------------|
| PPB 0      | REV 04 | 710-002845 | HP0887 | PPB Type 3             |
| PPB 1      | REV 04 | 710-002845 | HW5255 | PPB Type 3             |
| SPMB 0     | REV 10 | 710-003229 | HX3699 | T-series Switch CPU    |
| SPMB 1     | REV 12 | 710-003229 | DT3091 | T-series Switch CPU    |
| SIB 0      | REV 07 | 710-013074 | DS4747 | SIB-I8-SF              |
| SIB 1      | REV 07 | 710-013074 | DS4942 | SIB-I8-SF              |
| SIB 2      | REV 07 | 710-013074 | DS4965 | SIB-I8-SF              |
| SIB 3      | REV 07 | 710-013074 | DS4990 | SIB-I8-SF              |
| SIB 4      | REV 07 | 710-013074 | DS4944 | SIB-I8-SF              |
| Fan Tray 0 |        |            |        | Front Top Fan Tray     |
| Fan Tray 1 |        |            |        | Front Bottom Fan Tray  |
| Fan Tray 2 |        |            |        | Rear Fan Tray -- Rev 2 |

### show chassis hardware (TX Matrix Plus Router)

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user@host> show chassis hardware
sfc0-re0:
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#### Hardware inventory:

| Item             | Version | Part number | Serial number | Description        |
|------------------|---------|-------------|---------------|--------------------|
| Chassis          |         |             | JN113186EAHB  | TXP                |
| Midplane         | REV 05  | 710-022574  | TS3822        | SFC Midplane       |
| FPM Display      | REV 03  | 710-024027  | DW4701        | TXP FPM Display    |
| CIP 0            | REV 05  | 710-023792  | DW7998        | TXP CIP            |
| CIP 1            | REV 05  | 710-023792  | DW7999        | TXP CIP            |
| PEM 0            | Rev 04  | 740-027463  | UM26367       | Power Entry Module |
| PEM 1            | Rev 04  | 740-027463  | UM26346       | Power Entry Module |
| Routing Engine 0 | REV 06  | 740-026942  | 737A-1081     | RE-DUO-2600        |
| Routing Engine 1 | REV 06  | 740-026942  | 737A-1043     | RE-DUO-2600        |
| CB 0             | REV 05  | 710-022606  | DW4435        | SFC Control Board  |
| CB 1             | REV 09  | 710-022606  | DW6100        | SFC Control Board  |
| SPMB 0           |         | BUILTIN     |               | SFC Switch CPU     |
| SPMB 1           |         | BUILTIN     |               | SFC Switch CPU     |
| SIB F13 0        | REV 04  | 750-024564  | DW5764        | F13 SIB            |
| B Board          | REV 03  | 710-023431  | DW9053        | F13 SIB Mezz       |
| SIB F13 3        | REV 04  | 750-024564  | DW5785        | F13 SIB            |
| B Board          | REV 03  | 710-023431  | DW9030        | F13 SIB Mezz       |
| SIB F13 6        |         |             |               |                    |
| SIB F13 8        | REV 04  | 750-024564  | DW5752        | F13 SIB            |
| B Board          | REV 03  | 710-023431  | DW9051        | F13 SIB Mezz       |
| SIB F13 11       | REV 04  | 750-024564  | DW5782        | F13 SIB            |
| B Board          | REV 03  | 710-023431  | DW9058        | F13 SIB Mezz       |
| SIB F13 12       | REV 03  | 750-024564  | DT9466        | F13 SIB            |
| B Board          | REV 02  | 710-023431  | DT6556        | F13 SIB Mezz       |
| SIB F2S 0/0      | REV 05  | 710-022603  | DW7898        | F2S SIB            |
| B Board          | REV 05  | 710-023787  | DW7625        | F2S SIB Mezz       |
| SIB F2S 0/2      | REV 05  | 710-022603  | DW7811        | F2S SIB            |
| B Board          | REV 05  | 710-023787  | DW7550        | F2S SIB Mezz       |
| SIB F2S 0/4      | REV 04  | 710-022603  | DW4873        | F2S SIB            |
| B Board          | REV 05  | 710-023787  | DW8509        | F2S SIB Mezz       |
| SIB F2S 0/6      | REV 04  | 710-022603  | DW4867        | F2S SIB            |
| B Board          | REV 05  | 710-023787  | DW8472        | F2S SIB Mezz       |
| SIB F2S 1/0      | REV 04  | 710-022603  | DW4871        | F2S SIB            |
| B Board          | REV 05  | 710-023787  | DW8497        | F2S SIB Mezz       |
| SIB F2S 1/2      | REV 05  | 710-022603  | DW7868        | F2S SIB            |
| B Board          | REV 05  | 710-023787  | DW7551        | F2S SIB Mezz       |
| SIB F2S 1/4      | REV 04  | 710-022603  | DW4854        | F2S SIB            |
| B Board          | REV 05  | 710-023787  | DW8496        | F2S SIB Mezz       |
| SIB F2S 1/6      | REV 05  | 710-022603  | DW7889        | F2S SIB            |
| B Board          | REV 05  | 710-023787  | DW7496        | F2S SIB Mezz       |
| SIB F2S 2/0      | REV 04  | 710-022603  | DW4852        | F2S SIB            |



|             |        |            |        |                |
|-------------|--------|------------|--------|----------------|
| B Board     | REV 05 | 710-023787 | DW8498 | F2S SIB Mezz   |
| SIB F2S 2/2 | REV 04 | 710-022603 | DW4845 | F2S SIB        |
| B Board     | REV 05 | 710-023787 | DW8457 | F2S SIB Mezz   |
| SIB F2S 2/4 | REV 05 | 710-022603 | DW7802 | F2S SIB        |
| B Board     | REV 05 | 710-023787 | DW7562 | F2S SIB Mezz   |
| SIB F2S 2/6 | REV 04 | 710-022603 | DW4822 | F2S SIB        |
| B Board     | REV 05 | 710-023787 | DW8467 | F2S SIB Mezz   |
| SIB F2S 3/0 | REV 05 | 710-022603 | DW7815 | F2S SIB        |
| B Board     | REV 05 | 710-023787 | DW7518 | F2S SIB Mezz   |
| SIB F2S 3/2 | REV 03 | 710-022603 | DV0068 | F2S SIB        |
| B Board     | REV 03 | 710-023787 | DT9974 | F2S SIB Mezz   |
| SIB F2S 3/4 | REV 05 | 710-022603 | DW7874 | F2S SIB        |
| B Board     | REV 05 | 710-023787 | DW7601 | F2S SIB Mezz   |
| SIB F2S 3/6 | REV 03 | 710-022603 | DV0033 | F2S SIB        |
| B Board     | REV 03 | 710-023787 | DT9969 | F2S SIB Mezz   |
| SIB F2S 4/0 | REV 03 | 710-022603 | DV0043 | F2S SIB        |
| B Board     | REV 03 | 710-023787 | DT9948 | F2S SIB Mezz   |
| SIB F2S 4/2 | REV 05 | 710-022603 | DW5446 | F2S SIB        |
| B Board     | REV 05 | 710-023787 | DW7611 | F2S SIB Mezz   |
| SIB F2S 4/4 | REV 04 | 710-022603 | DW4826 | F2S SIB        |
| B Board     | REV 05 | 710-023787 | DW8458 | F2S SIB Mezz   |
| SIB F2S 4/6 | REV 03 | 710-022603 | DV0026 | F2S SIB        |
| B Board     | REV 03 | 710-023787 | DT9963 | F2S SIB Mezz   |
| Fan Tray 0  | REV 02 | 760-024497 | DR8290 | Front Fan Tray |
| Fan Tray 1  | REV 02 | 760-024497 | DR8293 | Front Fan Tray |
| Fan Tray 2  | REV 05 | 760-024502 | DR8280 | Rear Fan Tray  |
| Fan Tray 3  |        |            |        |                |
| Fan Tray 4  | REV 05 | 760-024502 | DR8276 | Rear Fan Tray  |
| Fan Tray 5  | REV 02 | 760-024502 | DP5643 | Rear Fan Tray  |

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lcc0-re0:
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Hardware inventory:
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| Item             | Version | Part number | Serial number | Description              |
|------------------|---------|-------------|---------------|--------------------------|
| Chassis          |         |             | JN11036F8AHA  | T1600                    |
| Midplane         | REV 03  | 710-017247  | RC3799        | T-series Backplane       |
| FPM GBUS         | REV 10  | 710-002901  | DP7009        | T640 FPM Board           |
| FPM Display      | REV 01  | 710-021387  | DN7026        | T1600 FPM Display        |
| CIP              | REV 06  | 710-002895  | DP6024        | T-series CIP             |
| PEM 1            | Rev 02  | 740-023211  | WA50019       | Power Entry Module 4x60A |
| SCG 0            | REV 15  | 710-003423  | DR6757        | T640 Sonet Clock Gen.    |
| SCG 1            | REV 15  | 710-003423  | DS2225        | T640 Sonet Clock Gen.    |
| Routing Engine 0 | REV 01  | 740-026941  | 737F-1040     | RE-DUO-1800              |
| Routing Engine 1 | REV 01  | 740-026941  | 737F-1016     | RE-DUO-1800              |
| CB 0             | REV 06  | 710-022597  | DX4011        | LCC Control Board        |
| CB 1             | REV 06  | 710-022597  | DX4017        | LCC Control Board        |
| FPC 1            | REV 07  | 710-013035  | DN5847        | FPC Type 3-ES            |
| CPU              | REV 08  | 710-016744  | DP2570        | ST-PMB2                  |
| PIC 0            | REV 05  | 750-015217  | DB0418        | 8x 1GE(TYPE3), IQ2       |
| Xcvr 0           | REV 01  | 740-011782  | P8Q27ZG       | SFP-SX                   |
| Xcvr 1           |         | NON-JNPR    | PDA1U0D       | SFP-SX                   |
| Xcvr 2           | REV 01  | 740-011613  | P9F1ALW       | SFP-SX                   |
| Xcvr 3           | REV 01  | 740-011782  | PBA403V       | SFP-SX                   |
| Xcvr 4           |         | NON-JNPR    | PDE09DP       | SFP-SX                   |
| Xcvr 5           | REV 01  | 740-011782  | PCH2P4K       | SFP-SX                   |
| Xcvr 6           | REV 01  | 740-011782  | PB94K0F       | SFP-SX                   |
| Xcvr 7           | REV 01  | 740-011782  | PBA2R2A       | SFP-SX                   |
| PIC 1            | REV 03  | 750-004424  | HJ4020        | 1x 10GE(LAN),DWDM        |
| PIC 2            | REV 01  | 750-003336  | HG6073        | 4x OC-48 SONET, SMSR     |
| MMB 0            | REV 04  | 710-016036  | DP3401        | ST-MMB2                  |
| FPC 3            | REV 12  | 710-013037  | DR1169        | FPC Type 4-ES            |

|        |        |            |             |                          |
|--------|--------|------------|-------------|--------------------------|
| CPU    | REV 08 | 710-016744 | DP9429      | ST-PMB2                  |
| PIC 0  | REV 02 | 750-010850 | JA0332      | 1x OC-768 SONET SR       |
| MMB 0  | REV 04 | 710-016036 | DR0628      | ST-MMB2                  |
| MMB 1  | REV 04 | 710-016036 | DR0592      | ST-MMB2                  |
| FPC 4  | REV 05 | 710-021534 | DR7350      | FPC Type 1-ES            |
| CPU    | REV 08 | 710-016744 | DP8096      | ST-PMB2                  |
| PIC 0  | REV 04 | 750-014627 | DP9171      | 4x OC-3 1x OC-12 SFP     |
| Xcvr 0 | REV 02 | 740-011615 | PDE2RVR     | SFP-SR                   |
| PIC 1  | REV 22 | 750-005634 | DS5815      | 1x CHOC12 IQ SONET, SMIR |
| PIC 2  | REV 09 | 750-002911 | CF4539      | 4x F/E, 100 BASE-TX      |
| PIC 3  | REV 08 | 750-021652 | DR2827      | 1x CHOC12 IQE SONET      |
| Xcvr 0 |        | NON-JNPR   | 8           | UNKNOWN                  |
| MMB 0  | REV 04 | 710-016036 | DR0809      | ST-MMB2                  |
| FPC 5  | REV 07 | 710-007529 | HS5608      | FPC Type 3               |
| CPU    | REV 15 | 710-001726 | HX4351      | FPC CPU                  |
| PIC 0  | REV 14 | 750-009567 | WJ8961      | 1x 10GE(LAN), XENPAK     |
| Xcvr 0 | REV 01 | 740-013170 | J05K05961   | XENPAK-LR                |
| PIC 1  | REV 16 | 750-007141 | JJ8146      | 10x 1GE(LAN), 1000 BASE  |
| Xcvr 1 | REV 01 | 740-011613 | P9F117T     | SFP-SX                   |
| Xcvr 2 | REV 01 | 740-011782 | PBA2VCL     | SFP-SX                   |
| Xcvr 3 | REV 01 | 740-011782 | PB83DRB     | SFP-SX                   |
| Xcvr 4 | REV 01 | 740-011613 | AM0812S8UP8 | SFP-SX                   |
| PIC 2  | REV 12 | 750-009567 | WF3566      | 1x 10GE(LAN), XENPAK     |
| Xcvr 0 | REV 02 | 740-013170 | T07C94489   | XENPAK-LR                |
| MMB 0  | REV 03 | 710-005555 | HZ1907      | MMB-288mbit              |
| MMB 1  | REV 03 | 710-005555 | HW5283      | MMB-288mbit              |
| PPB 0  | REV 04 | 710-002845 | HZ7717      | PPB Type 3               |
| PPB 1  | REV 04 | 710-002845 | HS0110      | PPB Type 3               |
| FPC 6  | REV 07 | 710-013035 | DP7486      | FPC Type 3-ES            |
| CPU    | REV 08 | 710-016744 | DP2545      | ST-PMB2                  |
| PIC 0  | REV 09 | 750-009567 | NE6323      | 1x 10GE(LAN), XENPAK     |
| Xcvr 0 | REV 02 | 740-013170 | T09C71959   | XENPAK-LR                |
| PIC 1  | REV 06 | 750-015217 | DN4775      | 8x 1GE(TYPE3), IQ2       |
| Xcvr 0 | REV 01 | 740-011782 | P7E0T6M     | SFP-SX                   |
| Xcvr 1 | REV 01 | 740-011613 | AM0812S8XAY | SFP-SX                   |
| Xcvr 2 | REV 01 | 740-011782 | P7E0T6J     | SFP-SX                   |
| Xcvr 3 | REV 01 | 740-011782 | PCH2P7D     | SFP-SX                   |
| Xcvr 4 | REV 01 | 740-011782 | P9B0QYT     | SFP-SX                   |
| Xcvr 5 | REV 01 | 740-011613 | AM0812S8WQJ | SFP-SX                   |
| Xcvr 6 | REV 02 | 740-013111 | 9301220     | SFP-T                    |
| Xcvr 7 | REV 01 | 740-011782 | P9B0TZ5     | SFP-SX                   |
| PIC 2  | REV 06 | 750-015217 | DM6747      | 8x 1GE(TYPE3), IQ2       |
| Xcvr 0 | REV 01 | 740-011613 | PAP0ZB2     | SFP-SX                   |
| Xcvr 1 | REV 01 | 740-013111 | 70191002    | SFP-T                    |
| Xcvr 6 | REV 01 | 740-011782 | PBA29H8     | SFP-SX                   |
| Xcvr 7 | REV 01 | 740-011613 | AM0812S8WQG | SFP-SX                   |
| MMB 0  | REV 04 | 710-016036 | DP3238      | ST-MMB2                  |
| FPC 7  | REV 03 | 710-021540 | DV3154      | FPC Type 2-ES            |
| CPU    | REV 09 | 710-016744 | DT9053      | ST-PMB2                  |
| PIC 0  | REV 13 | 750-001901 | HB4225      | 4x OC-12 SONET, SMIR     |
| PIC 1  | REV 05 | 750-001900 | AD3644      | 1x OC-48 SONET, SMSR     |
| PIC 2  | REV 10 | 750-008155 | HV0335      | 2x G/E IQ, 1000 BASE     |
| Xcvr 0 | REV 01 | 740-011782 | PCH2UKF     | SFP-SX                   |
| Xcvr 1 | REV 01 | 740-011782 | PCH2V19     | SFP-SX                   |
| PIC 3  | REV 03 | 750-014638 | JS9493      | 1x OC-48-12-3 SFP        |
| Xcvr 0 | REV 01 | 740-011785 | P6Q0ENK     | SFP-SR                   |
| MMB 0  | REV 05 | 710-016036 | DP3323      | ST-MMB2                  |
| SPMB 0 | REV 04 | 710-023321 | DX3004      | LCC Switch CPU           |
| SPMB 1 | REV 04 | 710-023321 | DX3009      | LCC Switch CPU           |

|            |        |            |        |                        |
|------------|--------|------------|--------|------------------------|
| SIB 0      | REV 07 | 710-022594 | DW4195 | LCC SIB                |
| B Board    | REV 07 | 710-023185 | DW3930 | LCC SIB Mezz           |
| SIB 1      | REV 07 | 710-022594 | DW4179 | LCC SIB                |
| B Board    | REV 07 | 710-023185 | DW3919 | LCC SIB Mezz           |
| SIB 2      |        |            |        |                        |
| SIB 3      | REV 06 | 710-022594 | DT8251 | LCC SIB                |
| B Board    | REV 06 | 710-023185 | DT5792 | LCC SIB Mezz           |
| SIB 4      | REV 08 | 710-022594 | DW8014 | LCC SIB                |
| B Board    | REV 07 | 710-023185 | DW3917 | LCC SIB Mezz           |
| Fan Tray 0 |        |            |        | Front Top Fan Tray     |
| Fan Tray 1 |        |            |        | Front Bottom Fan Tray  |
| Fan Tray 2 |        |            |        | Rear Fan Tray -- Rev 3 |

lcc1-re0:

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Hardware inventory:

| Item             | Version | Part number | Serial number | Description              |
|------------------|---------|-------------|---------------|--------------------------|
| Chassis          |         |             | JN1102270AHA  | T1600                    |
| Midplane         | REV 04  | 710-017247  | RC5358        | T-series Backplane       |
| FPM GBUS         | REV 10  | 710-002901  | DS3443        | T640 FPM Board           |
| FPM Display      | REV 01  | 710-021387  | DS6411        | T1600 FPM Display        |
| CIP              | REV 06  | 710-002895  | DS4235        | T-series CIP             |
| PEM 0            | Rev 02  | 740-023211  | VM82438       | Power Entry Module 4x60A |
| SCG 0            | REV 15  | 710-003423  | DS6649        | T640 Sonet Clock Gen.    |
| SCG 1            | REV 15  | 710-003423  | DR6775        | T640 Sonet Clock Gen.    |
| Routing Engine 0 | REV 01  | 740-026941  | 737F-1083     | RE-DUO-1800              |
| Routing Engine 1 | REV 01  | 740-026941  | 737F-1104     | RE-DUO-1800              |
| CB 0             | REV 06  | 710-022597  | DW8542        | LCC Control Board        |
| CB 1             | REV 06  | 710-022597  | DW8530        | LCC Control Board        |
| FPC 0            | REV 02  | 710-010845  | JE2392        | FPC Type 4               |
| CPU              | REV 02  | 710-011481  | JF6820        | FPC CPU-Enhanced         |
| PIC 0            | REV 11  | 750-017405  | DP7259        | 4x 10GE (LAN/WAN) XFP    |
| Xcvr 0           | REV 01  | 740-014279  | AA0741N1C8T   | XFP-10G-LR               |
| Xcvr 1           | REV 01  | 740-014279  | AA0746N1GAM   | XFP-10G-LR               |
| Xcvr 2           | REV 01  | 740-014279  | AA0747N1H0B   | XFP-10G-LR               |
| Xcvr 3           | REV 01  | 740-014279  | AA0748N1HZ5   | XFP-10G-LR               |
| MMB 0            | REV 03  | 710-010842  | HY7601        | ST-MMB                   |
| FPC 1            | REV 16  | 710-013037  | BBAA7398      | FPC Type 4-ES            |
| CPU              | REV 09  | 710-016744  | BBAA2329      | ST-PMB2                  |
| PIC 0            | REV 03  | 711-029996  | EB1575        | 100GE                    |
| PIC 1            | REV 06  | 750-034781  | EB9980        | 100GE CFP                |
| MMB 0            | REV 04  | 710-025563  | BBAA5325      | ST-MMB2                  |
| MMB 1            | REV 04  | 710-025563  | BBAA5444      | ST-MMB2                  |
| FPC 2            | REV 16  | 710-013037  | BBAA7185      | FPC Type 4-ES            |
| CPU              | REV 09  | 710-016744  | BBAA3522      | ST-PMB2                  |
| PIC 0            | REV 03  | 711-029996  | EB1557        | 100GE                    |
| PIC 1            | REV 05  | 750-034781  | EB4660        | 100GE CFP                |
| Xcvr 0           | REV 0   | 740-032210  | J10F73666     | CFP-100G-LR4             |
| BRIDGE 0         | REV 02  | 711-029995  | EB2237        | 100GE Bridge Board       |
| MMB 0            | REV 04  | 710-025563  | BBAA5347      | ST-MMB2                  |
| MMB 1            | REV 04  | 710-025563  | BBAA5401      | ST-MMB2                  |
| FPC 3            | REV 10  | 710-021534  | DZ0941        | FPC Type 1-ES            |
| CPU              | REV 09  | 710-016744  | DY6364        | ST-PMB2                  |
| PIC 0            | REV 13  | 750-012266  | DK9192        | 4x 1GE(LAN), IQ2         |
| Xcvr 0           | REV 01  | 740-011613  | AM0812S8WVD   | SFP-SX                   |
| Xcvr 1           |         | NON-JNPR    | PDD63Q4       | SFP-SX                   |
| Xcvr 2           |         | NON-JNPR    | PDE4G54       | SFP-SX                   |
| Xcvr 3           |         | NON-JNPR    | PD40MAG       | SFP-SX                   |
| PIC 1            | REV 01  | 750-007641  | HJ2003        | 1x G/E IQ, 1000 BASE     |
| Xcvr 0           | REV 01  | 740-011613  | AM0812S8WVG   | SFP-SX                   |
| PIC 3            | REV 17  | 750-007444  | JB6873        | 1x CHSTM1 IQ SDH, SMIR   |

|            |        |            |              |                         |
|------------|--------|------------|--------------|-------------------------|
| MMB 0      | REV 04 | 710-025563 | DZ0281       | ST-MMB2                 |
| FPC 4      | REV 06 | 710-013035 | DK0614       | FPC Type 3-ES           |
| CPU        | REV 07 | 710-016744 | DK1616       | ST-PMB2                 |
| PIC 0      | REV 22 | 750-007141 | DM1870       | 10x 1GE(LAN), 1000 BASE |
| Xcvr 0     | REV 01 | 740-011782 | PCL3UKW      | SFP-SX                  |
| Xcvr 1     | REV 01 | 740-011782 | P7E0T73      | SFP-SX                  |
| Xcvr 2     | REV 01 | 740-007326 | P4TOWLR      | SFP-SX                  |
| Xcvr 3     | REV 01 | 740-011782 | PAR1LRL      | SFP-SX                  |
| Xcvr 4     | REV 01 | 740-011782 | P9MOU3Z      | SFP-SX                  |
| Xcvr 5     | REV 01 | 740-011782 | P9MOU0C      | SFP-SX                  |
| Xcvr 6     | REV 01 | 740-011782 | P9M0TLG      | SFP-SX                  |
| Xcvr 7     | REV 01 | 740-011782 | P9MOU0F      | SFP-SX                  |
| Xcvr 8     | REV 01 | 740-011613 | PFA6LAP      | SFP-SX                  |
| Xcvr 9     | REV 01 | 740-011782 | PCH2POU      | SFP-SX                  |
| PIC 1      | REV 16 | 750-009450 | CV2565       | 1x OC-192 SM SR2        |
| PIC 2      | REV 05 | 750-004424 | HH3057       | 1x 10GE(LAN),10GBASE-LR |
| PIC 3      | REV 12 | 750-013423 | DP0403       | MultiServices 500       |
| MMB 0      | REV 04 | 710-016036 | DK1988       | ST-MMB2                 |
| FPC 5      | REV 07 | 710-013560 | DR0004       | E2-FPC Type 3           |
| CPU        | REV 05 | 710-013563 | DR0089       | FPC CPU-Enhanced        |
| PIC 0      | REV 11 | 750-012793 | DR6107       | 1x 10GE(LAN/WAN) IQ2    |
| Xcvr 0     | REV 01 | 740-014289 | C743XU074    | XFP-10G-SR              |
| PIC 1      | REV 01 | 750-004695 | HD5980       | 1x Tunnel               |
| PIC 2      | REV 32 | 750-003700 | DL3770       | 1x OC-192 12xMM VSR     |
| PIC 3      | REV 12 | 750-009553 | WB8901       | 4x OC-48 SONET          |
| Xcvr 0     | REV 01 | 740-011785 | P9D1GTQ      | SFP-SR                  |
| Xcvr 1     | REV 01 | 740-011785 | PDSOMMB      | SFP-SR                  |
| Xcvr 3     | REV 01 | 740-011785 | PDE1KXP      | SFP-SR                  |
| MMB 0      | REV 07 | 710-010171 | DP7374       | MMB-5M3-288mbit         |
| MMB 1      | REV 07 | 710-010171 | DP7404       | MMB-5M3-288mbit         |
| FPC 6      | REV 07 | 710-013035 | DM0994       | FPC Type 3-ES           |
| CPU        | REV 07 | 710-016744 | DM3651       | ST-PMB2                 |
| PIC 0      | REV 07 | 750-015217 | DN4743       | 8x 1GE(TYPE3), IQ2      |
| Xcvr 3     | REV 01 | 740-011613 | AM0812S8XB0  | SFP-SX                  |
| Xcvr 4     | REV 01 | 740-011782 | PB829RB      | SFP-SX                  |
| Xcvr 5     | REV 01 | 740-011782 | P8J1SYX      | SFP-SX                  |
| PIC 1      | REV 03 | 750-003336 | HJ9954       | 4x OC-48 SONET, SMSR    |
| PIC 3      | REV 02 | 750-012793 | JM7665       | 1x 10GE(LAN/WAN) IQ2    |
| MMB 0      | REV 04 | 710-016036 | DN6913       | ST-MMB2                 |
| FPC 7      | REV 08 | 710-010845 | JM3958       | FPC Type 4              |
| CPU        | REV 04 | 710-011481 | JK3669       | FPC CPU-Enhanced        |
| PIC 0      | REV 11 | 750-017405 | DP8837       | 4x 10GE (LAN/WAN) XFP   |
| Xcvr 1     | REV 01 | 740-014279 | 753019A00277 | XFP-10G-LR              |
| Xcvr 2     | REV 02 | 740-011571 | C850XJ00P    | XFP-10G-SR              |
| Xcvr 3     | REV 01 | 740-014279 | AA0813N1RTG  | XFP-10G-LR              |
| MMB 0      | REV 04 | 710-010842 | JN1971       | ST-MMB                  |
| SPMB 0     | REV 04 | 710-023321 | DW3629       | LCC Switch CPU          |
| SPMB 1     | REV 04 | 710-023321 | DW3621       | LCC Switch CPU          |
| SIB 0      | REV 07 | 710-022594 | DW4200       | LCC SIB                 |
| B Board    | REV 07 | 710-023185 | DW3932       | LCC SIB Mezz            |
| SIB 1      | REV 07 | 710-022594 | DW4193       | LCC SIB                 |
| B Board    | REV 07 | 710-023185 | DW3904       | LCC SIB Mezz            |
| SIB 2      |        |            |              |                         |
| SIB 3      | REV 07 | 710-022594 | DW4210       | LCC SIB                 |
| B Board    | REV 06 | 710-023185 | DT5780       | LCC SIB Mezz            |
| SIB 4      | REV 08 | 710-022594 | DW8019       | LCC SIB                 |
| B Board    | REV 06 | 710-023185 | DT5795       | LCC SIB Mezz            |
| Fan Tray 0 |        |            |              | Front Top Fan Tray      |

Fan Tray 1  
Fan Tray 2

Front Bottom Fan Tray  
Rear Fan Tray -- Rev 3

### show chassis hardware sfc (TX Matrix Plus Router)

```
user@host> show chassis hardware sfc 0
sfc0-re0:
```

-----  
Hardware inventory:

| Item             | Version | Part number | Serial number | Description        |
|------------------|---------|-------------|---------------|--------------------|
| Chassis          |         |             | JN112F007AHB  | TXP                |
| Midplane         | REV 05  | 710-022574  | TS4027        | SFC Midplane       |
| FPM Display      | REV 03  | 710-024027  | DX0282        | TXP FPM Display    |
| CIP 0            | REV 04  | 710-023792  | DW4889        | TXP CIP            |
| CIP 1            | REV 04  | 710-023792  | DW4887        | TXP CIP            |
| PEM 0            | Rev 07  | 740-027463  | UM26368       | Power Entry Module |
| Routing Engine 0 | REV 01  | 740-026942  | 737A-1064     | SFC RE             |
| Routing Engine 1 | REV 01  | 740-026942  | 737A-1082     | SFC RE             |
| CB 0             | REV 09  | 710-022606  | DW6099        | SFC Control Board  |
| CB 1             | REV 09  | 710-022606  | DW6096        | SFC Control Board  |
| SPMB 0           |         | BUILTIN     |               | SFC Switch CPU     |
| SPMB 1           |         | BUILTIN     |               | SFC Switch CPU     |
| SIB F13 0        | REV 04  | 710-022600  | DX0841        | F13 SIB            |
| B Board          | REV 03  | 710-023431  | DX0966        | F13 SIB Mezz       |
| SIB F13 1        | REV 04  | 750-024564  | DW5776        | F13 SIB            |
| B Board          | REV 03  | 710-023431  | DW9028        | F13 SIB            |
| SIB F13 3        | REV 04  | 750-024564  | DW5762        | F13 SIB            |
| B Board          | REV 03  | 710-023431  | DW9059        | F13 SIB            |
| SIB F13 4        | REV 04  | 750-024564  | DW5797        | F13 SIB            |
| B Board          | REV 03  | 710-023431  | DW9041        | F13 SIB            |
| SIB F13 6        | REV 04  | 750-024564  | DW5770        | F13 SIB            |
| B Board          | REV 03  | 710-023431  | DW9079        | F13 SIB Mezz       |
| SIB F13 7        | REV 04  | 750-024564  | DW5758        | F13 SIB            |
| B Board          | REV 03  | 710-023431  | DW9047        | F13 SIB            |
| SIB F13 8        | REV 04  | 750-024564  | DW5761        | F13 SIB            |
| B Board          | REV 03  | 710-023431  | DW9043        | F13 SIB Mezz       |
| SIB F13 9        | REV 04  | 750-024564  | DW5754        | F13 SIB            |
| B Board          | REV 03  | 710-023431  | DW9078        | F13 SIB Mezz       |
| SIB F13 11       | REV 04  | 710-022600  | DX0826        | F13 SIB            |
| B Board          | REV 03  | 710-023431  | DX0967        | F13 SIB Mezz       |
| SIB F13 12       | REV 04  | 750-024564  | DW5794        | F13 SIB            |
| B Board          | REV 03  | 710-023431  | DW9044        | F13 SIB Mezz       |
| SIB F2S 0/0      | REV 05  | 710-022603  | DW7897        | F2S SIB            |
| B Board          | REV 05  | 710-023787  | DW7657        | NEO PMB            |
| SIB F2S 0/2      | REV 05  | 710-022603  | DW7833        | F2S SIB            |
| B Board          | REV 05  | 710-023787  | DW7526        | NEO PMB            |
| SIB F2S 0/4      | REV 05  | 710-022603  | DW7875        | F2S SIB            |
| B Board          | REV 05  | 710-023787  | DW7588        | NEO PMB            |
| SIB F2S 0/6      | REV 05  | 710-022603  | DW7860        | F2S SIB            |
| B Board          | REV 05  | 710-023787  | DW7589        | NEO PMB            |
| SIB F2S 1/0      | REV 04  | 710-022603  | DW4820        | F2S SIB            |
| B Board          | REV 05  | 710-023787  | DW8510        | NEO PMB            |
| SIB F2S 1/2      | REV 05  | 710-022603  | DW7849        | F2S SIB            |
| B Board          | REV 05  | 710-023787  | DW7525        | NEO PMB            |
| SIB F2S 1/4      | REV 05  | 710-022603  | DW7927        | F2S SIB            |
| B Board          | REV 05  | 710-023787  | DW7556        | F2S SIB Mezz       |
| SIB F2S 1/6      | REV 05  | 710-022603  | DW7866        | F2S SIB            |
| B Board          | REV 05  | 710-023787  | DW7651        | NEO PMB            |
| SIB F2S 2/0      | REV 05  | 710-022603  | DW7880        | F2S SIB            |
| B Board          | REV 05  | 710-023787  | DW7523        | NEO PMB            |
| SIB F2S 2/2      | REV 05  | 710-022603  | DW7895        | F2S SIB            |

|             |        |            |        |                |
|-------------|--------|------------|--------|----------------|
| B Board     | REV 05 | 710-023787 | DW7591 | NEO PMB        |
| SIB F2S 2/4 | REV 05 | 710-022603 | DW7907 | F2S SIB        |
| B Board     | REV 05 | 710-023787 | DW7590 | NEO PMB        |
| SIB F2S 2/6 | REV 05 | 710-022603 | DW7785 | F2S SIB        |
| B Board     | REV 05 | 710-023787 | DW7524 | NEO PMB        |
| SIB F2S 3/0 | REV 05 | 710-022603 | DW7782 | F2S SIB        |
| B Board     | REV 05 | 710-023787 | DW7634 | NEO PMB        |
| SIB F2S 3/2 | REV 05 | 710-022603 | DW7793 | F2S SIB        |
| B Board     | REV 05 | 710-023787 | DW7548 | NEO PMB        |
| SIB F2S 3/4 | REV 05 | 710-022603 | DW7779 | F2S SIB        |
| B Board     | REV 05 | 710-023787 | DW7587 | NEO PMB        |
| SIB F2S 3/6 | REV 05 | 710-022603 | DW7930 | F2S SIB        |
| B Board     | REV 05 | 710-023787 | DW7505 | NEO PMB        |
| SIB F2S 4/0 | REV 05 | 710-022603 | DW7867 | F2S SIB        |
| B Board     | REV 05 | 710-023787 | DW7656 | NEO PMB        |
| SIB F2S 4/2 | REV 05 | 710-022603 | DW7917 | F2S SIB        |
| B Board     | REV 05 | 710-023787 | DW7640 | NEO PMB        |
| SIB F2S 4/4 | REV 05 | 710-022603 | DW7929 | F2S SIB        |
| B Board     | REV 05 | 710-023787 | DW7643 | NEO PMB        |
| SIB F2S 4/6 | REV 05 | 710-022603 | DW7870 | F2S SIB        |
| B Board     | REV 05 | 710-023787 | DW7635 | NEO PMB        |
| Fan Tray 0  | REV 06 | 760-024497 | DV7831 | Front Fan Tray |
| Fan Tray 1  | REV 06 | 760-024497 | DV9614 | Front Fan Tray |
| Fan Tray 2  | REV 06 | 760-024502 | DV9618 | Rear Fan Tray  |
| Fan Tray 3  | REV 06 | 760-024502 | DV9616 | Rear Fan Tray  |
| Fan Tray 4  | REV 06 | 760-024502 | DV7807 | Rear Fan Tray  |
| Fan Tray 5  | REV 06 | 760-024502 | DV7828 | Rear Fan Tray  |

#### show chassis hardware extensive (TX Matrix Plus Router)

```
user@host> show chassis hardware extensive
sfc0-re0:
```

##### ----- Hardware inventory:

| Item         | Version    | Part number       | Serial number | Description |
|--------------|------------|-------------------|---------------|-------------|
| Chassis      |            |                   | JN112F007AHB  | TXP         |
| Jedec Code:  | 0x7fb0     | EEPROM Version:   | 0x02          |             |
|              |            | S/N:              | JN112F007AHB  |             |
| Assembly ID: | 0x052c     | Assembly Version: | 00.00         |             |
| Date:        | 00-00-0000 | Assembly Flags:   | 0x00          |             |
| ID:          | TXP        |                   |               |             |

##### Board Information Record:

Address 0x00: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

##### I2C Hex Data:

Address 0x00: 7f b0 02 ff 05 2c 00 00 00 00 00 00 00 00 00 00  
 Address 0x10: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  
 Address 0x20: 4a 4e 31 31 32 46 30 30 37 41 48 42 00 00 00 00  
 Address 0x30: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  
 Address 0x40: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  
 Address 0x50: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  
 Address 0x60: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  
 Address 0x70: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

|          |        |            |        |              |
|----------|--------|------------|--------|--------------|
| Midplane | REV 05 | 710-022574 | TS4027 | SFC Midplane |
|----------|--------|------------|--------|--------------|

|              |            |                   |            |
|--------------|------------|-------------------|------------|
| Jedec Code:  | 0x7fb0     | EEPROM Version:   | 0x01       |
| P/N:         | 710-022574 | S/N:              | S/N TS4027 |
| Assembly ID: | 0x0962     | Assembly Version: | 01.05      |
| Date:        | 03-23-2009 | Assembly Flags:   | 0x00       |
| Version:     | REV 05     |                   |            |

ID: SFC Midplane

##### Board Information Record:

Address 0x00: ad 01 ff ff 00 1d b5 14 00 00 ff ff ff ff ff ff

```

I2C Hex Data:
Address 0x00: 7f b0 01 ff 09 62 01 05 52 45 56 20 30 35 00 00
Address 0x10: 00 00 00 00 37 31 30 2d 30 32 32 35 37 34 00 00
Address 0x20: 53 2f 4e 20 54 53 34 30 32 37 00 00 00 17 03 07
Address 0x30: d9 ff ff ff ad 01 ff ff 00 1d b5 14 00 00 ff ff
Address 0x40: ff ff ff ff 00 ff ff ff ff ff ff ff ff ff ff
Address 0x50: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
Address 0x60: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
Address 0x70: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
FPM Display      REV 03    710-024027    DX0282          TXP FPM Display
Jedec Code:      0x7fb0          EEPROM Version: 0x01
P/N:             710-024027      S/N:           S/N DX0282
Assembly ID:     0x096c          Assembly Version: 01.03
Date:            02-10-2009      Assembly Flags: 0x00
Version:         REV 03
ID: TXP FPM Display          FRU Model Number: CRAFT-TXP
Board Information Record:
Address 0x00: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
I2C Hex Data:
Address 0x00: 7f b0 01 ff 09 6c 01 03 52 45 56 20 30 33 00 00
Address 0x10: 00 00 00 00 37 31 30 2d 30 32 34 30 32 37 00 00
Address 0x20: 53 2f 4e 20 44 58 30 32 38 32 00 00 00 0a 02 07
Address 0x30: d9 ff ff ff ff ff ff ff ff ff ff ff ff ff ff
Address 0x40: ff ff ff ff 01 00 00 00 00 00 00 00 00 00 00 43
Address 0x50: 52 41 46 54 2d 54 58 50 00 00 00 00 00 00 00 00
Address 0x60: 00 00 00 00 00 00 ff ff ff ff ff ff ff ff ff
Address 0x70: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
CIP 0            REV 04    710-023792    DW4889          TXP CIP
Jedec Code:      0x7fb0          EEPROM Version: 0x01
P/N:             710-023792      S/N:           S/N DW4889
Assembly ID:     0x0969          Assembly Version: 01.04
Date:            01-26-2009      Assembly Flags: 0x00
Version:         REV 04
ID: TXP CIP          FRU Model Number: CIP-TXP
Board Information Record:
Address 0x00: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff

```

### show chassis hardware clei-models (TX Matrix Plus Router)

```

user@host> show chassis hardware clei-models
sfc0-re0:
-----
Hardware inventory:
Item          Version  Part number  CLEI code          FRU model number
Midplane      REV 05   710-022574
FPM Display   REV 03   710-024027          CRAFT-TXP-S
CIP 0         REV 05   710-023792          CIP-TXP-S
CIP 1         REV 05   710-023792          CIP-TXP-S
PEM 0         Rev 04   740-027463   IPUPAFGKTA         PWR-TXP-7-60-DC
PEM 1         Rev 04   740-027463   IPUPAFGKTA         PWR-TXP-7-60-DC
Routing Engine 0 REV 06   740-026942          RE-DUO-C2600-16G-S
Routing Engine 1 REV 06   740-026942          RE-DUO-C2600-16G-S
CB 0          REV 05   710-022606          CB-TXP-S
CB 1          REV 09   710-022606          CB-TXP-S
SIB F13 0     REV 04   750-024564          SIB-TXP-F13
SIB F13 3     REV 04   750-024564          SIB-TXP-F13
SIB F13 8     REV 04   750-024564          SIB-TXP-F13
SIB F13 11    REV 04   750-024564          SIB-TXP-F13
SIB F13 12    REV 03   750-024564          SIB-TXP-F13
SIB F2S 0/0   REV 05   710-022603          SIB-TXP-F2S-S
SIB F2S 0/2   REV 05   710-022603          SIB-TXP-F2S-S

```

|             |        |            |                 |
|-------------|--------|------------|-----------------|
| SIB F2S 0/4 | REV 04 | 710-022603 | SIB-TXP-F2S-S   |
| SIB F2S 0/6 | REV 04 | 710-022603 | SIB-TXP-F2S-S   |
| SIB F2S 1/0 | REV 04 | 710-022603 | SIB-TXP-F2S-S   |
| SIB F2S 1/2 | REV 05 | 710-022603 | SIB-TXP-F2S-S   |
| SIB F2S 1/4 | REV 04 | 710-022603 | SIB-TXP-F2S-S   |
| SIB F2S 1/6 | REV 05 | 710-022603 | SIB-TXP-F2S-S   |
| SIB F2S 2/0 | REV 04 | 710-022603 | SIB-TXP-F2S-S   |
| SIB F2S 2/2 | REV 04 | 710-022603 | SIB-TXP-F2S-S   |
| SIB F2S 2/4 | REV 05 | 710-022603 | SIB-TXP-F2S-S   |
| SIB F2S 2/6 | REV 04 | 710-022603 | SIB-TXP-F2S-S   |
| SIB F2S 3/0 | REV 05 | 710-022603 | SIB-TXP-F2S-S   |
| SIB F2S 3/2 | REV 03 | 710-022603 | SIB-TXP-F2S-S   |
| SIB F2S 3/4 | REV 05 | 710-022603 | SIB-TXP-F2S-S   |
| SIB F2S 3/6 | REV 03 | 710-022603 | SIB-TXP-F2S-S   |
| SIB F2S 4/0 | REV 03 | 710-022603 | SIB-TXP-F2S-S   |
| SIB F2S 4/2 | REV 05 | 710-022603 | SIB-TXP-F2S-S   |
| SIB F2S 4/4 | REV 04 | 710-022603 | SIB-TXP-F2S-S   |
| SIB F2S 4/6 | REV 03 | 710-022603 | SIB-TXP-F2S-S   |
| Fan Tray 0  | REV 02 | 760-024497 | FANTRAY-TXP-H-S |
| Fan Tray 1  | REV 02 | 760-024497 | FANTRAY-TXP-H-S |
| Fan Tray 2  | REV 05 | 760-024502 | FANTRAY-TXP-V-S |
| Fan Tray 3  |        |            |                 |
| Fan Tray 4  | REV 05 | 760-024502 | FANTRAY-TXP-V-S |
| Fan Tray 5  | REV 02 | 760-024502 | FANTRAY-TXP-V-S |

1cc0-re0:

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Hardware inventory:

| Item             | Version | Part number | CLEI code  | FRU model number        |
|------------------|---------|-------------|------------|-------------------------|
| Midplane         | REV 03  | 710-017247  |            | CHAS-BP-T1600-S         |
| FPM Display      | REV 01  | 710-021387  |            | CRAFT-T1600-S           |
| CIP              | REV 06  | 710-002895  |            | CIP-L-T640-S            |
| PEM 1            | Rev 02  | 740-023211  | IPUPAC8KTA | PWR-T1600-4-60-DC-S     |
| SCG 0            | REV 15  | 710-003423  |            | SCG-T-S                 |
| SCG 1            | REV 15  | 710-003423  |            | SCG-T-S                 |
| Routing Engine 0 | REV 01  | 740-026941  |            | RE-DUO-C1800-8G-S       |
| Routing Engine 1 | REV 01  | 740-026941  |            | RE-DUO-C1800-8G-S       |
| CB 0             | REV 06  | 710-022597  |            | CB-LCC-S                |
| CB 1             | REV 06  | 710-022597  |            | CB-LCC-S                |
| FPC 1            | REV 07  | 710-013035  |            | T640-FPC3-ES            |
| PIC 0            | REV 05  | 750-015217  |            | PC-8GE-TYPE3-SFP-IQ2    |
| PIC 1            | REV 03  | 750-004424  |            | PC-1XGE-LR              |
| PIC 2            | REV 01  | 750-003336  |            | PC-40C48-SON-SMSR       |
| FPC 3            | REV 12  | 710-013037  |            | T1600-FPC4-ES           |
| PIC 0            | REV 02  | 750-010850  |            | PD-10C768-SON-SR        |
| FPC 4            | REV 05  | 710-021534  |            | T640-FPC1-ES            |
| PIC 0            | REV 04  | 750-014627  |            | PB-40C3-10C12-SON-SFP   |
| PIC 1            | REV 22  | 750-005634  |            | PB-1CHOC12SMIR-QPP      |
| PIC 2            | REV 09  | 750-002911  |            | PB-4FE-TX               |
| PIC 3            | REV 08  | 750-021652  |            | PB-1CHOC12-STM4-IQE-SFP |
| FPC 5            | REV 07  | 710-007529  |            | T640-FPC3               |
| PIC 0            | REV 14  | 750-009567  |            | PC-1XGE-XENPAK          |
| PIC 1            | REV 16  | 750-007141  |            | PC-10GE-SFP             |
| PIC 2            | REV 12  | 750-009567  |            | PC-1XGE-XENPAK          |
| FPC 6            | REV 07  | 710-013035  |            | T640-FPC3-ES            |
| PIC 0            | REV 09  | 750-009567  |            | PC-1XGE-XENPAK          |
| PIC 1            | REV 06  | 750-015217  |            | PC-8GE-TYPE3-SFP-IQ2    |
| PIC 2            | REV 06  | 750-015217  |            | PC-8GE-TYPE3-SFP-IQ2    |
| FPC 7            | REV 03  | 710-021540  |            | T640-FPC2-ES            |
| PIC 0            | REV 13  | 750-001901  |            | PB-40C12-SON-SMIR       |
| PIC 1            | REV 05  | 750-001900  |            | PB-10C48-SON-SMSR       |



|            |        |            |                    |
|------------|--------|------------|--------------------|
| PIC 2      | REV 10 | 750-008155 | PB-2GE-SFP-QPP     |
| PIC 3      | REV 03 | 750-014638 | PB-10C48-SON-B-SFP |
| SIB 0      | REV 07 | 710-022594 | SIB-TXP-T1600-S    |
| SIB 1      | REV 07 | 710-022594 | SIB-TXP-T1600-S    |
| SIB 3      | REV 06 | 710-022594 | SIB-TXP-T1600-S    |
| SIB 4      | REV 08 | 710-022594 | SIB-TXP-T1600-S    |
| Fan Tray 0 |        |            | FANTRAY-T-S        |
| Fan Tray 1 |        |            | FANTRAY-T-S        |
| Fan Tray 2 |        |            | FANTRAY-TXP-R-S    |

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lcc1-re0:
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Hardware inventory:
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| Item             | Version | Part number | CLEI code  | FRU model number      |
|------------------|---------|-------------|------------|-----------------------|
| Midplane         | REV 04  | 710-017247  |            | CHAS-BP-T1600-S       |
| FPM Display      | REV 01  | 710-021387  |            | CRAFT-T1600-S         |
| CIP              | REV 06  | 710-002895  |            | CIP-L-T640-S          |
| PEM 0            | Rev 02  | 740-023211  | IPUPAC8KTA | PWR-T1600-4-60-DC-S   |
| SCG 0            | REV 15  | 710-003423  |            | SCG-T-S               |
| SCG 1            | REV 15  | 710-003423  |            | SCG-T-S               |
| Routing Engine 0 | REV 01  | 740-026941  |            | RE-DUO-C1800-8G-S     |
| Routing Engine 1 | REV 01  | 740-026941  |            | RE-DUO-C1800-8G-S     |
| CB 0             | REV 06  | 710-022597  |            | CB-LCC-S              |
| CB 1             | REV 06  | 710-022597  |            | CB-LCC-S              |
| FPC 0            | REV 02  | 710-010845  |            | T640-FPC4-ES          |
| PIC 0            | REV 11  | 750-017405  |            | PD-4XGE-XFP           |
| FPC 1            | REV 16  | 710-013037  |            | T1600-FPC4-ES         |
| PIC 1            | REV 06  | 750-034781  |            | PD-1CE-CFP            |
| FPC 2            | REV 16  | 710-013037  |            | T1600-FPC4-ES         |
| PIC 1            | REV 05  | 750-034781  |            | PD-1CE-CFP            |
| FPC 3            | REV 10  | 710-021534  |            | T640-FPC1-ES          |
| PIC 0            | REV 13  | 750-012266  |            | PB-4GE-TYPE1-SFP-IQ2  |
| PIC 1            | REV 01  | 750-007641  |            | PE-1GE-SFP-QPP        |
| PIC 3            | REV 17  | 750-007444  |            | PB-1CHSTM1-SMIR-QPP   |
| FPC 4            | REV 06  | 710-013035  |            | T640-FPC3-ES          |
| PIC 0            | REV 22  | 750-007141  |            | PC-10GE-SFP           |
| PIC 1            | REV 16  | 750-009450  |            | PC-10C192-SON-SR2     |
| PIC 2            | REV 05  | 750-004424  |            | PC-1XGE-LR            |
| PIC 3            | REV 12  | 750-013423  |            | PC-MS-500-3           |
| FPC 5            | REV 07  | 710-013560  |            | T640-FPC3-E2          |
| PIC 0            | REV 11  | 750-012793  |            | PC-1XGE-TYPE3-XFP-IQ2 |
| PIC 1            | REV 01  | 750-004695  |            | PC-TUNNEL             |
| PIC 2            | REV 32  | 750-003700  |            | PC-10C192-SON-VSR     |
| PIC 3            | REV 12  | 750-009553  |            | PC-40C48-SON-SFP      |
| FPC 6            | REV 07  | 710-013035  |            | T640-FPC3-ES          |
| PIC 0            | REV 07  | 750-015217  |            | PC-8GE-TYPE3-SFP-IQ2  |
| PIC 1            | REV 03  | 750-003336  |            | PC-40C48-SON-SMSR     |
| PIC 3            | REV 02  | 750-012793  |            | PC-1XGE-TYPE3-XFP-IQ2 |
| FPC 7            | REV 08  | 710-010845  |            | T640-FPC4-ES          |
| PIC 0            | REV 11  | 750-017405  |            | PD-4XGE-XFP           |
| SIB 0            | REV 07  | 710-022594  |            | SIB-TXP-T1600-S       |
| SIB 1            | REV 07  | 710-022594  |            | SIB-TXP-T1600-S       |
| SIB 3            | REV 07  | 710-022594  |            | SIB-TXP-T1600-S       |
| SIB 4            | REV 08  | 710-022594  |            | SIB-TXP-T1600-S       |
| Fan Tray 0       |         |             |            | FANTRAY-T-S           |
| Fan Tray 1       |         |             |            | FANTRAY-T-S           |
| Fan Tray 2       |         |             |            | FANTRAY-TXP-R-S       |

### show chassis hardware detail (TX Matrix Plus Router)

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user@host> show chassis hardware detail
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sfc0-re0:

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Hardware inventory:

| Item             | Version  | Part number | Serial number              | Description        |
|------------------|----------|-------------|----------------------------|--------------------|
| Chassis          |          |             | JN111B023AHB               | TXP                |
| Midplane         | REV 01   | 710-022574  | TR7990                     | SFC Midplane       |
| FPM Display      | REV 03   | 710-024027  | DW4699                     | TXP FPM Display    |
| CIP 0            | REV 01   | 710-023792  | DR1437                     | TXP CIP            |
| CIP 1            | REV 02   | 710-023792  | DS4564                     | TXP CIP            |
| PEM 0            | Rev 07   | 740-027463  | UM26360                    | Power Entry Module |
| Routing Engine 0 | REV 01   | 740-026942  | 737A-1024                  | SFC RE             |
| ad0              | 3887 MB  | SMART CF    | 200811050193CEB1CEB1       | Compact Flash      |
| ad1              | 30533 MB | SAMSUNG     | MCBQE32G8MPP-0V SY814A0762 | Disk 1             |
| Routing Engine 1 | REV 01   | 740-026942  | 737A-1024                  | SFC RE             |
| ad0              | 3887 MB  | SMART CF    | 20081105004C19A019A0       | Compact Flash      |
| ad1              | 30533 MB | SAMSUNG     | MCBQE32G8MPP-0V SY814A0794 | Disk 1             |
| CB 0             | REV 03   | 710-022606  | DR7134                     | SFC Control Board  |
| CB 1             | REV 01   | 710-022606  | DP8890                     | SFC Control Board  |
| SPMB 0           |          | BUILTIN     |                            | SFC Switch CPU     |
| SPMB 1           |          | BUILTIN     |                            | SFC Switch CPU     |
| SIB F13 0        | REV 03   | 750-024564  | DT9478                     | F13 SIB            |
| B Board          | REV 02   | 710-023431  | DT6554                     | F13 SIB            |
| SIB F13 1        | REV 03   | 750-024564  | DT9454                     | F13 SIB            |
| B Board          | REV 02   | 710-023431  | DT6551                     | F13 SIB            |
| SIB F2S 0/0      | REV 02   | 710-022603  | DT2838                     | F2S SIB            |
| B Board          | REV 02   | 710-023787  | DT1725                     | NEO PMB            |
| SIB F2S 0/2      | REV 02   | 710-022603  | DT2824                     | F2S SIB            |
| B Board          | REV 02   | 710-023787  | DT1706                     | NEO PMB            |
| SIB F2S 0/4      | REV 02   | 710-022603  | DT2822                     | F2S SIB            |
| B Board          | REV 02   | 710-023787  | DT1696                     | NEO PMB            |
| SIB F2S 0/6      | REV 02   | 710-022603  | DT2823                     | F2S SIB            |
| B Board          | REV 02   | 710-023787  | DT1717                     | NEO PMB            |
| SIB F2S 1/0      | REV 03   | 710-022603  | DV0059                     | F2S SIB            |
| B Board          | REV 03   | 710-023787  | DT9942                     | NEO PMB            |
| SIB F2S 1/2      | REV 02   | 710-022603  | DT2826                     | F2S SIB            |
| B Board          | REV 02   | 710-023787  | DT1713                     | NEO PMB            |
| SIB F2S 1/4      | REV 03   | 710-022603  | DV0092                     | F2S SIB            |
| B Board          | REV 03   | 710-023787  | DV0000                     | NEO PMB            |
| SIB F2S 1/6      | REV 03   | 710-022603  | DV0079                     | F2S SIB            |
| B Board          | REV 03   | 710-023787  | DT9972                     | NEO PMB            |
| SIB F2S 2/0      | REV 03   | 710-022603  | DV0100                     | F2S SIB            |
| B Board          | REV 03   | 710-023787  | DT9925                     | NEO PMB            |
| SIB F2S 2/2      | REV 03   | 710-022603  | DV0050                     | F2S SIB            |
| B Board          | REV 03   | 710-023787  | DV0005                     | NEO PMB            |
| SIB F2S 2/4      | REV 03   | 710-022603  | DV0097                     | F2S SIB            |
| B Board          | REV 03   | 710-023787  | DT9936                     | NEO PMB            |
| Fan Tray 0       | REV 02   | 760-024497  | DR8286                     | Front Fan Tray     |
| Fan Tray 1       | REV 06   | 760-024497  | DV9624                     | Front Fan Tray     |
| Fan Tray 2       | REV 02   | 760-024502  | DR8259                     | Rear Fan Tray      |
| Fan Tray 3       | REV 02   | 760-024502  | DR8270                     | Rear Fan Tray      |
| Fan Tray 4       | REV 02   | 760-024502  | DR8284                     | Rear Fan Tray      |
| Fan Tray 5       | REV 06   | 760-024502  | DV7813                     | Rear Fan Tray      |

lcc0-re0:

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Hardware inventory:

| Item        | Version | Part number | Serial number | Description        |
|-------------|---------|-------------|---------------|--------------------|
| Chassis     |         |             | JN1101F27AHA  | T1600              |
| Midplane    | REV 04  | 710-017247  | RC5317        | T Series Backplane |
| FPM GBUS    | REV 10  | 710-002901  | DS8197        | T640 FPM Board     |
| FPM Display | REV 01  | 710-021387  | DS6433        | T1600 FPM Display  |

|                  |          |            |                            |                         |
|------------------|----------|------------|----------------------------|-------------------------|
| CIP              | REV 06   | 710-002895 | DS1493                     | T Series CIP            |
| PEM 0            | Rev 08   | 740-017906 | UD26601                    | Power Entry Module 3x80 |
| SCG 0            | REV 15   | 710-003423 | DP5847                     | T640 Sonet Clock Gen.   |
| SCG 1            | REV 15   | 710-003423 | DR0924                     | T640 Sonet Clock Gen.   |
| Routing Engine 0 | REV 01   | 740-026942 | 737F-1024                  | LCC RE                  |
| ad0              | 3887 MB  | SMART CF   | 2008110502B63E513E51       | Compact Flash           |
| ad1              | 30533 MB | SAMSUNG    | MCBQE32G8MPP-0V SY814A1208 | Disk 1                  |
| Routing Engine 1 | REV 01   | 740-026942 | 737F-1024                  | LCC RE                  |
| ad0              | 3887 MB  | SMART CF   | 2008110500F9A8A8A8A8       | Compact Flash           |
| ad1              | 30533 MB | SAMSUNG    | MCBQE32G8MPP-0V SY814A1076 | Disk 1                  |
| CB 0             | REV 05   | 710-022597 | DV4264                     | LCC Control Board       |
| CB 1             | REV 03   | 710-022597 | DP8558                     | LCC Control Board       |
| FPC 0            | REV 14   | 710-013037 | DS9967                     | FPC Type 4-ES           |
| CPU              | REV 08   | 710-016744 | DS3989                     | ST-PMB2                 |
| PIC 0            | REV 12   | 750-013198 | DL7506                     | 1x Tunnel               |
| PIC 1            | REV 12   | 750-013198 | DL7505                     | 1x Tunnel               |
| MMB 0            | REV 01   | 710-025563 | DS8524                     | ST-MMB2                 |
| MMB 1            | REV 01   | 710-025563 | DS8373                     | ST-MMB2                 |
| FPC 1            | REV 14   | 710-013037 | DT0027                     | FPC Type 4-ES           |
| CPU              | REV 09   | 710-016744 | DS7684                     | ST-PMB2                 |
| PIC 0            | REV 12   | 750-013198 | DL7512                     | 1x Tunnel               |
| PIC 1            | REV 12   | 750-013198 | DL7498                     | 1x Tunnel               |
| MMB 0            | REV 01   | 710-025563 | DS8494                     | ST-MMB2                 |
| MMB 1            | REV 01   | 710-025563 | DS8436                     | ST-MMB2                 |
| SPMB 0           | REV 04   | 710-023321 | DV3867                     | LCC Switch CPU          |
| SPMB 1           | REV 02   | 710-023321 | DP0238                     | LCC Switch CPU          |
| SIB 0            | REV 06   | 710-022594 | DT8268                     | LCC SIB                 |
| B Board          | REV 06   | 710-023185 | DT5791                     | LCC SIB Mezz            |
| SIB 1            | REV 06   | 710-022594 | DT8261                     | LCC SIB                 |
| B Board          | REV 06   | 710-023185 | DT5769                     | LCC SIB Mezz            |
| SIB 2            | REV 04   | 710-022594 | DS2315                     | LCC SIB                 |
| B Board          | REV 06   | 710-023185 | DT5788                     | LCC SIB Mezz            |
| SIB 3            | REV 06   | 710-022594 | DT8253                     | LCC SIB                 |
| B Board          | REV 06   | 710-023185 | DT5811                     | LCC SIB Mezz            |
| SIB 4            | REV 06   | 710-022594 | DT8248                     | LCC SIB                 |
| B Board          | REV 06   | 710-023185 | DT5812                     | LCC SIB Mezz            |
| Fan Tray 0       |          |            |                            | Front Top Fan Tray      |
| Fan Tray 1       |          |            |                            | Front Bottom Fan Tray   |
| Fan Tray 2       |          |            |                            | Rear Fan Tray           |

### show chassis hardware models (TX Matrix Plus Router)

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user@host> show chassis hardware models
sfc0-re0:
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#### Hardware inventory:

| Item             | Version | Part number | Serial number | FRU model number               |
|------------------|---------|-------------|---------------|--------------------------------|
| FPM Display      | REV 03  | 710-024027  | DX0282        | CRAFT-TXP                      |
| CIP 0            | REV 04  | 710-023792  | DW4889        | CIP-TXP                        |
| CIP 1            | REV 04  | 710-023792  | DW4887        | CIP-TXP                        |
| PEM 0            | Rev 07  | 740-027463  | UM26368       | yyyyyyyyyyyyyyyyyyyyyyyyyyyyyy |
| Routing Engine 0 | REV 01  | 740-026942  | 737A-1064     | RE-TXP-SFC-DU0-2600-16G        |
| Routing Engine 1 | REV 01  | 740-026942  | 737A-1082     | RE-TXP-SFC-DU0-2600-16G        |
| CB 0             | REV 09  | 710-022606  | DW6099        | CB-TXP                         |
| CB 1             | REV 09  | 710-022606  | DW6096        | CB-TXP                         |
| SIB F13 1        | REV 04  | 750-024564  | DW5776        | SIB-TXP-F13                    |
| SIB F13 3        | REV 04  | 750-024564  | DW5762        | SIB-TXP-F13                    |
| SIB F13 4        | REV 04  | 750-024564  | DW5797        | SIB-TXP-F13                    |
| SIB F13 6        | REV 04  | 750-024564  | DW5770        | SIB-TXP-F13                    |
| SIB F13 7        | REV 04  | 750-024564  | DW5758        | SIB-TXP-F13                    |
| SIB F13 8        | REV 04  | 750-024564  | DW5761        | SIB-TXP-F13                    |

|             |        |            |        |               |
|-------------|--------|------------|--------|---------------|
| SIB F13 9   | REV 04 | 750-024564 | DW5754 | SIB-TXP-F13   |
| SIB F13 12  | REV 04 | 750-024564 | DW5794 | SIB-TXP-F13   |
| SIB F2S 0/0 | REV 05 | 710-022603 | DW7897 |               |
| SIB F2S 0/2 | REV 05 | 710-022603 | DW7833 |               |
| SIB F2S 0/4 | REV 05 | 710-022603 | DW7875 |               |
| SIB F2S 0/6 | REV 05 | 710-022603 | DW7860 |               |
| SIB F2S 1/0 | REV 04 | 710-022603 | DW4820 |               |
| SIB F2S 1/2 | REV 05 | 710-022603 | DW7849 |               |
| SIB F2S 1/4 | REV 05 | 710-022603 | DW7927 | SIB-TXP-F2S   |
| SIB F2S 1/6 | REV 05 | 710-022603 | DW7866 |               |
| SIB F2S 2/0 | REV 05 | 710-022603 | DW7880 |               |
| SIB F2S 2/2 | REV 05 | 710-022603 | DW7895 |               |
| SIB F2S 2/4 | REV 05 | 710-022603 | DW7907 |               |
| SIB F2S 2/6 | REV 05 | 710-022603 | DW7785 |               |
| SIB F2S 3/0 | REV 05 | 710-022603 | DW7782 |               |
| SIB F2S 3/2 | REV 05 | 710-022603 | DW7793 |               |
| SIB F2S 3/4 | REV 05 | 710-022603 | DW7779 |               |
| SIB F2S 3/6 | REV 05 | 710-022603 | DW7930 |               |
| SIB F2S 4/0 | REV 05 | 710-022603 | DW7867 |               |
| SIB F2S 4/2 | REV 05 | 710-022603 | DW7917 |               |
| SIB F2S 4/4 | REV 05 | 710-022603 | DW7929 |               |
| SIB F2S 4/6 | REV 05 | 710-022603 | DW7870 |               |
| Fan Tray 0  | REV 06 | 760-024497 | DV7831 | FANTRAY-TXP-F |
| Fan Tray 1  | REV 06 | 760-024497 | DV9614 | FANTRAY-TXP-F |
| Fan Tray 2  | REV 06 | 760-024502 | DV9618 | FANTRAY-TXP-R |
| Fan Tray 3  | REV 06 | 760-024502 | DV9616 | FANTRAY-TXP-R |
| Fan Tray 4  | REV 06 | 760-024502 | DV7807 | FANTRAY-TXP-R |
| Fan Tray 5  | REV 06 | 760-024502 | DV7828 | FANTRAY-TXP-R |

lcc0-re0:

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Hardware inventory:

| Item        | Version | Part number | Serial number | FRU model number    |
|-------------|---------|-------------|---------------|---------------------|
| Midplane    | REV 03  | 710-017247  | RC3765        | CHAS-BP-T1600-S     |
| FPM Display | REV 01  | 710-021387  | DN5441        | CRAFT-T1600-S       |
| CIP         | REV 06  | 710-002895  | DP6021        | CIP-L-T640-S        |
| PEM 0       | Rev 07  | 740-017906  | UA26384       | PWR-T1600-3-80-DC-S |
| PEM 1       | Rev 07  | 740-017906  | UA26296       | PWR-T1600-3-80-DC-S |
| SCG 0       | REV 15  | 710-003423  | DR0875        | SCG-T-S             |
| CB 0        | REV 06  | 710-022597  | DW8534        | CB-LCC              |
| CB 1        | REV 06  | 710-022597  | DW8527        | CB-LCC              |
| FPC 4       | REV 12  | 710-013037  | DJ8717        | T1600-FPC4-ES       |
| PIC 0       | REV 11  | 750-017405  | DP8795        | PD-4XGE-XFP         |
| PIC 1       | REV 11  | 750-017405  | DP8794        | PD-4XGE-XFP         |
| FPC 6       | REV 14  | 710-013037  | DS5335        | T1600-FPC4-ES       |
| PIC 0       | REV 13  | 750-017405  | DS7634        | PD-4XGE-XFP         |
| PIC 1       | REV 13  | 750-017405  | DS7637        | PD-4XGE-XFP         |
| FPC 7       | REV 07  | 710-013035  | DM0990        | T1600-FPC3-ES       |
| PIC 0       | REV 16  | 750-007141  | JJ8067        | PC-10GE-SFP         |
| PIC 1       | REV 08  | 750-015749  | WE9598        | PC-10C192-SON-XFP   |
| PIC 2       | REV 10  | 750-009450  | HX6466        | PC-10C192-SON-SR2   |
| SIB 0       | REV 08  | 710-022594  | DW8033        | SIB-TXP-T1600-S     |
| SIB 1       | REV 08  | 710-022594  | DW8044        | SIB-TXP-T1600-S     |
| SIB 2       | REV 08  | 710-022594  | DW8020        | SIB-TXP-T1600-S     |
| SIB 3       | REV 08  | 710-022594  | DW8063        | SIB-TXP-T1600-S     |
| SIB 4       | REV 08  | 710-022594  | DW8064        | SIB-TXP-T1600-S     |
| Fan Tray 0  |         |             |               | FANTRAY-T-S         |
| Fan Tray 1  |         |             |               | FANTRAY-T-S         |
| Fan Tray 2  |         |             |               | FANTRAY-TXP-R-S     |

lcc1-re0:

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Hardware inventory:

| Item        | Version | Part number | Serial number | FRU model number    |
|-------------|---------|-------------|---------------|---------------------|
| Midplane    | REV 04  | 710-017247  | RC5361        | CHAS-BP-T1600-S     |
| FPM Display | REV 01  | 710-021387  | DS6430        | CRAFT-T1600-S       |
| CIP         | REV 06  | 710-002895  | DS4239        | CIP-L-T640-S        |
| PEM 0       | Rev 08  | 740-017906  | UD26649       | PWR-T1600-3-80-DC-S |
| SCG 0       | REV 15  | 710-003423  | DP5820        | SCG-T-S             |
| CB 0        | REV 06  | 710-022597  | DW8523        | CB-LCC              |
| CB 1        | REV 06  | 710-022597  | DW8528        | CB-LCC              |
| FPC 4       | REV 12  | 710-013037  | DP8509        | T1600-FPC4-ES       |
| PIC 0       | REV 11  | 750-017405  | DP8808        | PD-4XGE-XFP         |
| PIC 1       | REV 11  | 750-017405  | DP7263        | PD-4XGE-XFP         |
| FPC 6       | REV 14  | 710-013037  | DS9961        | T1600-FPC4-ES       |
| PIC 0       | REV 13  | 750-017405  | DS5532        | PD-4XGE-XFP         |
| PIC 1       | REV 13  | 750-017405  | DS7639        | PD-4XGE-XFP         |
| FPC 7       | REV 03  | 710-013035  | DF5564        | T1600-FPC3-ES       |
| PIC 0       | REV 16  | 750-007141  | JJ8063        | PC-10GE-SFP         |
| SIB 0       | REV 08  | 710-022594  | DW8035        | SIB-TXP-T1600-S     |
| SIB 1       | REV 10  | 710-022594  | DX7672        | SIB-TXP-T1600-S     |
| SIB 2       | REV 08  | 710-022594  | DW8060        | SIB-TXP-T1600-S     |
| SIB 3       | REV 08  | 710-022594  | DW8072        | SIB-TXP-T1600-S     |
| SIB 4       | REV 08  | 710-022594  | DW8043        | SIB-TXP-T1600-S     |
| Fan Tray 0  |         |             |               | FANTRAY-T-S         |
| Fan Tray 1  |         |             |               | FANTRAY-T-S         |
| Fan Tray 2  |         |             |               | FANTRAY-TXP-R-S     |

1cc2-re0:

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Hardware inventory:

| Item        | Version | Part number | Serial number | FRU model number    |
|-------------|---------|-------------|---------------|---------------------|
| Midplane    | REV 03  | 710-017247  | RC3956        | CHAS-BP-T1600-S     |
| FPM Display | REV 01  | 710-021387  | DN7030        | CRAFT-T1600-S       |
| CIP         | REV 06  | 710-002895  | DM3962        | CIP-L-T640-S        |
| PEM 0       | Rev 08  | 740-017906  | UD26519       | PWR-T1600-3-80-DC-S |
| PEM 1       | Rev 07  | 740-017906  | UC26601       | PWR-T1600-3-80-DC-S |
| SCG 0       | REV 15  | 710-003423  | DP0277        | SCG-T-S             |
| CB 0        | REV 06  | 710-022597  | DW8524        | CB-LCC              |
| CB 1        | REV 06  | 710-022597  | DW8536        | CB-LCC              |
| FPC 4       | REV 12  | 710-013037  | DR1194        | T1600-FPC4-ES       |
| PIC 0       | REV 11  | 750-017405  | DP8811        | PD-4XGE-XFP         |
| PIC 1       | REV 11  | 750-017405  | DP8823        | PD-4XGE-XFP         |
| FPC 5       | REV 12  | 710-013037  | DR1184        | T1600-FPC4-ES       |
| PIC 1       | REV 11  | 750-017405  | DP4744        | PD-4XGE-XFP         |
| FPC 6       | REV 12  | 710-013037  | DN8622        | T1600-FPC4-ES       |
| PIC 0       | REV 14  | 750-012518  | JY9924        | PD-40C192-S0N-XFP   |
| PIC 1       | REV 11  | 750-017405  | DP8776        | PD-4XGE-XFP         |
| FPC 7       | REV 04  | 710-013560  | JR3968        | T640-FPC3-E2        |
| PIC 0       | REV 16  | 750-007141  | NC9330        | PC-10GE-SFP         |
| SIB 0       | REV 07  | 710-022594  | DW4217        | SIB-TXP-T1600-S     |
| SIB 1       | REV 07  | 710-022594  | DW4213        | SIB-TXP-T1600-S     |
| SIB 2       | REV 07  | 710-022594  | DW4189        | SIB-TXP-T1600-S     |
| SIB 3       | REV 07  | 710-022594  | DW4173        | SIB-TXP-T1600-S     |
| SIB 4       | REV 07  | 710-022594  | DW4201        | SIB-TXP-T1600-S     |
| Fan Tray 0  |         |             |               | FANTRAY-T-S         |
| Fan Tray 1  |         |             |               | FANTRAY-T-S         |
| Fan Tray 2  |         |             |               | FANTRAY-TXP-R-S     |

1cc3-re0:

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Hardware inventory:

| Item        | Version | Part number | Serial number | FRU model number    |
|-------------|---------|-------------|---------------|---------------------|
| Midplane    | REV 04  | 710-017247  | RC5319        | CHAS-BP-T1600-S     |
| FPM Display | REV 01  | 710-021387  | DS6402        | CRAFT-T1600-S       |
| CIP         | REV 06  | 710-002895  | DR9973        | CIP-L-T640-S        |
| PEM 0       | Rev 07  | 740-017906  | UC26496       | PWR-T1600-3-80-DC-S |
| PEM 1       | Rev 07  | 740-017906  | UC26599       | PWR-T1600-3-80-DC-S |
| SCG 0       | REV 15  | 710-003423  | DP5831        | SCG-T-S             |
| CB 0        | REV 06  | 710-022597  | DW8533        | CB-LCC              |
| CB 1        | REV 06  | 710-022597  | DW8538        | CB-LCC              |
| FPC 0       | REV 14  | 710-013037  | DS5345        | T1600-FPC4-ES       |
| PIC 0       | REV 13  | 750-017405  | DS7641        | PD-4XGE-XFP         |
| PIC 1       | REV 13  | 750-017405  | DS5479        | PD-4XGE-XFP         |
| FPC 1       | REV 14  | 710-013037  | DS7338        | T1600-FPC4-ES       |
| PIC 0       | REV 13  | 750-017405  | DS7631        | PD-4XGE-XFP         |
| PIC 1       | REV 13  | 750-017405  | DS7632        | PD-4XGE-XFP         |
| FPC 2       | REV 14  | 710-013037  | DS9962        | T1600-FPC4-ES       |
| PIC 0       | REV 13  | 750-017405  | DS7581        | PD-4XGE-XFP         |
| PIC 1       | REV 13  | 750-017405  | DS7627        | PD-4XGE-XFP         |
| FPC 4       | REV 10  | 710-010845  | JZ6573        | T640-FPC4-ES        |
| PIC 0       | REV 14  | 750-012518  | JT5124        | PD-40C192-SON-XFP   |
| FPC 5       | REV 14  | 710-013037  | DT0016        | T1600-FPC4-ES       |
| PIC 0       | REV 14  | 750-012518  | JY9918        | PD-40C192-SON-XFP   |
| FPC 7       | REV 07  | 710-013035  | DM0967        | T1600-FPC3-ES       |
| PIC 0       | REV 16  | 750-007141  | JJ8059        | PC-10GE-SFP         |
| PIC 1       | REV 13  | 750-004695  | DM5712        | PC-TUNNEL           |
| SIB 0       | REV 07  | 710-022594  | DW4174        | SIB-TXP-T1600-S     |
| SIB 1       | REV 07  | 710-022594  | DW4207        | SIB-TXP-T1600-S     |
| SIB 2       | REV 06  | 710-022594  | DT8231        | SIB-TXP-T1600-S     |
| SIB 3       | REV 07  | 710-022594  | DW4175        | SIB-TXP-T1600-S     |
| SIB 4       | REV 07  | 710-022594  | DW4209        | SIB-TXP-T1600-S     |
| Fan Tray 0  |         |             |               | FANTRAY-T-S         |
| Fan Tray 1  |         |             |               | FANTRAY-T-S         |
| Fan Tray 2  |         |             |               | FANTRAY-TXP-R-S     |

### show chassis hardware (TX Matrix Plus router with 3D SIBs)

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user@host> show chassis hardware
sfc0-re0:
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#### Hardware inventory:

| Item             | Version | Part number | Serial number | Description        |
|------------------|---------|-------------|---------------|--------------------|
| Chassis          |         |             | JN11CAAA4AHB  | TXP                |
| Midplane         | REV 05  | 710-022574  | ABAC4696      | SFC Midplane       |
| FPM Display      | REV 09  | 710-024027  | EH3138        | TXP FPM Display    |
| CIP 0            | REV 12  | 710-023792  | EF6349        | TXP CIP            |
| CIP 1            | REV 12  | 710-023792  | EG5294        | TXP CIP            |
| PEM 0            | Rev 06  | 740-027463  | XH04595       | Power Entry Module |
| PEM 1            | Rev 06  | 740-027463  | XH04592       | Power Entry Module |
| Routing Engine 0 | REV 07  | 740-026942  | P737A-002541  | RE-DUO-2600        |
| Routing Engine 1 | REV 07  | 740-026942  | P737A-002602  | RE-DUO-2600        |
| CB 0             | REV 15  | 710-022606  | EH4376        | SFC Control Board  |
| CB 1             | REV 15  | 710-022606  | EH4379        | SFC Control Board  |
| SPMB 0           |         | BUILTIN     |               | SFC Switch CPU     |
| SPMB 1           |         | BUILTIN     |               | SFC Switch CPU     |
| SIB F13 0        | REV 10  | 750-035002  | EM9305        | F13 SIB 3D         |
| B Board          | REV 06  | 711-035082  | EM9667        | F13 SIB 3D Mezz    |
| P Board          | REV 05  | 711-043544  | EM9708        | F13 SIB 3D Power   |
| Xcvr 0           | REV 01  | 740-047547  | XB34FB00S     | CXP Module         |
| Xcvr 2           | REV 01  | 740-047547  | XB48FB01H     | CXP Module         |
| Xcvr 4           | REV 01  | 740-047547  | XB34FB02W     | CXP Module         |
| Xcvr 6           | REV 01  | 740-047547  | XB34FB01T     | CXP Module         |

|             |        |            |           |                  |
|-------------|--------|------------|-----------|------------------|
| Xcvr 8      | REV 01 | 740-047547 | XB48FB00W | CXP Module       |
| Xcvr 10     | REV 01 | 740-047547 | XB34FB01S | CXP Module       |
| Xcvr 12     | REV 01 | 740-047547 | XB34FB03H | CXP Module       |
| Xcvr 14     | REV 01 | 740-047547 | XB34FB023 | CXP Module       |
| SIB F13 3   | REV 01 | 710-035001 | EJ2612    | F13 SIB 3D       |
| B Board     | REV 01 | 711-035082 | EJ3815    | F13 SIB 3D Mezz  |
| P Board     | REV 01 | 711-043544 | EJ2678    | F13 SIB 3D Power |
| Xcvr 0      | REV 01 | 740-047547 | XB48FB04C | CXP Module       |
| Xcvr 2      | REV 01 | 740-047547 | XB48FB00Z | CXP Module       |
| Xcvr 4      | REV 01 | 740-047547 | XB47FB036 | CXP Module       |
| Xcvr 6      | REV 01 | 740-047547 | XB47FB029 | CXP Module       |
| Xcvr 8      | REV 01 | 740-047547 | XB48FB02N | CXP Module       |
| Xcvr 10     | REV 01 | 740-047547 | XB42FB0CS | CXP Module       |
| Xcvr 12     | REV 01 | 740-047547 | XB47FB01X | CXP Module       |
| Xcvr 14     | REV 01 | 740-047547 | XB48FB02F | CXP Module       |
| SIB F13 6   | REV 05 | 750-035002 | EK2675    | F13 SIB 3D       |
| B Board     | REV 03 | 711-035082 | EK2612    | F13 SIB 3D Mezz  |
| P Board     | REV 04 | 711-043544 | EK1179    | F13 SIB 3D Power |
| Xcvr 0      | REV 01 | 740-047547 | XB48FB01T | CXP Module       |
| Xcvr 2      | REV 01 | 740-047547 | XB48FB02M | CXP Module       |
| Xcvr 4      | REV 01 | 740-047547 | XB48FB031 | CXP Module       |
| Xcvr 6      | REV 01 | 740-047547 | XB48FB04P | CXP Module       |
| Xcvr 8      | REV 01 | 740-047547 | XB48FB02T | CXP Module       |
| Xcvr 10     | REV 01 | 740-047547 | XB34FB01V | CXP Module       |
| Xcvr 12     | REV 01 | 740-047547 | XB48FB02C | CXP Module       |
| Xcvr 14     |        | NON-JNPR   |           | No Module        |
| SIB F13 12  | REV 01 | 710-035001 | EJ2631    | F13 SIB 3D       |
| B Board     | REV 01 | 711-035082 | EJ3808    | F13 SIB 3D Mezz  |
| P Board     | REV 01 | 711-043544 | EJ2676    | F13 SIB 3D Power |
| SIB F2S 0/0 | REV 01 | 711-034977 | EH9829    | F2S SIB 3D       |
| B Board     | REV 01 | 711-034979 | EH9927    | F2S SIB 3D Mezz  |
| SIB F2S 0/2 | REV 01 | 711-034977 | EH9791    | F2S SIB 3D       |
| B Board     | REV 01 | 711-034979 | EH9852    | F2S SIB 3D Mezz  |
| SIB F2S 0/4 | REV 01 | 711-034977 | EH9803    | F2S SIB 3D       |
| B Board     | REV 01 | 711-034979 | EH9915    | F2S SIB 3D Mezz  |
| SIB F2S 0/6 | REV 01 | 711-034977 | EH9763    | F2S SIB 3D       |
| B Board     | REV 01 | 711-034979 | EH9880    | F2S SIB 3D Mezz  |
| SIB F2S 1/0 | REV 01 | 711-034977 | EH9757    | F2S SIB 3D       |
| B Board     | REV 01 | 711-034979 | EH9889    | F2S SIB 3D Mezz  |
| SIB F2S 1/2 | REV 01 | 711-034977 | EH9815    | F2S SIB 3D       |
| B Board     | REV 01 | 711-034979 | EH9890    | F2S SIB 3D Mezz  |
| SIB F2S 1/4 | REV 08 | 750-034978 | EN1954    | F2S SIB 3D       |
| B Board     | REV 02 | 711-034979 | EN1436    | F2S SIB 3D Mezz  |
| SIB F2S 1/6 | REV 01 | 711-034977 | EJ7054    | F2S SIB 3D       |
| B Board     | REV 01 | 711-034979 | EJ8238    | F2S SIB 3D Mezz  |
| SIB F2S 2/0 | REV 01 | 711-034977 | EH9830    | F2S SIB 3D       |
| B Board     | REV 01 | 711-034979 | EH9844    | F2S SIB 3D Mezz  |
| SIB F2S 2/2 | REV 01 | 711-034977 | EH9818    | F2S SIB 3D       |
| B Board     | REV 01 | 711-034979 | EH9888    | F2S SIB 3D Mezz  |
| SIB F2S 2/4 | REV 01 | 711-034977 | EH9795    | F2S SIB 3D       |
| B Board     | REV 01 | 711-034979 | EH9869    | F2S SIB 3D Mezz  |
| SIB F2S 2/6 | REV 01 | 711-034977 | EJ7026    | F2S SIB 3D       |
| B Board     | REV 01 | 711-034979 | EJ8273    | F2S SIB 3D Mezz  |
| SIB F2S 3/0 | REV 01 | 711-034977 | EH9811    | F2S SIB 3D       |
| B Board     | REV 01 | 711-034979 | EH9892    | F2S SIB 3D Mezz  |
| SIB F2S 3/2 | REV 01 | 711-034977 | EH9812    | F2S SIB 3D       |
| B Board     | REV 01 | 711-034979 | EH9877    | F2S SIB 3D Mezz  |
| SIB F2S 3/4 | REV 08 | 750-034978 | EN1947    | F2S SIB 3D       |
| B Board     | REV 02 | 711-034979 | EN1471    | F2S SIB 3D Mezz  |
| Fan Tray 0  | REV 10 | 760-024497 | EH3313    | Front Fan Tray   |
| Fan Tray 1  | REV 10 | 760-024497 | EH3290    | Front Fan Tray   |

|            |        |            |        |               |
|------------|--------|------------|--------|---------------|
| Fan Tray 2 | REV 10 | 760-024502 | EH3292 | Rear Fan Tray |
| Fan Tray 3 | REV 10 | 760-024502 | EH3287 | Rear Fan Tray |
| Fan Tray 4 | REV 10 | 760-024502 | EH3286 | Rear Fan Tray |
| Fan Tray 5 | REV 10 | 760-024502 | EH3285 | Rear Fan Tray |

lcc0-re0:

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Hardware inventory:

| Item             | Version | Part number | Serial number | Description             |
|------------------|---------|-------------|---------------|-------------------------|
| Chassis          |         |             | JN11B23FEAHA  | T1600                   |
| Midplane         | REV 01  | 710-027486  | RC9787        | T-series Backplane      |
| FPM GBUS         | REV 13  | 710-002901  | BBAG5132      | T640 FPM Board          |
| FPM Display      | REV 04  | 710-021387  | BBAL9612      | T1600 FPM Display       |
| CIP              | REV 06  | 710-002895  | BBAN0605      | T-series CIP            |
| PEM 0            | REV 05  | 740-036442  | 1G022060143   | Power Entry Module 6x60 |
| PEM 1            | REV 05  | 740-036442  | 1G022060011   | Power Entry Module 6x60 |
| SCG 0            | REV 18  | 710-003423  | BBAL7318      | T640 Sonet Clock Gen.   |
| SCG 1            | REV 18  | 710-003423  | BBAL7255      | T640 Sonet Clock Gen.   |
| Routing Engine 0 | REV 07  | 740-026941  | P737F-002933  | RE-DUO-1800             |
| Routing Engine 1 | REV 06  | 740-026941  | P737F-002749  | RE-DUO-1800             |
| CB 0             | REV 11  | 710-022597  | EH3611        | LCC Control Board       |
| CB 1             | REV 11  | 710-022597  | EH4798        | LCC Control Board       |
| FPC 5            | REV 17  | 710-013037  | BBAC5333      | FPC Type 4-ES           |
| CPU              | REV 10  | 710-016744  | BBAB7619      | ST-PMB2                 |
| PIC 0            | REV 18  | 750-017405  | BBAE3420      | 4x 10GE (LAN/WAN) XFP   |
| Xcvr 0           | REV 03  | 740-014289  | T10C90659     | XFP-10G-SR              |
| MMB 0            | REV 05  | 710-025563  | BBAB9538      | ST-MMB2                 |
| MMB 1            | REV 05  | 710-025563  | BBAB9502      | ST-MMB2                 |
| FPC 7            | REV 01  | 750-045173  | BBAV0032      | FPC Type 5-3D           |
| CPU              |         |             |               |                         |
| SPMB 0           | REV 05  | 710-023321  | EG9434        | LCC Switch CPU          |
| SPMB 1           | REV 05  | 710-023321  | EH3878        | LCC Switch CPU          |
| SIB 0            | REV 01  | 750-041657  | EH7997        | LCC SIB 3D              |
| B Board          | REV 01  | 711-042424  | EH7674        | LCC SIB 3D Mezz         |
| Xcvr 0           | REV 01  | 740-047547  | XB48FB014     | CXP Module              |
| Xcvr 2           | REV 01  | 740-047547  | XB48FB05A     | CXP Module              |
| Xcvr 4           | REV 01  | 740-047547  | XB48FB052     | CXP Module              |
| Xcvr 6           | REV 01  | 740-047547  | XB48FB01B     | CXP Module              |
| SIB 1            | REV 01  | 750-041657  | EH8023        | LCC SIB 3D              |
| B Board          | REV 01  | 711-042424  | EH7659        | LCC SIB 3D Mezz         |
| Xcvr 0           | REV 01  | 740-047547  | XB48FB05J     | CXP Module              |
| Xcvr 2           | REV 01  | 740-047547  | XB48FB01E     | CXP Module              |
| Xcvr 4           | REV 01  | 740-047547  | XB48FB01J     | CXP Module              |
| Xcvr 6           | REV 01  | 740-047547  | XB48FB02S     | CXP Module              |
| SIB 2            | REV 03  | 750-041657  | EJ6554        | LCC SIB 3D              |
| B Board          | REV 02  | 711-042424  | EJ5756        | LCC SIB 3D Mezz         |
| Xcvr 0           | REV 01  | 740-047547  | XB34FB01Z     | CXP Module              |
| Xcvr 2           | REV 01  | 740-047547  | XB34FB013     | CXP Module              |
| Xcvr 4           | REV 01  | 740-047547  | XB48FB04Z     | CXP Module              |
| Xcvr 6           | REV 01  | 740-047547  | XB48FB05N     | CXP Module              |
| Fan Tray 0       |         |             |               | Front Top Fan Tray      |
| Fan Tray 1       |         |             |               | Front Bottom Fan Tray   |
| Fan Tray 2       |         |             |               | Rear Fan Tray -- Rev 4  |

lcc2-re0:

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Hardware inventory:

| Item     | Version | Part number | Serial number | Description        |
|----------|---------|-------------|---------------|--------------------|
| Chassis  |         |             | JN11B3975AHA  | T1600              |
| Midplane | REV 01  | 710-027486  | RC9826        | T-series Backplane |
| FPM GBUS | REV 13  | 710-002901  | BBAG5124      | T640 FPM Board     |



|                  |        |            |              |                         |
|------------------|--------|------------|--------------|-------------------------|
| FPM Display      | REV 03 | 710-021387 | BBAJ1112     | T1600 FPM Display       |
| CIP              | REV 06 | 710-002895 | BBAL3744     | T-series CIP            |
| PEM 0            | REV 05 | 740-036442 | 1G022060081  | Power Entry Module 6x60 |
| PEM 1            | REV 05 | 740-036442 | 1G022060188  | Power Entry Module 6x60 |
| SCG 0            | REV 18 | 710-003423 | BBAH8775     | T640 Sonet Clock Gen.   |
| SCG 1            | REV 18 | 710-003423 | BBAL7272     | T640 Sonet Clock Gen.   |
| Routing Engine 0 | REV 07 | 740-026941 | P737F-002992 | RE-DUO-1800             |
| Routing Engine 1 | REV 07 | 740-026941 | P737F-002938 | RE-DUO-1800             |
| CB 0             | REV 11 | 710-022597 | EH4805       | LCC Control Board       |
| CB 1             | REV 11 | 710-022597 | EH4786       | LCC Control Board       |
| FPC 1            | REV 01 | 710-033873 | BBAH0320     | FPC Type 3-ES           |
| CPU              | REV 11 | 710-016744 | BBAF3281     | ST-PMB2                 |
| MMB 0            | REV 06 | 710-025563 | BBAF5061     | ST-MMB2                 |
| FPC 5            | REV 04 | 710-033871 | BBAM5070     | FPC Type 4-ES           |
| CPU              | REV 11 | 710-016744 | BBAM6653     | ST-PMB2                 |
| PIC 1            | REV 20 | 750-017405 | BBAM1296     | 4x 10GE (LAN/WAN) XFP   |
| Xcvr 0           | REV 03 | 740-014289 | T10B42981    | XFP-10G-SR              |
| MMB 0            | REV 07 | 710-025563 | BBAN2631     | ST-MMB2                 |
| MMB 1            | REV 07 | 710-025563 | BBAN2538     | ST-MMB2                 |
| SPMB 0           | REV 05 | 710-023321 | EH3903       | LCC Switch CPU          |
| SPMB 1           | REV 05 | 710-023321 | EH3902       | LCC Switch CPU          |
| SIB 0            | REV 01 | 750-041657 | EH8019       | LCC SIB 3D              |
| B Board          | REV 01 | 711-042424 | EH7680       | LCC SIB 3D Mezz         |
| Xcvr 0           | REV 01 | 740-047547 | XB48FB04F    | CXP Module              |
| Xcvr 2           | REV 01 | 740-047547 | XB48FB04S    | CXP Module              |
| Xcvr 4           | REV 01 | 740-047547 | XB48FB04B    | CXP Module              |
| Xcvr 6           | REV 01 | 740-047547 | XB48FB043    | CXP Module              |
| SIB 1            | REV 01 | 750-041657 | EH8012       | LCC SIB 3D              |
| B Board          | REV 01 | 711-042424 | EH7658       | LCC SIB 3D Mezz         |
| Xcvr 0           | REV 01 | 740-047547 | XB48FB05E    | CXP Module              |
| Xcvr 2           | REV 01 | 740-047547 | XB48FB01Z    | CXP Module              |
| Xcvr 4           | REV 01 | 740-047547 | XB48FB018    | CXP Module              |
| Xcvr 6           | REV 01 | 740-047547 | XB48FB054    | CXP Module              |
| SIB 2            | REV 01 | 750-041657 | EH7993       | LCC SIB 3D              |
| B Board          | REV 01 | 711-042424 | EH7678       | LCC SIB 3D Mezz         |
| Xcvr 0           | REV 01 | 740-047547 | XB48FB05C    | CXP Module              |
| Xcvr 2           | REV 01 | 740-047547 | XB47FB00N    | CXP Module              |
| Xcvr 4           | REV 01 | 740-047547 | XB48FB05U    | CXP Module              |
| Xcvr 6           | REV 01 | 740-047547 | XB48FB05L    | CXP Module              |
| Fan Tray 0       |        |            |              | Front Top Fan Tray      |
| Fan Tray 1       |        |            |              | Front Bottom Fan Tray   |
| Fan Tray 2       |        |            |              | Rear Fan Tray -- Rev 4  |

### show chassis hardware clei-models (TX Matrix Plus router with 3D SIBs)

```
user@host> show chassis hardware clei-models
sfc0-re0:
```

```
-----
Hardware inventory:
```

| Item             | Version | Part number | CLEI code  | FRU model number   |
|------------------|---------|-------------|------------|--------------------|
| Midplane         | REV 05  | 710-022574  |            | CHAS-BP-TXP-S      |
| FPM Display      | REV 09  | 710-024027  |            | CRAFT-TXP-S        |
| CIP 0            | REV 12  | 710-023792  |            | CIP-TXP-S          |
| CIP 1            | REV 12  | 710-023792  |            | CIP-TXP-S          |
| PEM 0            | Rev 06  | 740-027463  | IPUPAFGKTA | PWR-TXP-7-60-DC-S  |
| Routing Engine 0 | REV 07  | 740-026942  |            | RE-DUO-C2600-16G-S |
| Routing Engine 1 | REV 07  | 740-026942  |            | RE-DUO-C2600-16G-S |
| CB 0             | REV 13  | 710-022606  |            | CB-TXP-S           |
| CB 1             | REV 14  | 710-022606  |            | CB-TXP-S           |
| SIB F13 0        | REV 10  | 750-035002  | PROTOXCLEI | SIB-TXP-3D-F13-S   |
| Xcvr 0           | REV 01  | 740-048813  |            |                    |

|           |        |            |            |                  |
|-----------|--------|------------|------------|------------------|
| Xcvr 1    | REV 01 | 740-048813 |            |                  |
| Xcvr 2    | REV 01 | 740-048813 |            |                  |
| Xcvr 3    | REV 01 | 740-048813 |            |                  |
| Xcvr 4    | REV 01 | 740-048813 |            |                  |
| Xcvr 5    | REV 01 | 740-048813 |            |                  |
| Xcvr 6    | REV 01 | 740-048813 |            |                  |
| Xcvr 7    | REV 01 | 740-048813 |            |                  |
| Xcvr 8    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 10   | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 12   | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 14   | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| SIB F13 1 | REV 10 | 750-035002 | PROTOXCLEI | SIB-TXP-3D-F13-S |
| Xcvr 0    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 1    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 2    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 3    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 4    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 5    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 6    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 7    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 8    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 10   | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 12   | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 14   | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 0    | REV 01 | 740-048813 |            |                  |
| Xcvr 1    | REV 01 | 740-048813 |            |                  |
| Xcvr 2    | REV 01 | 740-048813 |            |                  |
| Xcvr 3    | REV 01 | 740-048813 |            |                  |
| Xcvr 4    | REV 01 | 740-048813 |            |                  |
| Xcvr 5    | REV 01 | 740-048813 |            |                  |
| Xcvr 6    | REV 01 | 740-048813 |            |                  |
| Xcvr 7    | REV 01 | 740-048813 |            |                  |
| Xcvr 8    | REV 01 | 740-048813 |            |                  |
| Xcvr 10   | REV 01 | 740-048813 |            |                  |
| Xcvr 12   | REV 01 | 740-048813 |            |                  |
| Xcvr 14   | REV 01 | 740-048813 |            |                  |
| Xcvr 0    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 1    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 2    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 3    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 4    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 5    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 6    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 7    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 8    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 10   | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 12   | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 14   | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| SIB F13 6 | REV 16 | 750-035002 | PROTOXCLEI | SIB-TXP-3D-F13   |
| Xcvr 0    | REV 01 | 740-048813 |            |                  |
| Xcvr 1    | REV 01 | 740-048813 |            |                  |
| Xcvr 2    | REV 01 | 740-048813 |            |                  |
| Xcvr 3    | REV 01 | 740-048813 |            |                  |
| Xcvr 4    | REV 01 | 740-048813 |            |                  |
| Xcvr 5    | REV 01 | 740-048813 |            |                  |
| Xcvr 6    | REV 01 | 740-048813 |            |                  |
| Xcvr 7    | REV 01 | 740-048813 |            |                  |
| Xcvr 8    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 10   | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 12   | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 14   | REV 01 | 740-047547 |            | CXP-TXP-3D       |

|            |        |            |            |                  |
|------------|--------|------------|------------|------------------|
| SIB F13 7  | REV 10 | 750-035002 | PROTOXCLEI | SIB-TXP-3D-F13-S |
| Xcvr 0     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 1     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 2     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 3     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 4     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 5     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 6     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 7     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 8     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 10    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 12    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 14    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 0     | REV 01 | 740-048813 |            |                  |
| Xcvr 1     | REV 01 | 740-048813 |            |                  |
| Xcvr 2     | REV 01 | 740-048813 |            |                  |
| Xcvr 3     | REV 01 | 740-048813 |            |                  |
| Xcvr 4     | REV 01 | 740-048813 |            |                  |
| Xcvr 5     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 6     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 7     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 8     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 10    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 12    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 14    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| SIB F13 9  | REV 16 | 750-035002 | PROTOXCLEI | SIB-TXP-3D-F13   |
| Xcvr 0     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 1     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 2     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 3     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 4     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 5     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 6     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 7     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 8     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 10    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 12    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 14    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| SIB F13 11 | REV 10 | 750-035002 | PROTOXCLEI | 750-035002       |
| Xcvr 0     | REV 01 | 740-048813 |            |                  |
| Xcvr 1     | REV 01 | 740-048813 |            |                  |
| Xcvr 2     | REV 01 | 740-048813 |            |                  |
| Xcvr 3     | REV 01 | 740-048813 |            |                  |
| Xcvr 4     | REV 01 | 740-048813 |            |                  |
| Xcvr 5     | REV 01 | 740-048813 |            |                  |
| Xcvr 6     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 7     | REV 01 | 740-048813 |            |                  |
| Xcvr 8     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 12    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 14    | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| SIB F13 12 | REV 16 | 750-035002 | PROTOXCLEI | SIB-TXP-3D-F13   |
| Xcvr 0     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 1     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 2     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 3     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 4     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 5     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 6     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 7     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 8     | REV 01 | 740-047547 |            | CXP-TXP-3D       |
| Xcvr 10    | REV 01 | 740-047547 |            | CXP-TXP-3D       |

|             |        |            |            |                 |
|-------------|--------|------------|------------|-----------------|
| Xcvr 12     | REV 01 | 740-047547 |            | CXP-TXP-3D      |
| Xcvr 14     | REV 01 | 740-047547 |            | CXP-TXP-3D      |
| SIB F2S 0/0 | REV 06 | 750-034978 | PROTOXCLEI | SIB-TXP-3D-F2S  |
| SIB F2S 0/2 | REV 07 | 750-034978 | PROTOXCLEI | SIB-TXP-3D-F2S  |
| SIB F2S 0/4 | REV 06 | 750-034978 | PROTOXCLEI | SIB-TXP-3D-F2S  |
| SIB F2S 0/6 | REV 06 | 750-034978 | PROTOXCLEI | SIB-TXP-3D-F2S  |
| SIB F2S 1/0 | REV 07 | 750-034978 | PROTOXCLEI | SIB-TXP-3D-F2S  |
| SIB F2S 1/2 | REV 07 | 750-034978 | PROTOXCLEI | SIB-TXP-3D-F2S  |
| SIB F2S 1/4 | REV 07 | 750-034978 | PROTOXCLEI | SIB-TXP-3D-F2S  |
| SIB F2S 1/6 | REV 08 | 750-034978 | PROTOXCLEI | SIB-TXP-3D-F2S  |
| SIB F2S 2/0 | REV 06 | 750-034978 | PROTOXCLEI | SIB-TXP-3D-F2S  |
| SIB F2S 2/2 | REV 06 | 750-034978 | PROTOXCLEI | SIB-TXP-3D-F2S  |
| SIB F2S 2/4 | REV 07 | 750-034978 | PROTOXCLEI | SIB-TXP-3D-F2S  |
| SIB F2S 2/6 | REV 06 | 750-034978 | PROTOXCLEI | SIB-TXP-3D-F2S  |
| SIB F2S 3/0 | REV 07 | 750-034978 | PROTOXCLEI | SIB-TXP-3D-F2S  |
| SIB F2S 3/2 | REV 06 | 750-034978 | PROTOXCLEI | SIB-TXP-3D-F2S  |
| SIB F2S 3/4 | REV 06 | 750-034978 | PROTOXCLEI | SIB-TXP-3D-F2S  |
| SIB F2S 3/6 | REV 06 | 750-034978 | PROTOXCLEI | SIB-TXP-3D-F2S  |
| SIB F2S 4/0 | REV 07 | 750-034978 | PROTOXCLEI | SIB-TXP-3D-F2S  |
| SIB F2S 4/2 | REV 06 | 750-034978 | PROTOXCLEI | SIB-TXP-3D-F2S  |
| SIB F2S 4/4 | REV 06 | 750-034978 | PROTOXCLEI | SIB-TXP-3D-F2S  |
| SIB F2S 4/6 | REV 06 | 750-034978 | PROTOXCLEI | SIB-TXP-3D-F2S  |
| Fan Tray 0  | REV 10 | 760-024497 |            | FANTRAY-TXP-H-S |
| Fan Tray 1  | REV 10 | 760-024497 |            | FANTRAY-TXP-H-S |
| Fan Tray 2  | REV 10 | 760-024502 |            | FANTRAY-TXP-V-S |
| Fan Tray 3  | REV 10 | 760-024502 |            | FANTRAY-TXP-V-S |
| Fan Tray 4  | REV 10 | 760-024502 |            | FANTRAY-TXP-V-S |
| Fan Tray 5  | REV 10 | 760-024502 |            | FANTRAY-TXP-V-S |

lcc0-re0:

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Hardware inventory:

| Item             | Version | Part number | CLEI code  | FRU model number  |
|------------------|---------|-------------|------------|-------------------|
| Midplane         | REV 01  | 710-027486  | IPMJ700DRD | CHAS-BP-T1600-S   |
| FPM Display      | REV 04  | 710-021387  |            | CRAFT-T1600-S     |
| CIP              | REV 06  | 710-002895  |            | CIP-L-T640-S      |
| PEM 0            | REV 05  | 740-036442  | IPUPAG6KAA | PWR-T-6-60-DC-S   |
| PEM 1            | REV 05  | 740-036442  | IPUPAG6KAA | PWR-T-6-60-DC-S   |
| SCG 0            | REV 18  | 710-003423  |            | SCG-T-S           |
| SCG 1            | REV 18  | 710-003423  |            | SCG-T-S           |
| Routing Engine 0 | REV 10  | 740-026941  |            | RE-DUO-C1800-8G-S |
| Routing Engine 1 | REV 07  | 740-026941  |            | RE-DUO-C1800-8G-S |
| CB 0             | REV 11  | 710-022597  |            | CB-LCC-S          |
| CB 1             | REV 11  | 710-022597  |            | CB-LCC-S          |
| FPC 0            | REV 01  | 750-045173  | IP9IAL4DAB | T4000-FPC5-3D     |
| PIC 0            | REV 17  | 750-034624  | IP9IAL2DAA | PF-12XGE-SFPP     |
| PIC 1            | REV 17  | 750-034624  | IP9IAL2DAA | PF-12XGE-SFPP     |
| FPC 3            | REV 01  | 750-045173  | IP9IAL4DAB | T4000-FPC5-3D     |
| PIC 0            | REV 13  | 750-033423  | XXXXXXXXDD | PF-12-24XGE-SFPP  |
| FPC 4            | REV 02  | 750-045173  | IP9IAL4DAC | T4000-FPC5-3D     |
| PIC 0            | REV 17  | 750-034624  | IP9IAL2DAA | PF-12XGE-SFPP     |
| PIC 1            | REV 17  | 750-034624  | IP9IAL2DAA | PF-12XGE-SFPP     |
| FPC 5            | REV 01  | 750-045173  | IP9IAL4DAB | T4000-FPC5-3D     |
| PIC 0            | REV 17  | 750-034624  | IP9IAL2DAA | PF-12XGE-SFPP     |
| PIC 1            | REV 17  | 750-034624  | IP9IAL2DAA | PF-12XGE-SFPP     |
| FPC 6            | REV 01  | 750-045173  | IP9IAL4DAB | T4000-FPC5-3D     |
| PIC 0            | REV 17  | 750-034624  | IP9IAL2DAA | PF-12XGE-SFPP     |
| PIC 1            | REV 10  | 750-035293  | IP9IAL3DAA | PF-1CGE-CFP       |
| SIB 0            | REV 06  | 750-041657  | PROTOXCLEI | SIB-TXP-3D-LCC    |
| Xcvr 0           | REV 01  | 740-048813  |            |                   |
| Xcvr 1           | REV 01  | 740-048813  |            |                   |

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Xcvr 2      REV 01  740-048813
Xcvr 3      REV 01  740-048813
Xcvr 4      REV 01  740-048813
Xcvr 5      REV 01  740-048813
Xcvr 6      REV 01  740-048813
Xcvr 7      REV 01  740-048813
SIB 1       REV 06  750-041657  PROTOXCLEI  SIB-TXP-3D-LCC
Xcvr 0      REV 01  740-048813
Xcvr 1      REV 01  740-048813
Xcvr 2      REV 01  740-048813
Xcvr 3      REV 01  740-048813
Xcvr 4      REV 01  740-048813
Xcvr 5      REV 01  740-048813
Xcvr 6      REV 01  740-048813
Xcvr 7      REV 01  740-048813
SIB 2       REV 06  750-041657  PROTOXCLEI  SIB-TXP-3D-LCC
Xcvr 0      REV 01  740-048813
Xcvr 1      REV 01  740-048813
Xcvr 2      REV 01  740-048813
Xcvr 3      REV 01  740-048813
Xcvr 4      REV 01  740-048813
Xcvr 5      REV 01  740-048813
Xcvr 6      REV 01  740-048813
Xcvr 7      REV 01  740-048813
SIB 3       REV 07  750-041657  PROTOXCLEI  SIB-TXP-3D-LCC
Xcvr 0      REV 01  740-048813
Xcvr 1      REV 01  740-048813
Xcvr 2      REV 01  740-048813
Xcvr 3      REV 01  740-048813
Xcvr 4      REV 01  740-048813
Xcvr 5      REV 01  740-048813
Xcvr 6      REV 01  740-048813
Xcvr 7      REV 01  740-048813
SIB 4       REV 06  750-041657  PROTOXCLEI  SIB-TXP-3D-LCC
Xcvr 0      REV 01  740-048813
Xcvr 1      REV 01  740-048813
Xcvr 2      REV 01  740-048813
Xcvr 3      REV 01  740-048813
Xcvr 4      REV 01  740-048813
Xcvr 5      REV 01  740-048813
Xcvr 6      REV 01  740-048813
Xcvr 7      REV 01  740-048813
Fan Tray 0
Fan Tray 1
Fan Tray 2
[Output Truncated]
FANTRAY-T-S
FANTRAY-T-S
FANTRAY-TXP3D-LCC-R-S

```

### show chassis hardware detail (TX Matrix Plus router with 3D SIBs)

```

user@host> show chassis hardware detail
sfc0-re0:

```

#### Hardware inventory:

| Item        | Version | Part number | Serial number | Description        |
|-------------|---------|-------------|---------------|--------------------|
| Chassis     |         |             | JN11CAAA4AHB  | TXP                |
| Midplane    | REV 05  | 710-022574  | ABAC4696      | SFC Midplane       |
| FPM Display | REV 09  | 710-024027  | EH3138        | TXP FPM Display    |
| CIP 0       | REV 12  | 710-023792  | EF6349        | TXP CIP            |
| CIP 1       | REV 12  | 710-023792  | EG5294        | TXP CIP            |
| PEM 0       | Rev 06  | 740-027463  | XH04595       | Power Entry Module |
| PEM 1       | Rev 06  | 740-027463  | XH04592       | Power Entry Module |

|                  |          |                 |                      |                   |
|------------------|----------|-----------------|----------------------|-------------------|
| Routing Engine 0 | REV 07   | 740-026942      | P737A-002541         | RE-DUO-2600       |
| ad0 3823 MB      | SMART CF |                 | 2011030400062C132C13 | Compact Flash     |
| ad1 62720 MB     | SMART    | Lite SATA Drive | 201105100009A452A452 | Disk 1            |
| Routing Engine 1 | REV 07   | 740-026942      | P737A-002602         | RE-DUO-2600       |
| ad0 3823 MB      | SMART CF |                 | 20110508085EE471E471 | Compact Flash     |
| ad1 62720 MB     | SMART    | Lite SATA Drive | 201110210089DF39DF39 | Disk 1            |
| CB 0             | REV 15   | 710-022606      | EH4376               | SFC Control Board |
| CB 1             | REV 15   | 710-022606      | EH4379               | SFC Control Board |
| SPMB 0           |          | BUILTIN         |                      | SFC Switch CPU    |
| SPMB 1           |          | BUILTIN         |                      | SFC Switch CPU    |
| SIB F13 0        | REV 10   | 750-035002      | EM9305               | F13 SIB 3D        |
| B Board          | REV 06   | 711-035082      | EM9667               | F13 SIB 3D Mezz   |
| P Board          | REV 05   | 711-043544      | EM9708               | F13 SIB 3D Power  |
| Xcvr 0           | REV 01   | 740-047547      | XB34FB00S            | CXP Module        |
| Xcvr 2           | REV 01   | 740-047547      | XB48FB01H            | CXP Module        |
| Xcvr 4           | REV 01   | 740-047547      | XB34FB02W            | CXP Module        |
| Xcvr 6           | REV 01   | 740-047547      | XB34FB01T            | CXP Module        |
| Xcvr 8           | REV 01   | 740-047547      | XB48FB00W            | CXP Module        |
| Xcvr 10          | REV 01   | 740-047547      | XB34FB01S            | CXP Module        |
| Xcvr 12          | REV 01   | 740-047547      | XB34FB03H            | CXP Module        |
| Xcvr 14          | REV 01   | 740-047547      | XB34FB023            | CXP Module        |
| SIB F13 3        | REV 01   | 710-035001      | EJ2612               | F13 SIB 3D        |
| B Board          | REV 01   | 711-035082      | EJ3815               | F13 SIB 3D Mezz   |
| P Board          | REV 01   | 711-043544      | EJ2678               | F13 SIB 3D Power  |
| Xcvr 0           | REV 01   | 740-047547      | XB48FB04C            | CXP Module        |
| Xcvr 2           | REV 01   | 740-047547      | XB48FB00Z            | CXP Module        |
| Xcvr 4           | REV 01   | 740-047547      | XB47FB036            | CXP Module        |
| Xcvr 6           | REV 01   | 740-047547      | XB47FB029            | CXP Module        |
| Xcvr 8           | REV 01   | 740-047547      | XB48FB02N            | CXP Module        |
| Xcvr 10          | REV 01   | 740-047547      | XB42FB0CS            | CXP Module        |
| Xcvr 12          | REV 01   | 740-047547      | XB47FB01X            | CXP Module        |
| Xcvr 14          | REV 01   | 740-047547      | XB48FB02F            | CXP Module        |
| SIB F13 6        | REV 05   | 750-035002      | EK2675               | F13 SIB 3D        |
| B Board          | REV 03   | 711-035082      | EK2612               | F13 SIB 3D Mezz   |
| P Board          | REV 04   | 711-043544      | EK1179               | F13 SIB 3D Power  |
| Xcvr 0           | REV 01   | 740-047547      | XB48FB01T            | CXP Module        |
| Xcvr 2           | REV 01   | 740-047547      | XB48FB02M            | CXP Module        |
| Xcvr 4           | REV 01   | 740-047547      | XB48FB031            | CXP Module        |
| Xcvr 6           | REV 01   | 740-047547      | XB48FB04P            | CXP Module        |
| Xcvr 8           | REV 01   | 740-047547      | XB48FB02T            | CXP Module        |
| Xcvr 10          | REV 01   | 740-047547      | XB34FB01V            | CXP Module        |
| Xcvr 12          | REV 01   | 740-047547      | XB48FB02C            | CXP Module        |
| Xcvr 14          |          | NON-JNPR        |                      | No Module         |
| SIB F13 12       | REV 01   | 710-035001      | EJ2631               | F13 SIB 3D        |
| B Board          | REV 01   | 711-035082      | EJ3808               | F13 SIB 3D Mezz   |
| P Board          | REV 01   | 711-043544      | EJ2676               | F13 SIB 3D Power  |
| SIB F2S 0/0      | REV 01   | 711-034977      | EH9829               | F2S SIB 3D        |
| B Board          | REV 01   | 711-034979      | EH9927               | F2S SIB 3D Mezz   |
| SIB F2S 0/2      | REV 01   | 711-034977      | EH9791               | F2S SIB 3D        |
| B Board          | REV 01   | 711-034979      | EH9852               | F2S SIB 3D Mezz   |
| SIB F2S 0/4      | REV 01   | 711-034977      | EH9803               | F2S SIB 3D        |
| B Board          | REV 01   | 711-034979      | EH9915               | F2S SIB 3D Mezz   |
| SIB F2S 0/6      | REV 01   | 711-034977      | EH9763               | F2S SIB 3D        |
| B Board          | REV 01   | 711-034979      | EH9880               | F2S SIB 3D Mezz   |
| SIB F2S 1/0      | REV 01   | 711-034977      | EH9757               | F2S SIB 3D        |
| B Board          | REV 01   | 711-034979      | EH9889               | F2S SIB 3D Mezz   |
| SIB F2S 1/2      | REV 01   | 711-034977      | EH9815               | F2S SIB 3D        |
| B Board          | REV 01   | 711-034979      | EH9890               | F2S SIB 3D Mezz   |
| SIB F2S 1/4      | REV 08   | 750-034978      | EN1954               | F2S SIB 3D        |
| B Board          | REV 02   | 711-034979      | EN1436               | F2S SIB 3D Mezz   |
| SIB F2S 1/6      | REV 01   | 711-034977      | EJ7054               | F2S SIB 3D        |

|             |        |            |        |                 |
|-------------|--------|------------|--------|-----------------|
| B Board     | REV 01 | 711-034979 | EJ8238 | F2S SIB 3D Mezz |
| SIB F2S 2/0 | REV 01 | 711-034977 | EH9830 | F2S SIB 3D      |
| B Board     | REV 01 | 711-034979 | EH9844 | F2S SIB 3D Mezz |
| SIB F2S 2/2 | REV 01 | 711-034977 | EH9818 | F2S SIB 3D      |
| B Board     | REV 01 | 711-034979 | EH9888 | F2S SIB 3D Mezz |
| SIB F2S 2/4 | REV 01 | 711-034977 | EH9795 | F2S SIB 3D      |
| B Board     | REV 01 | 711-034979 | EH9869 | F2S SIB 3D Mezz |
| SIB F2S 2/6 | REV 01 | 711-034977 | EJ7026 | F2S SIB 3D      |
| B Board     | REV 01 | 711-034979 | EJ8273 | F2S SIB 3D Mezz |
| SIB F2S 3/0 | REV 01 | 711-034977 | EH9811 | F2S SIB 3D      |
| B Board     | REV 01 | 711-034979 | EH9892 | F2S SIB 3D Mezz |
| SIB F2S 3/2 | REV 01 | 711-034977 | EH9812 | F2S SIB 3D      |
| B Board     | REV 01 | 711-034979 | EH9877 | F2S SIB 3D Mezz |
| SIB F2S 3/4 | REV 08 | 750-034978 | EN1947 | F2S SIB 3D      |
| B Board     | REV 02 | 711-034979 | EN1471 | F2S SIB 3D Mezz |
| Fan Tray 0  | REV 10 | 760-024497 | EH3313 | Front Fan Tray  |
| Fan Tray 1  | REV 10 | 760-024497 | EH3290 | Front Fan Tray  |
| Fan Tray 2  | REV 10 | 760-024502 | EH3292 | Rear Fan Tray   |
| Fan Tray 3  | REV 10 | 760-024502 | EH3287 | Rear Fan Tray   |
| Fan Tray 4  | REV 10 | 760-024502 | EH3286 | Rear Fan Tray   |
| Fan Tray 5  | REV 10 | 760-024502 | EH3285 | Rear Fan Tray   |

1cc0-re0:

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Hardware inventory:

| Item             | Version               | Part number | Serial number        | Description             |
|------------------|-----------------------|-------------|----------------------|-------------------------|
| Chassis          |                       |             | JN11B23FEAHA         | T1600                   |
| Midplane         | REV 01                | 710-027486  | RC9787               | T-series Backplane      |
| FPM GBUS         | REV 13                | 710-002901  | BBAG5132             | T640 FPM Board          |
| FPM Display      | REV 04                | 710-021387  | BBAL9612             | T1600 FPM Display       |
| CIP              | REV 06                | 710-002895  | BBAN0605             | T-series CIP            |
| PEM 0            | REV 05                | 740-036442  | 1G022060143          | Power Entry Module 6x60 |
| PEM 1            | REV 05                | 740-036442  | 1G022060011          | Power Entry Module 6x60 |
| SCG 0            | REV 18                | 710-003423  | BBAL7318             | T640 Sonet Clock Gen.   |
| SCG 1            | REV 18                | 710-003423  | BBAL7255             | T640 Sonet Clock Gen.   |
| Routing Engine 0 | REV 07                | 740-026941  | P737F-002933         | RE-DUO-1800             |
| ad0 3823 MB      | SMART CF              |             | 201103030490604E604E | Compact Flash           |
| ad1 62720 MB     | SMART Lite SATA Drive |             | 20110729028B11D411D4 | Disk 1                  |
| Routing Engine 1 | REV 06                | 740-026941  | P737F-002749         | RE-DUO-1800             |
| ad0 3823 MB      | SMART CF              |             | 2011010504EB99649964 | Compact Flash           |
| ad1 62720 MB     | SMART Lite SATA Drive |             | 201102140058934A934A | Disk 1                  |
| CB 0             | REV 11                | 710-022597  | EH3611               | LCC Control Board       |
| CB 1             | REV 11                | 710-022597  | EH4798               | LCC Control Board       |
| FPC 5            | REV 17                | 710-013037  | BBAC5333             | FPC Type 4-ES           |
| CPU              | REV 10                | 710-016744  | BBAB7619             | ST-PMB2                 |
| PIC 0            | REV 18                | 750-017405  | BBAE3420             | 4x 10GE (LAN/WAN) XFP   |
| Xcvr 0           | REV 03                | 740-014289  | T10C90659            | XFP-10G-SR              |
| MMB 0            | REV 05                | 710-025563  | BBAB9538             | ST-MMB2                 |
| MMB 1            | REV 05                | 710-025563  | BBAB9502             | ST-MMB2                 |
| FPC 7            | REV 01                | 750-045173  | BBAV0032             | FPC Type 5-3D           |
| CPU              |                       |             |                      |                         |
| SPMB 0           | REV 05                | 710-023321  | EG9434               | LCC Switch CPU          |
| SPMB 1           | REV 05                | 710-023321  | EH3878               | LCC Switch CPU          |
| SIB 0            | REV 01                | 750-041657  | EH7997               | LCC SIB 3D              |
| B Board          | REV 01                | 711-042424  | EH7674               | LCC SIB 3D Mezz         |
| Xcvr 0           | REV 01                | 740-047547  | XB48FB014            | CXP Module              |
| Xcvr 2           | REV 01                | 740-047547  | XB48FB05A            | CXP Module              |
| Xcvr 4           | REV 01                | 740-047547  | XB48FB052            | CXP Module              |
| Xcvr 6           | REV 01                | 740-047547  | XB48FB01B            | CXP Module              |
| SIB 1            | REV 01                | 750-041657  | EH8023               | LCC SIB 3D              |
| B Board          | REV 01                | 711-042424  | EH7659               | LCC SIB 3D Mezz         |

|            |        |            |           |                        |
|------------|--------|------------|-----------|------------------------|
| Xcvr 0     | REV 01 | 740-047547 | XB48FB05J | CXP Module             |
| Xcvr 2     | REV 01 | 740-047547 | XB48FB01E | CXP Module             |
| Xcvr 4     | REV 01 | 740-047547 | XB48FB01J | CXP Module             |
| Xcvr 6     | REV 01 | 740-047547 | XB48FB02S | CXP Module             |
| SIB 2      | REV 03 | 750-041657 | EJ6554    | LCC SIB 3D             |
| B Board    | REV 02 | 711-042424 | EJ5756    | LCC SIB 3D Mezz        |
| Xcvr 0     | REV 01 | 740-047547 | XB34FB01Z | CXP Module             |
| Xcvr 2     | REV 01 | 740-047547 | XB34FB013 | CXP Module             |
| Xcvr 4     | REV 01 | 740-047547 | XB48FB04Z | CXP Module             |
| Xcvr 6     | REV 01 | 740-047547 | XB48FB05N | CXP Module             |
| Fan Tray 0 |        |            |           | Front Top Fan Tray     |
| Fan Tray 1 |        |            |           | Front Bottom Fan Tray  |
| Fan Tray 2 |        |            |           | Rear Fan Tray -- Rev 4 |

lcc2-re0:

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Hardware inventory:

| Item             | Version               | Part number | Serial number        | Description             |
|------------------|-----------------------|-------------|----------------------|-------------------------|
| Chassis          |                       |             | JN11B3975AHA         | T1600                   |
| Midplane         | REV 01                | 710-027486  | RC9826               | T-series Backplane      |
| FPM GBUS         | REV 13                | 710-002901  | BBAG5124             | T640 FPM Board          |
| FPM Display      | REV 03                | 710-021387  | BBAJ1112             | T1600 FPM Display       |
| CIP              | REV 06                | 710-002895  | BBAL3744             | T-series CIP            |
| PEM 0            | REV 05                | 740-036442  | 1G022060081          | Power Entry Module 6x60 |
| PEM 1            | REV 05                | 740-036442  | 1G022060188          | Power Entry Module 6x60 |
| SCG 0            | REV 18                | 710-003423  | BBAH8775             | T640 Sonet Clock Gen.   |
| SCG 1            | REV 18                | 710-003423  | BBAL7272             | T640 Sonet Clock Gen.   |
| Routing Engine 0 | REV 07                | 740-026941  | P737F-002992         | RE-DUO-1800             |
| ad0 3823 MB      | SMART CF              |             | 201103030356329E329E | Compact Flash           |
| ad1 62720 MB     | SMART Lite SATA Drive |             | 2011051000488D8B8D8B | Disk 1                  |
| Routing Engine 1 | REV 07                | 740-026941  | P737F-002938         | RE-DUO-1800             |
| ad0 3823 MB      | SMART CF              |             | 20110304000F02680268 | Compact Flash           |
| ad1 62720 MB     | SMART Lite SATA Drive |             | 201105300A70F325F325 | Disk 1                  |
| CB 0             | REV 11                | 710-022597  | EH4805               | LCC Control Board       |
| CB 1             | REV 11                | 710-022597  | EH4786               | LCC Control Board       |
| FPC 1            | REV 01                | 710-033873  | BBAH0320             | FPC Type 3-ES           |
| CPU              | REV 11                | 710-016744  | BBAF3281             | ST-PMB2                 |
| MMB 0            | REV 06                | 710-025563  | BBAF5061             | ST-MMB2                 |
| FPC 5            | REV 04                | 710-033871  | BBAM5070             | FPC Type 4-ES           |
| CPU              | REV 11                | 710-016744  | BBAM6653             | ST-PMB2                 |
| PIC 1            | REV 20                | 750-017405  | BBAM1296             | 4x 10GE (LAN/WAN) XFP   |
| Xcvr 0           | REV 03                | 740-014289  | T10B42981            | XFP-10G-SR              |
| MMB 0            | REV 07                | 710-025563  | BBAN2631             | ST-MMB2                 |
| MMB 1            | REV 07                | 710-025563  | BBAN2538             | ST-MMB2                 |
| SPMB 0           | REV 05                | 710-023321  | EH3903               | LCC Switch CPU          |
| SPMB 1           | REV 05                | 710-023321  | EH3902               | LCC Switch CPU          |
| SIB 0            | REV 01                | 750-041657  | EH8019               | LCC SIB 3D              |
| B Board          | REV 01                | 711-042424  | EH7680               | LCC SIB 3D Mezz         |
| Xcvr 0           | REV 01                | 740-047547  | XB48FB04F            | CXP Module              |
| Xcvr 2           | REV 01                | 740-047547  | XB48FB04S            | CXP Module              |
| Xcvr 4           | REV 01                | 740-047547  | XB48FB04B            | CXP Module              |
| Xcvr 6           | REV 01                | 740-047547  | XB48FB043            | CXP Module              |
| SIB 1            | REV 01                | 750-041657  | EH8012               | LCC SIB 3D              |
| B Board          | REV 01                | 711-042424  | EH7658               | LCC SIB 3D Mezz         |
| Xcvr 0           | REV 01                | 740-047547  | XB48FB05E            | CXP Module              |
| Xcvr 2           | REV 01                | 740-047547  | XB48FB01Z            | CXP Module              |
| Xcvr 4           | REV 01                | 740-047547  | XB48FB018            | CXP Module              |
| Xcvr 6           | REV 01                | 740-047547  | XB48FB054            | CXP Module              |
| SIB 2            | REV 01                | 750-041657  | EH7993               | LCC SIB 3D              |
| B Board          | REV 01                | 711-042424  | EH7678               | LCC SIB 3D Mezz         |
| Xcvr 0           | REV 01                | 740-047547  | XB48FB05C            | CXP Module              |



|            |        |            |           |                        |
|------------|--------|------------|-----------|------------------------|
| Xcvr 2     | REV 01 | 740-047547 | XB47FB00N | CXP Module             |
| Xcvr 4     | REV 01 | 740-047547 | XB48FB05U | CXP Module             |
| Xcvr 6     | REV 01 | 740-047547 | XB48FB05L | CXP Module             |
| Fan Tray 0 |        |            |           | Front Top Fan Tray     |
| Fan Tray 1 |        |            |           | Front Bottom Fan Tray  |
| Fan Tray 2 |        |            |           | Rear Fan Tray -- Rev 4 |

### show chassis hardware lcc (TX Matrix Plus router with 3D SIBs)

```
user@host> show chassis hardware lcc 0
lcc0-re0:
```

#### ----- Hardware inventory:

| Item             | Version | Part number | Serial number | Description             |
|------------------|---------|-------------|---------------|-------------------------|
| Chassis          |         |             | JN11B23FEAHA  | T1600                   |
| Midplane         | REV 01  | 710-027486  | RC9787        | T-series Backplane      |
| FPM GBUS         | REV 13  | 710-002901  | BBAG5132      | T640 FPM Board          |
| FPM Display      | REV 04  | 710-021387  | BBAL9612      | T1600 FPM Display       |
| CIP              | REV 06  | 710-002895  | BBAN0605      | T-series CIP            |
| PEM 0            | REV 05  | 740-036442  | 1G022060143   | Power Entry Module 6x60 |
| PEM 1            | REV 05  | 740-036442  | 1G022060011   | Power Entry Module 6x60 |
| SCG 0            | REV 18  | 710-003423  | BBAL7318      | T640 Sonet Clock Gen.   |
| SCG 1            | REV 18  | 710-003423  | BBAL7255      | T640 Sonet Clock Gen.   |
| Routing Engine 0 | REV 07  | 740-026941  | P737F-002933  | RE-DUO-1800             |
| Routing Engine 1 | REV 06  | 740-026941  | P737F-002749  | RE-DUO-1800             |
| CB 0             | REV 11  | 710-022597  | EH3611        | LCC Control Board       |
| CB 1             | REV 11  | 710-022597  | EH4798        | LCC Control Board       |
| FPC 5            | REV 17  | 710-013037  | BBAC5333      | FPC Type 4-ES           |
| CPU              | REV 10  | 710-016744  | BBAB7619      | ST-PMB2                 |
| PIC 0            | REV 18  | 750-017405  | BBAE3420      | 4x 10GE (LAN/WAN) XFP   |
| Xcvr 0           | REV 03  | 740-014289  | T10C90659     | XFP-10G-SR              |
| MMB 0            | REV 05  | 710-025563  | BBAB9538      | ST-MMB2                 |
| MMB 1            | REV 05  | 710-025563  | BBAB9502      | ST-MMB2                 |
| FPC 7            | REV 01  | 750-045173  | BBAV0032      | FPC Type 5-3D           |
| CPU              |         |             |               |                         |
| SPMB 0           | REV 05  | 710-023321  | EG9434        | LCC Switch CPU          |
| SPMB 1           | REV 05  | 710-023321  | EH3878        | LCC Switch CPU          |
| SIB 0            | REV 01  | 750-041657  | EH7997        | LCC SIB 3D              |
| B Board          | REV 01  | 711-042424  | EH7674        | LCC SIB 3D Mezz         |
| Xcvr 0           | REV 01  | 740-047547  | XB48FB014     | CXP Module              |
| Xcvr 2           | REV 01  | 740-047547  | XB48FB05A     | CXP Module              |
| Xcvr 4           | REV 01  | 740-047547  | XB48FB052     | CXP Module              |
| Xcvr 6           | REV 01  | 740-047547  | XB48FB01B     | CXP Module              |
| SIB 1            | REV 01  | 750-041657  | EH8023        | LCC SIB 3D              |
| B Board          | REV 01  | 711-042424  | EH7659        | LCC SIB 3D Mezz         |
| Xcvr 0           | REV 01  | 740-047547  | XB48FB05J     | CXP Module              |
| Xcvr 2           | REV 01  | 740-047547  | XB48FB01E     | CXP Module              |
| Xcvr 4           | REV 01  | 740-047547  | XB48FB01J     | CXP Module              |
| Xcvr 6           | REV 01  | 740-047547  | XB48FB02S     | CXP Module              |
| SIB 2            | REV 03  | 750-041657  | EJ6554        | LCC SIB 3D              |
| B Board          | REV 02  | 711-042424  | EJ5756        | LCC SIB 3D Mezz         |
| Xcvr 0           | REV 01  | 740-047547  | XB34FB01Z     | CXP Module              |
| Xcvr 2           | REV 01  | 740-047547  | XB34FB013     | CXP Module              |
| Xcvr 4           | REV 01  | 740-047547  | XB48FB04Z     | CXP Module              |
| Xcvr 6           | REV 01  | 740-047547  | XB48FB05N     | CXP Module              |
| Fan Tray 0       |         |             |               | Front Top Fan Tray      |
| Fan Tray 1       |         |             |               | Front Bottom Fan Tray   |
| Fan Tray 2       |         |             |               | Rear Fan Tray -- Rev 4  |

## show chassis hardware sfc (TX Matrix Plus router with 3D SIBs)

```
user@host> show chassis hardware sfc 0
sfc0-re0:
```

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Hardware inventory:
```

| Item             | Version | Part number | Serial number | Description        |
|------------------|---------|-------------|---------------|--------------------|
| Chassis          |         |             | JN11CAAA4AHB  | TXP                |
| Midplane         | REV 05  | 710-022574  | ABAC4696      | SFC Midplane       |
| FPM Display      | REV 09  | 710-024027  | EH3138        | TXP FPM Display    |
| CIP 0            | REV 12  | 710-023792  | EF6349        | TXP CIP            |
| CIP 1            | REV 12  | 710-023792  | EG5294        | TXP CIP            |
| PEM 0            | Rev 06  | 740-027463  | XH04595       | Power Entry Module |
| PEM 1            | Rev 06  | 740-027463  | XH04592       | Power Entry Module |
| Routing Engine 0 | REV 07  | 740-026942  | P737A-002541  | RE-DUO-2600        |
| Routing Engine 1 | REV 07  | 740-026942  | P737A-002602  | RE-DUO-2600        |
| CB 0             | REV 15  | 710-022606  | EH4376        | SFC Control Board  |
| CB 1             | REV 15  | 710-022606  | EH4379        | SFC Control Board  |
| SPMB 0           |         | BUILTIN     |               | SFC Switch CPU     |
| SPMB 1           |         | BUILTIN     |               | SFC Switch CPU     |
| SIB F13 0        | REV 10  | 750-035002  | EM9305        | F13 SIB 3D         |
| B Board          | REV 06  | 711-035082  | EM9667        | F13 SIB 3D Mezz    |
| P Board          | REV 05  | 711-043544  | EM9708        | F13 SIB 3D Power   |
| Xcvr 0           | REV 01  | 740-047547  | XB34FB00S     | CXP Module         |
| Xcvr 2           | REV 01  | 740-047547  | XB48FB01H     | CXP Module         |
| Xcvr 4           | REV 01  | 740-047547  | XB34FB02W     | CXP Module         |
| Xcvr 6           | REV 01  | 740-047547  | XB34FB01T     | CXP Module         |
| Xcvr 8           | REV 01  | 740-047547  | XB48FB00W     | CXP Module         |
| Xcvr 10          | REV 01  | 740-047547  | XB34FB01S     | CXP Module         |
| Xcvr 12          | REV 01  | 740-047547  | XB34FB03H     | CXP Module         |
| Xcvr 14          | REV 01  | 740-047547  | XB34FB023     | CXP Module         |
| SIB F13 3        | REV 01  | 710-035001  | EJ2612        | F13 SIB 3D         |
| B Board          | REV 01  | 711-035082  | EJ3815        | F13 SIB 3D Mezz    |
| P Board          | REV 01  | 711-043544  | EJ2678        | F13 SIB 3D Power   |
| Xcvr 0           | REV 01  | 740-047547  | XB48FB04C     | CXP Module         |
| Xcvr 2           | REV 01  | 740-047547  | XB48FB00Z     | CXP Module         |
| Xcvr 4           | REV 01  | 740-047547  | XB47FB036     | CXP Module         |
| Xcvr 6           | REV 01  | 740-047547  | XB47FB029     | CXP Module         |
| Xcvr 8           | REV 01  | 740-047547  | XB48FB02N     | CXP Module         |
| Xcvr 10          | REV 01  | 740-047547  | XB42FB0CS     | CXP Module         |
| Xcvr 12          | REV 01  | 740-047547  | XB47FB01X     | CXP Module         |
| Xcvr 14          | REV 01  | 740-047547  | XB48FB02F     | CXP Module         |
| SIB F13 6        | REV 05  | 750-035002  | EK2675        | F13 SIB 3D         |
| B Board          | REV 03  | 711-035082  | EK2612        | F13 SIB 3D Mezz    |
| P Board          | REV 04  | 711-043544  | EK1179        | F13 SIB 3D Power   |
| Xcvr 0           | REV 01  | 740-047547  | XB48FB01T     | CXP Module         |
| Xcvr 2           | REV 01  | 740-047547  | XB48FB02M     | CXP Module         |
| Xcvr 4           | REV 01  | 740-047547  | XB48FB031     | CXP Module         |
| Xcvr 6           | REV 01  | 740-047547  | XB48FB04P     | CXP Module         |
| Xcvr 8           | REV 01  | 740-047547  | XB48FB02T     | CXP Module         |
| Xcvr 10          | REV 01  | 740-047547  | XB34FB01V     | CXP Module         |
| Xcvr 12          | REV 01  | 740-047547  | XB48FB02C     | CXP Module         |
| Xcvr 14          |         | NON-JNPR    |               | No Module          |
| SIB F13 12       | REV 01  | 710-035001  | EJ2631        | F13 SIB 3D         |
| B Board          | REV 01  | 711-035082  | EJ3808        | F13 SIB 3D Mezz    |
| P Board          | REV 01  | 711-043544  | EJ2676        | F13 SIB 3D Power   |
| SIB F2S 0/0      | REV 01  | 711-034977  | EH9829        | F2S SIB 3D         |
| B Board          | REV 01  | 711-034979  | EH9927        | F2S SIB 3D Mezz    |
| SIB F2S 0/2      | REV 01  | 711-034977  | EH9791        | F2S SIB 3D         |
| B Board          | REV 01  | 711-034979  | EH9852        | F2S SIB 3D Mezz    |
| SIB F2S 0/4      | REV 01  | 711-034977  | EH9803        | F2S SIB 3D         |

|             |        |            |        |                 |
|-------------|--------|------------|--------|-----------------|
| B Board     | REV 01 | 711-034979 | EH9915 | F2S SIB 3D Mezz |
| SIB F2S 0/6 | REV 01 | 711-034977 | EH9763 | F2S SIB 3D      |
| B Board     | REV 01 | 711-034979 | EH9880 | F2S SIB 3D Mezz |
| SIB F2S 1/0 | REV 01 | 711-034977 | EH9757 | F2S SIB 3D      |
| B Board     | REV 01 | 711-034979 | EH9889 | F2S SIB 3D Mezz |
| SIB F2S 1/2 | REV 01 | 711-034977 | EH9815 | F2S SIB 3D      |
| B Board     | REV 01 | 711-034979 | EH9890 | F2S SIB 3D Mezz |
| SIB F2S 1/4 | REV 08 | 750-034978 | EN1954 | F2S SIB 3D      |
| B Board     | REV 02 | 711-034979 | EN1436 | F2S SIB 3D Mezz |
| SIB F2S 1/6 | REV 01 | 711-034977 | EJ7054 | F2S SIB 3D      |
| B Board     | REV 01 | 711-034979 | EJ8238 | F2S SIB 3D Mezz |
| SIB F2S 2/0 | REV 01 | 711-034977 | EH9830 | F2S SIB 3D      |
| B Board     | REV 01 | 711-034979 | EH9844 | F2S SIB 3D Mezz |
| SIB F2S 2/2 | REV 01 | 711-034977 | EH9818 | F2S SIB 3D      |
| B Board     | REV 01 | 711-034979 | EH9888 | F2S SIB 3D Mezz |
| SIB F2S 2/4 | REV 01 | 711-034977 | EH9795 | F2S SIB 3D      |
| B Board     | REV 01 | 711-034979 | EH9869 | F2S SIB 3D Mezz |
| SIB F2S 2/6 | REV 01 | 711-034977 | EJ7026 | F2S SIB 3D      |
| B Board     | REV 01 | 711-034979 | EJ8273 | F2S SIB 3D Mezz |
| SIB F2S 3/0 | REV 01 | 711-034977 | EH9811 | F2S SIB 3D      |
| B Board     | REV 01 | 711-034979 | EH9892 | F2S SIB 3D Mezz |
| SIB F2S 3/2 | REV 01 | 711-034977 | EH9812 | F2S SIB 3D      |
| B Board     | REV 01 | 711-034979 | EH9877 | F2S SIB 3D Mezz |
| SIB F2S 3/4 | REV 08 | 750-034978 | EN1947 | F2S SIB 3D      |
| B Board     | REV 02 | 711-034979 | EN1471 | F2S SIB 3D Mezz |
| Fan Tray 0  | REV 10 | 760-024497 | EH3313 | Front Fan Tray  |
| Fan Tray 1  | REV 10 | 760-024497 | EH3290 | Front Fan Tray  |
| Fan Tray 2  | REV 10 | 760-024502 | EH3292 | Rear Fan Tray   |
| Fan Tray 3  | REV 10 | 760-024502 | EH3287 | Rear Fan Tray   |
| Fan Tray 4  | REV 10 | 760-024502 | EH3286 | Rear Fan Tray   |
| Fan Tray 5  | REV 10 | 760-024502 | EH3285 | Rear Fan Tray   |

### show chassis hardware (16-Port 10-Gigabit Ethernet MPC with SFP+ Optics [MX Series Routers])

```
user@host> show chassis hardware
```

```
Hardware inventory:
```

| Item             | Version | Part number | Serial number | Description          |
|------------------|---------|-------------|---------------|----------------------|
| Chassis          |         |             | JN112D865AFA  | MX960                |
| Midplane         | REV 03  | 710-013698  | TS3339        | MX960 Backplane      |
| FPM Board        | REV 03  | 710-014974  | WW6267        | Front Panel Display  |
| PDM              | Rev 03  | 740-013110  | QCS12485026   | Power Distribution   |
| Module           |         |             |               |                      |
| PEM 0            | Rev 04  | 740-013682  | QCS12434086   | PS 1.7kW; 200-240VAC |
| in               |         |             |               |                      |
| PEM 1            | Rev 04  | 740-013682  | QCS1243408Z   | PS 1.7kW; 200-240VAC |
| in               |         |             |               |                      |
| PEM 2            | Rev 04  | 740-013682  | QCS1243407X   | PS 1.7kW; 200-240VAC |
| in               |         |             |               |                      |
| Routing Engine 0 | REV 07  | 740-015113  | 9009009677    | RE-S-1300            |
| Routing Engine 1 | REV 07  | 740-015113  | 9009011510    | RE-S-1300            |
| CB 0             | REV 03  | 710-021523  | XF0394        | MX SCB               |
| CB 1             | REV 03  | 710-021523  | XF0550        | MX SCB               |
| CB 2             | REV 03  | 710-021523  | XD7455        | MX SCB               |
| FPC 4            | REV 02  | 750-028467  | JR6127        | MPC M 16x 10GE       |
| CPU              | REV 02  | 711-029089  | JX0129        | AS PMB               |
| PIC 0            |         | BUILTIN     | BUILTIN       | 4x 10GE(LAN) SFP+    |
| PIC 1            |         | BUILTIN     | BUILTIN       | 4x 10GE(LAN) SFP+    |
| PIC 2            |         | BUILTIN     | BUILTIN       | 4x 10GE(LAN) SFP+    |
| PIC 3            |         | BUILTIN     | BUILTIN       | 4x 10GE(LAN) SFP+    |

|            |        |            |        |          |
|------------|--------|------------|--------|----------|
| Fan Tray 0 | REV 05 | 740-014971 | TP9990 | Fan Tray |
| Fan Tray 1 | REV 05 | 740-014971 | VS1709 | Fan Tray |

**show chassis hardware (MPC3E [MX Series Routers])**

user@host&gt; show chassis hardware

Hardware inventory:

| Item             | Version     | Part number | Serial number | Description            |
|------------------|-------------|-------------|---------------|------------------------|
| Chassis          |             |             | JN1101AFEAFB  | MX480                  |
| Midplane         | REV 05      | 710-017414  | TR4444        | MX480 Midplane         |
| FPM Board        | REV 02      | 710-017254  | KG6056        | Front Panel Display    |
| PEM 0            | Rev 03      | 740-017330  | QCS082090FC   | PS 1.2-1.7kW; 100-240V |
| PEM 1            | Rev 03      | 740-017330  | QCS082090FD   | PS 1.2-1.7kW; 100-240V |
| Routing Engine 0 | REV 07      | 740-013063  | 9009004124    | RE-S-2000              |
| Routing Engine 1 | REV 07      | 740-013063  | 9009005569    | RE-S-2000              |
| CB 0             | REV 07      | 710-021523  | XZ3587        | MX SCB                 |
| CB 1             | REV 03      | 710-021523  | KH8306        | MX SCB                 |
| FPC 1            | REV 04.1.07 | 750-033205  | P1240         | MPC Type 3             |
| CPU              | REV 01      | 711-035209  | YL0504        | HMPC PMB 2G            |
| MIC 1            | REV 10      | 750-033199  | YX4495        | 1X100GE CFP            |
| PIC 2            |             | BUILTIN     | BUILTIN       | 1X100GE CFP            |
| Xcvr 0           | REV 01      | 740-032210  | C22CQNE       | CFP-100G-LR4           |
| FPC 2            | REV 26      | 750-016670  | KH0045        | DPCE 40x 1GE R EQ      |
| CPU              | REV 07      | 710-013713  | KF5448        | DPC PMB                |
| PIC 0            |             | BUILTIN     | BUILTIN       | 10x 1GE(LAN) EQ        |
| Xcvr 0           | REV 01      | 740-011613  | PF21JHU       | SFP-SX                 |
| PIC 1            |             | BUILTIN     | BUILTIN       | 10x 1GE(LAN) EQ        |
| Xcvr 9           | REV 01      | 740-011613  | AM0813S8ZL6   | SFP-SX                 |
| PIC 2            |             | BUILTIN     | BUILTIN       | 10x 1GE(LAN) EQ        |
| Xcvr 0           | REV 02      | 740-011613  | PGL2KYF       | SFP-SX                 |
| Xcvr 2           | REV 01      | 740-011613  | AM0806S8N4P   | SFP-SX                 |
| PIC 3            |             | BUILTIN     | BUILTIN       | 10x 1GE(LAN) EQ        |
| Xcvr 5           | REV 01      | 740-011613  | AM0815S967N   | SFP-SX                 |
| Xcvr 7           | REV 01      | 740-011613  | AM0806S8N1X   | SFP-SX                 |
| Xcvr 8           | REV 01      | 740-011613  | AM0815S967J   | SFP-SX                 |
| Xcvr 9           | REV 01      | 740-011613  | AM0815S967M   | SFP-SX                 |
| FPC 3            | REV 12.2.09 | 750-033205  | YR9443        | MPC Type 3             |
| CPU              | REV 03      | 711-035209  | YL6931        | HMPC PMB 2G            |
| MIC 0            | REV 05      | 750-033199  | YR3269        | 1X100GE CFP            |
| PIC 0            |             | BUILTIN     | BUILTIN       | 1X100GE CFP            |
| Xcvr 0           | REV 01      | 740-032210  | ULH0KG3       | CFP-100G-LR4           |
| MIC 1            | REV 02      | 750-033199  | YG3245        | 1X100GE CFP            |
| PIC 2            |             | BUILTIN     | BUILTIN       | 1X100GE CFP            |
| Xcvr 0           | REV 01      | 740-032210  | ULH0KGF       | CFP-100G-LR4           |
| FPC 4            | REV 12.3.09 | 750-033205  | YR9437        | MPC Type 3             |
| CPU              | REV 03      | 711-035209  | YT5857        | HMPC PMB 2G            |
| MIC 0            | REV 05      | 750-033199  | YR3295        | 1X100GE CFP            |
| PIC 0            |             | BUILTIN     | BUILTIN       | 1X100GE CFP            |
| Xcvr 0           |             | NON-JNPR    | X12000187     | CFP-100G-SR10          |
| MIC 1            | REV 10      | 750-033199  | YX4518        | 1X100GE CFP            |
| PIC 2            |             | BUILTIN     | BUILTIN       | 1X100GE CFP            |
| Xcvr 0           | REV 01      | 740-035329  | X12J00008     | CFP-100G-SR10          |
| FPC 5            | REV 06      | 750-024884  | JW9769        | MPC Type 2 3D EQ       |
| CPU              | REV 02      | 711-028401  | JR6158        | MPC PMB 2G Proto       |
| MIC 0            | REV 05      | 750-028387  | JR6197        | 3D 4x 10GE XFP         |
| PIC 0            |             | BUILTIN     | BUILTIN       | 2x 10GE XFP            |
| Xcvr 0           | REV 01      | 740-014289  | T07M71112     | XFP-10G-SR             |
| Xcvr 1           | REV 02      | 740-014289  | T08L85610     | XFP-10G-SR             |

|          |        |            |             |                     |
|----------|--------|------------|-------------|---------------------|
| PIC 1    |        | BUILTIN    | BUILTIN     | 2x 10GE XFP         |
| MIC 1    | REV 22 | 750-028392 | YM0053      | 3D 20x 1GE(LAN) SFP |
| PIC 2    |        | BUILTIN    | BUILTIN     | 10x 1GE(LAN) SFP    |
| Xcvr 0   | REV 01 | 740-011613 | AM0703S005B | SFP-SX              |
| Xcvr 1   | REV 01 | 740-011613 | E07L01352   | SFP-SX              |
| PIC 3    |        | BUILTIN    | BUILTIN     | 10x 1GE(LAN) SFP    |
| Xcvr 5   | REV 01 | 740-013111 | 6500217     | SFP-T               |
| Xcvr 9   | REV 02 | 740-013111 | 8499527     | SFP-T               |
| Fan Tray |        |            |             | Left Fan Tray       |

The PIC number for MIC 1 always starts from 2 (even if the first MIC is a 1X100GE CFP or a legacy MIC).

### show chassis hardware (QFX3500 Switches)

```
user@switch> show chassis hardware
Hardware inventory:
Item          Version  Part number  Serial number  Description
Chassis                               QFX3500
Routing Engine 0                               QFX Routing Engine
FPC 0         REV 04   750-044071   BBAR3902      QFX3500-48S4Q-AFI
CPU                               FPC CPU
PIC 0                               48x 10G-SFP+
PIC 1                               15x 10G-SFP+
MGMT BRD      REV 02   750-044063   BBAR0398      QFX3500-MGMT-SFP-AF0
Xcvr 0        REV 01   740-011614   AC0946S0BD1   SFP-LX10
Xcvr 1        REV 02   740-013111   A281922       SFP-T
Power Supply 0 Rev 04   740-032091   UI00677       JPSU-650W-AC-AFI
Power Supply 1 REV 00   740-041741   VJ00162       JPSU-650W-AC-AF0
Fan Tray 0                               QFX Fan Tray, Back to
Front Airflow
Fan Tray 1                               QFX Fan Tray, Back to
Front Airflow
Fan Tray 2                               QFX Fan Tray, Back to
Front Airflow
```

### show chassis hardware detail (QFX3500 Switches)

```
user@switch> show chassis hardware detail
Hardware inventory:
Item          Version  Part number  Serial number  Description
Chassis                               QFX3500
Routing Engine 0                               QFX Routing Engine
FPC 0         REV 05   750-036931   EE0823        QFX3500-48S4Q-AFI

CPU                               FPC CPU
PIC 0                               48x 10G-SFP+
Xcvr 0        REV 01   740-030589   S99E270079    SFP+-10G-LPBK
Xcvr 1        REV 01   740-030589   S9AK450099    SFP+-10G-LPBK
Xcvr 2        REV 01   740-030589   S99E270078    SFP+-10G-LPBK
Xcvr 3        REV 01   740-030589   S9AK450098    SFP+-10G-LPBK
Xcvr 4        REV 01   740-030589   S99E270075    SFP+-10G-LPBK
Xcvr 5        REV 01   740-030589   S9AK450093    SFP+-10G-LPBK
Xcvr 6        REV 01   740-030589   S9AK450097    SFP+-10G-LPBK
Xcvr 7        REV 01   740-030589   S9AK450095    SFP+-10G-LPBK
Xcvr 8        REV 01   740-030589   S99E270072    SFP+-10G-LPBK
Xcvr 9        REV 01   740-030589   S99E270073    SFP+-10G-LPBK
Xcvr 10       REV 01   740-030589   S99E270080    SFP+-10G-LPBK
Xcvr 11       REV 01   740-030589   S9AK450169    SFP+-10G-LPBK
```

|                |        |            |            |                |
|----------------|--------|------------|------------|----------------|
| Xcvr 12        | REV 01 | 740-030589 | S99E270076 | SFP+-10G-LPBK  |
| Xcvr 13        | REV 01 | 740-030589 | S9AK450167 | SFP+-10G-LPBK  |
| Xcvr 14        | REV 01 | 740-030589 | S9AK450170 | SFP+-10G-LPBK  |
| Xcvr 15        | REV 01 | 740-030589 | S9AK450166 | SFP+-10G-LPBK  |
| Xcvr 16        | REV 01 | 740-030589 | S9AK450092 | SFP+-10G-LPBK  |
| Xcvr 17        | REV 01 | 740-030589 | S9AK450163 | SFP+-10G-LPBK  |
| Xcvr 18        | REV 01 | 740-030589 | S9AK450094 | SFP+-10G-LPBK  |
| Xcvr 19        | REV 01 | 740-030589 | S9AK450100 | SFP+-10G-LPBK  |
| Xcvr 20        | REV 01 | 740-030589 | S9AK450168 | SFP+-10G-LPBK  |
| Xcvr 21        | REV 01 | 740-030589 | S9AK450165 | SFP+-10G-LPBK  |
| Xcvr 22        | REV 01 | 740-030589 | S9AK450073 | SFP+-10G-LPBK  |
| Xcvr 23        | REV 01 | 740-030589 | S9AK450164 | SFP+-10G-LPBK  |
| Xcvr 24        | REV 01 | 740-030589 | S9AK450074 | SFP+-10G-LPBK  |
| Xcvr 25        | REV 01 | 740-030589 | SA62270195 | SFP+-10G-LPBK  |
| Xcvr 26        | REV 01 | 740-030589 | S9AK450078 | SFP+-10G-LPBK  |
| Xcvr 27        | REV 01 | 740-030589 | S9AK450024 | SFP+-10G-LPBK  |
| Xcvr 28        | REV 01 | 740-030589 | S9AK450027 | SFP+-10G-LPBK  |
| Xcvr 29        | REV 01 | 740-030589 | S9AK450080 | SFP+-10G-LPBK  |
| Xcvr 30        | REV 01 | 740-030589 | S9AK450030 | SFP+-10G-LPBK  |
| Xcvr 31        | REV 01 | 740-030589 | S9AK450025 | SFP+-10G-LPBK  |
| Xcvr 32        | REV 01 | 740-030589 | S9AK450023 | SFP+-10G-LPBK  |
| Xcvr 33        | REV 01 | 740-030589 | S9AK450075 | SFP+-10G-LPBK  |
| Xcvr 34        | REV 01 | 740-030589 | S9AK450161 | SFP+-10G-LPBK  |
| Xcvr 35        | REV 01 | 740-030589 | S9AK450071 | SFP+-10G-LPBK  |
| Xcvr 36        | REV 01 | 740-030589 | S9AK450072 | SFP+-10G-LPBK  |
| Xcvr 37        | REV 01 | 740-030589 | S9AK450022 | SFP+-10G-LPBK  |
| Xcvr 38        | REV 01 | 740-030589 | S9AK450021 | SFP+-10G-LPBK  |
| Xcvr 39        | REV 01 | 740-030589 | S9AK450175 | SFP+-10G-LPBK  |
| Xcvr 40        | REV 01 | 740-030589 | S9AK450162 | SFP+-10G-LPBK  |
| Xcvr 41        | REV 01 | 740-030589 | S99E270074 | SFP+-10G-LPBK  |
| Xcvr 42        | REV 01 | 740-030589 | S9AK450174 | SFP+-10G-LPBK  |
| Xcvr 43        | REV 01 | 740-030589 | S9AK450077 | SFP+-10G-LPBK  |
| Xcvr 44        | REV 01 | 740-030589 | S9AK450076 | SFP+-10G-LPBK  |
| Xcvr 45        | REV 01 | 740-030589 | S9AK450026 | SFP+-10G-LPBK  |
| Xcvr 46        | REV 01 | 740-030589 | S9AK450079 | SFP+-10G-LPBK  |
| Xcvr 47        | REV 01 | 740-030589 | S9AK450029 | SFP+-10G-LPBK  |
| PIC 1          |        | BUILTIN    | BUILTIN    | 15x 10G-SFP+   |
| Xcvr 1         | REV 01 | 740-032986 | QA170087   | QSFP+-40G-SR4  |
| Xcvr 4         | REV 01 | 740-032986 | QA360442   | QSFP+-40G-SR4  |
| Xcvr 8         | REV 01 | 740-032986 | QA170091   | QSFP+-40G-SR4  |
| Xcvr 12        | REV 01 | 740-032986 | QA170042   | QSFP+-40G-SR4  |
| MGMT BRD       | REV 08 | 750-036946 | EE0731     | QFX3500-MB     |
| Power Supply 0 | Rev 04 | 740-032091 | UI00690    | QFX PS 650W AC |
| Power Supply 1 | Rev 04 | 740-032091 | UI00679    | QFX PS 650W AC |
| Fan Tray 0     |        |            |            | QFX Fan Tray   |
| Fan Tray 1     |        |            |            | QFX Fan Tray   |

### show chassis hardware models (QFX3500 Switches)

```

user@switch> show chassis hardware models
Hardware inventory:
Item          Version  Part number  Serial number  FRU model number
Routing Engine 0      BUILTIN    BUILTIN
FPC 0          REV 02    711-032234  EC4074
Power Supply 0  PSMI 2C  11-d65800  --

```

### show chassis hardware clei-models (QFX3500 Switches)

```

user@switch> show chassis hardware clei-models
Hardware inventory:
Item          Version  Part number  CLEI code  FRU model number

```

```

Routing Engine 0      BUILTIN
FPC 0                 REV 02  711-032234
Power Supply 0        PSMI 2C 11-d65800

```

### show chassis hardware interconnect-device (QFabric Systems)

```

user@switch> show chassis hardware interconnect-device interconnect1
Hardware inventory:
Item          Version  Part number  Serial number  Description
Chassis       REV 07                BH0208188289  QFX_olive
Midplane      REV 07  750-021261  BH0208188289  QFX Midplane
CB 0          REV 07  750-021261  BH0208188289  QFXIC08-CB4S

```

### show chassis hardware node-device (QFabric Systems)

```

user@switch> show chassis hardware node-device node1
Routing Engine 0      BUILTIN      BUILTIN      QFX Routing Engine
node1                REV 05  711-032234  ED3694        QFX3500-48S4Q-AFI

CPU                  BUILTIN      BUILTIN      FPC CPU
PIC 0                BUILTIN      BUILTIN      48x 10G-SFP+
Xcvr 8               REV 01  740-030658  AD0946A028B  SFP+-10G-USR
...

```

### show chassis hardware (PTX5000 Packet Transport Router)

```

user@switch> show chassis hardware
Hardware inventory:
Item          Version  Part number  Serial number  Description
Chassis       REV 03  711-031896  JN11D1FD7AJA  PTX5000
Midplane      REV 08  760-030647  EG1679        Midplane-8S
FPM           REV 05  740-032019  ZE00006       Front Panel Display
PDU 0         Rev 05  740-032022  ZJ00018       DC Power Dist Unit
PSM 0         Rev 05  740-032022  ZJ00018       DC 12V Power Supply
PSM 1         Rev 04  740-032022  ZC00052       DC 12V Power Supply
PSM 2         Rev 04  740-032022  ZD00051       DC 12V Power Supply
PSM 3         Rev 05  740-032022  ZJ00060       DC 12V Power Supply
CCG 0         REV 04  750-030653  EG3703        Clock Generator
CCG 1         REV 04  750-030653  EG3698        Clock Generator
Routing Engine 0 REV 05  740-026942  P737A-002231  RE-DUO-2600
Routing Engine 1 REV 06  740-026942  P737A-002438  RE-DUO-2600
CB 0          REV 08  750-030625  EG5519        Control Board
CB 1          REV 08  750-030625  EG5516        Control Board
FPC 0         REV 18  750-036844  EJ3080        FPC
CPU           REV 12  711-030686  EJ3260        SNG PMB
FPC 2         REV 13  750-036844  EG5065        FPC
CPU           REV 09  711-030686  EG4082        SNG PMB
PIC 0         REV 14  750-031913  EG5127        24x 10GE(LAN) SFP+
Xcvr 0        REV 01  740-031980  143363A00240  SFP+-10G-SR
Xcvr 1        REV 01  740-031981  UK90PZ1       SFP+-10G-LR
Xcvr 2        REV 01  740-031980  AD1141A04XH   SFP+-10G-SR
Xcvr 3        REV 01  740-031981  UK90Q46       SFP+-10G-LR
Xcvr 4        REV 01  740-031980  AD1141A04X4   SFP+-10G-SR
Xcvr 6        REV 01  740-031980  B11H02560     SFP+-10G-SR
Xcvr 7        REV 01  740-031980  B11C01589     SFP+-10G-SR
Xcvr 8        REV 01  740-031980  AD1141A04XF   SFP+-10G-SR
Xcvr 10       REV 01  740-031980  123363A01094  SFP+-10G-SR
Xcvr 11       REV 01  740-031980  AK80LKF       SFP+-10G-SR
Xcvr 12       REV 01  740-031980  183363A01528  SFP+-10G-SR
Xcvr 14       REV 01  740-031980  193363A01079  SFP+-10G-SR
Xcvr 15       REV 01  740-031980  AK80MC8       SFP+-10G-SR

```

|            |        |            |              |                     |
|------------|--------|------------|--------------|---------------------|
| Xcvr 16    | REV 01 | 740-031980 | AJC0BHC      | SFP+-10G-SR         |
| Xcvr 19    | REV 01 | 740-021309 | J08D26856    | SFP+-10G-LR         |
| Xcvr 21    | REV 01 | 740-031980 | AK80KCT      | SFP+-10G-SR         |
| Xcvr 22    | REV 01 | 740-031981 | UK90PZL      | SFP+-10G-LR         |
| Xcvr 23    | REV 01 | 740-031980 | AK80N1V      | SFP+-10G-SR         |
| FPC 3      | REV 13 | 750-036844 | EG5074       | FPC                 |
| CPU        | REV 09 | 711-030686 | EG4064       | SNG PMB             |
| PIC 1      | REV 10 | 750-031903 | EG0325       | SNG Load            |
| FPC 5      | REV 06 | 750-036844 | EH3198       | FPC                 |
| CPU        |        |            |              |                     |
| PIC 0      | REV 14 | 750-031913 | EG5134       | 24x 10GE(LAN) SFP+  |
| Xcvr 0     | REV 01 | 740-031980 | AK80LBH      | SFP+-10G-SR         |
| Xcvr 1     | REV 01 | 740-031980 | B11B03724    | SFP+-10G-SR         |
| Xcvr 2     | REV 01 | 740-031980 | AK80FMH      | SFP+-10G-SR         |
| Xcvr 5     | REV 01 | 740-031980 | B11J00818    | SFP+-10G-SR         |
| Xcvr 6     | REV 01 | 740-031980 | 193363A00743 | SFP+-10G-SR         |
| Xcvr 7     | REV 01 | 740-031980 | B11B06125    | SFP+-10G-SR         |
| Xcvr 10    | REV 01 | 740-031980 | B11H02529    | SFP+-10G-SR         |
| Xcvr 11    | REV 01 | 740-031980 | AK80LFB      | SFP+-10G-SR         |
| Xcvr 12    | REV 01 | 740-031980 | 193363A01061 | SFP+-10G-SR         |
| Xcvr 15    | REV 01 | 740-031980 | B11J00687    | SFP+-10G-SR         |
| Xcvr 16    | REV 01 | 740-031980 | 193363A00738 | SFP+-10G-SR         |
| Xcvr 18    | REV 01 | 740-031980 | AK80MQX      | SFP+-10G-SR         |
| Xcvr 19    | REV 01 | 740-021309 | J08C17257    | SFP+-10G-LR         |
| Xcvr 22    | REV 01 | 740-031980 | B11J00730    | SFP+-10G-SR         |
| Xcvr 23    | REV 01 | 740-031980 | AK80KEE      | SFP+-10G-SR         |
| PIC 1      | REV 08 | 750-036710 | EG3105       | 2x 40GE CFP         |
| Xcvr 0     | REV 01 | 740-034554 | B260HLT      | CFP-40G-LR4         |
| Xcvr 1     | REV 01 | 740-034554 | B11C02847    | CFP-40G-LR4         |
| FPC 6      | REV 18 | 750-036844 | EJ4391       | FPC                 |
| CPU        | REV 12 | 711-030686 | EJ3257       | SNG PMB             |
| FPC 7      | REV 18 | 750-036844 | EJ4382       | FPC                 |
| CPU        | REV 12 | 711-030686 | EJ3238       | SNG PMB             |
| SPMB 0     | REV 10 | 711-030686 | EG5418       | SNG PMB             |
| SPMB 1     | REV 09 | 711-030686 | EG5373       | SNG PMB             |
| SIB 0      | REV 07 | 750-030631 | EG4858       | SIB-I-8S            |
| SIB 1      | REV 07 | 750-030631 | EG4872       | SIB-I-8S            |
| SIB 2      | REV 07 | 750-030631 | EG4866       | SIB-I-8S            |
| SIB 3      | REV 07 | 750-030631 | EG6011       | SIB-I-8S            |
| SIB 4      | REV 07 | 750-030631 | EG4907       | SIB-I-8S            |
| SIB 5      | REV 07 | 750-030631 | EG4879       | SIB-I-8S            |
| SIB 6      | REV 07 | 750-030631 | EG4864       | SIB-I-8S            |
| SIB 7      | REV 07 | 750-030631 | EG4899       | SIB-I-8S            |
| SIB 8      | REV 07 | 750-030631 | EG4880       | SIB-I-8S            |
| Fan Tray 0 | REV 04 | 760-032784 | EG1496       | Vertical Fan Tray   |
| Fan Tray 1 | REV 04 | 760-030642 | EG1335       | Horizontal Fan Tray |
| Fan Tray 2 | REV 02 | 760-030642 | ED4952       | Horizontal Fan Tray |

### show chassis hardware clei-models (PTX5000 Packet Transport Router)

```

user@switch> show chassis hardware clei-models
Hardware inventory:
Item          Version  Part number  CLEI code  FRU model number
FPM           REV 08   760-030647  PROTOXCLEI CRAFT-PTX5000-S
PDU 0        Rev 05   740-032019  IPUPAHLKAA  PWR-SAN-PDU-DC
PSM 0        Rev 05   740-032022  IPUPAHNKAA  PSM-PTX-DC-120-S
PSM 1        Rev 04   740-032022  032022XXXX PWR-SAN-12-DC
PSM 2        Rev 04   740-032022  032022XXXX PWR-SAN-12-DC
PSM 3        Rev 05   740-032022  IPUPAHNKAA  PSM-PTX-DC-120-S
CCG 0        REV 04   750-030653  PROTOXCLEI CCG-PTX-S
CCG 1        REV 04   750-030653  PROTOXCLEI CCG-PTX-S

```



|                  |        |            |            |                     |
|------------------|--------|------------|------------|---------------------|
| Routing Engine 0 | REV 05 | 740-026942 |            | RE-DUO-C2600-16G-S  |
| Routing Engine 1 | REV 06 | 740-026942 |            | RE-DUO-C2600-16G-S  |
| CB 0             | REV 08 | 750-030625 | PROTOXCLEI | CB-PTX-S            |
| CB 1             | REV 08 | 750-030625 | PROTOXCLEI | CB-PTX-S            |
| FPC 0            | REV 18 | 750-036844 | PROTOXCLEI | FPC-PTX-P1-A        |
| FPC 2            | REV 13 | 750-036844 | PROTOXCLEI | FPC-PTX-P1-A        |
| PIC 0            | REV 14 | 750-031913 | PROTOXCLEI | P1-PTX-24-10GE-SFPP |
| FPC 3            | REV 13 | 750-036844 | PROTOXCLEI | FPC-PTX-P1-A        |
| FPC 5            |        |            |            |                     |
| PIC 0            | REV 14 | 750-031913 | PROTOXCLEI | P1-PTX-24-10GE-SFPP |
| FPC 6            | REV 18 | 750-036844 | PROTOXCLEI | FPC-PTX-P1-A        |
| FPC 7            | REV 18 | 750-036844 | PROTOXCLEI | FPC-PTX-P1-A        |
| SIB 0            | REV 07 | 750-030631 | PROTOXCLEI | SIB-I-PTX5008       |
| SIB 1            | REV 07 | 750-030631 | PROTOXCLEI | SIB-I-PTX5008       |
| SIB 2            | REV 07 | 750-030631 | PROTOXCLEI | SIB-I-PTX5008       |
| SIB 3            | REV 07 | 750-030631 | PROTOXCLEI | SIB-I-PTX5008       |
| SIB 4            | REV 07 | 750-030631 | PROTOXCLEI | SIB-I-PTX5008       |
| SIB 5            | REV 07 | 750-030631 | PROTOXCLEI | SIB-I-PTX5008       |
| SIB 6            | REV 07 | 750-030631 | PROTOXCLEI | SIB-I-PTX5008       |
| SIB 7            | REV 07 | 750-030631 | PROTOXCLEI | SIB-I-PTX5008       |
| SIB 8            | REV 07 | 750-030631 | PROTOXCLEI | SIB-I-PTX5008       |
| Fan Tray 1       | REV 04 | 760-030642 | PROTOXCLEI | FAN-PTX-H-S         |

#### show chassis hardware detail (PTX5000 Packet Transport Router)

```

user@switch> show chassis hardware detail
Hardware inventory:
Item          Version  Part number  Serial number  Description
Chassis
Midplane      REV 03   711-031896   ABAC5589       Midplane-8S
FPM           REV 08   760-030647   EG1679         Front Panel Display
PDU 0         Rev 05   740-032019   ZE00006        DC Power Dist Unit
  PSM 0        Rev 05   740-032022   ZJ00018        DC 12V Power Supply
  PSM 1        Rev 04   740-032022   ZC00052        DC 12V Power Supply
  PSM 2        Rev 04   740-032022   ZD00051        DC 12V Power Supply
  PSM 3        Rev 05   740-032022   ZJ00060        DC 12V Power Supply
CCG 0         REV 04   750-030653   EG3703         Clock Generator
CCG 1         REV 04   750-030653   EG3698         Clock Generator
Routing Engine 0 REV 05   740-026942   P737A-002231   RE-DUO-2600
  ad0  3823 MB SMART CF      201006190039C02DC02D Compact Flash
  ad1  62720 MB SMART Lite SATA Drive 2011042300CF4C6B4C6B Disk 1
Routing Engine 1 REV 06   740-026942   P737A-002438   RE-DUO-2600
  ad0  3823 MB SMART CF      20100619053455F055F0 Compact Flash
  ad1  62720 MB SMART Lite SATA Drive 20110423000AE8E7E8E7 Disk 1
CB 0          REV 08   750-030625   EG5519         Control Board
CB 1          REV 08   750-030625   EG5516         Control Board
FPC 0         REV 18   750-036844   EJ3080         FPC
CPU           REV 12   711-030686   EJ3260         SNG PMB
FPC 2         REV 13   750-036844   EG5065         FPC
CPU           REV 09   711-030686   EG4082         SNG PMB
PIC 0         REV 14   750-031913   EG5127         24x 10GE(LAN) SFP+
  Xcvr 0       REV 01   740-031980   143363A00240   SFP+-10G-SR
  Xcvr 1       REV 01   740-031981   UK90PZ1        SFP+-10G-LR
  Xcvr 2       REV 01   740-031980   AD1141A04XH    SFP+-10G-SR
  Xcvr 3       REV 01   740-031981   UK90Q46        SFP+-10G-LR
  Xcvr 4       REV 01   740-031980   AD1141A04X4    SFP+-10G-SR
  Xcvr 6       REV 01   740-031980   B11H02560      SFP+-10G-SR
  Xcvr 7       REV 01   740-031980   B11C01589      SFP+-10G-SR
  Xcvr 8       REV 01   740-031980   AD1141A04XF    SFP+-10G-SR
  Xcvr 10      REV 01   740-031980   123363A01094   SFP+-10G-SR
  Xcvr 11      REV 01   740-031980   AK80LKF        SFP+-10G-SR

```

|            |        |            |              |                     |
|------------|--------|------------|--------------|---------------------|
| Xcvr 12    | REV 01 | 740-031980 | 183363A01528 | SFP+-10G-SR         |
| Xcvr 14    | REV 01 | 740-031980 | 193363A01079 | SFP+-10G-SR         |
| Xcvr 15    | REV 01 | 740-031980 | AK80MC8      | SFP+-10G-SR         |
| Xcvr 16    | REV 01 | 740-031980 | AJC0BHC      | SFP+-10G-SR         |
| Xcvr 19    | REV 01 | 740-021309 | J08D26856    | SFP+-10G-LR         |
| Xcvr 21    | REV 01 | 740-031980 | AK80KCT      | SFP+-10G-SR         |
| Xcvr 22    | REV 01 | 740-031981 | UK90PZL      | SFP+-10G-LR         |
| Xcvr 23    | REV 01 | 740-031980 | AK80N1V      | SFP+-10G-SR         |
| FPC 3      | REV 13 | 750-036844 | EG5074       | FPC                 |
| CPU        | REV 09 | 711-030686 | EG4064       | SNG PMB             |
| PIC 1      | REV 10 | 750-031903 | EG0325       | SNG Load            |
| FPC 5      | REV 06 | 750-036844 | EH3198       | FPC                 |
| CPU        |        |            |              |                     |
| PIC 0      | REV 14 | 750-031913 | EG5134       | 24x 10GE(LAN) SFP+  |
| Xcvr 0     | REV 01 | 740-031980 | AK80LBH      | SFP+-10G-SR         |
| Xcvr 1     | REV 01 | 740-031980 | B11B03724    | SFP+-10G-SR         |
| Xcvr 2     | REV 01 | 740-031980 | AK80FMH      | SFP+-10G-SR         |
| Xcvr 5     | REV 01 | 740-031980 | B11J00818    | SFP+-10G-SR         |
| Xcvr 6     | REV 01 | 740-031980 | 193363A00743 | SFP+-10G-SR         |
| Xcvr 7     | REV 01 | 740-031980 | B11B06125    | SFP+-10G-SR         |
| Xcvr 10    | REV 01 | 740-031980 | B11H02529    | SFP+-10G-SR         |
| Xcvr 11    | REV 01 | 740-031980 | AK80LFB      | SFP+-10G-SR         |
| Xcvr 12    | REV 01 | 740-031980 | 193363A01061 | SFP+-10G-SR         |
| Xcvr 15    | REV 01 | 740-031980 | B11J00687    | SFP+-10G-SR         |
| Xcvr 16    | REV 01 | 740-031980 | 193363A00738 | SFP+-10G-SR         |
| Xcvr 18    | REV 01 | 740-031980 | AK80MQX      | SFP+-10G-SR         |
| Xcvr 19    | REV 01 | 740-021309 | J08C17257    | SFP+-10G-LR         |
| Xcvr 22    | REV 01 | 740-031980 | B11J00730    | SFP+-10G-SR         |
| Xcvr 23    | REV 01 | 740-031980 | AK80KEE      | SFP+-10G-SR         |
| PIC 1      | REV 08 | 750-036710 | EG3105       | 2x 40GE CFP         |
| Xcvr 0     | REV 01 | 740-034554 | B260HLT      | CFP-40G-LR4         |
| Xcvr 1     | REV 01 | 740-034554 | B11C02847    | CFP-40G-LR4         |
| FPC 6      | REV 18 | 750-036844 | EJ4391       | FPC                 |
| CPU        | REV 12 | 711-030686 | EJ3257       | SNG PMB             |
| FPC 7      | REV 18 | 750-036844 | EJ4382       | FPC                 |
| CPU        | REV 12 | 711-030686 | EJ3238       | SNG PMB             |
| SPMB 0     | REV 10 | 711-030686 | EG5418       | SNG PMB             |
| SPMB 1     | REV 09 | 711-030686 | EG5373       | SNG PMB             |
| SIB 0      | REV 07 | 750-030631 | EG4858       | SIB-I-8S            |
| SIB 1      | REV 07 | 750-030631 | EG4872       | SIB-I-8S            |
| SIB 2      | REV 07 | 750-030631 | EG4866       | SIB-I-8S            |
| SIB 3      | REV 07 | 750-030631 | EG6011       | SIB-I-8S            |
| SIB 4      | REV 07 | 750-030631 | EG4907       | SIB-I-8S            |
| SIB 5      | REV 07 | 750-030631 | EG4879       | SIB-I-8S            |
| SIB 6      | REV 07 | 750-030631 | EG4864       | SIB-I-8S            |
| SIB 7      | REV 07 | 750-030631 | EG4899       | SIB-I-8S            |
| SIB 8      | REV 07 | 750-030631 | EG4880       | SIB-I-8S            |
| Fan Tray 0 | REV 04 | 760-032784 | EG1496       | Vertical Fan Tray   |
| Fan Tray 1 | REV 04 | 760-030642 | EG1335       | Horizontal Fan Tray |
| Fan Tray 2 | REV 02 | 760-030642 | ED4952       | Horizontal Fan Tray |

### show chassis hardware models (PTX5000 Packet Transport Router)

```
user@switch> show chassis hardware models
```

| Hardware inventory: |         |             |               |                  |
|---------------------|---------|-------------|---------------|------------------|
| Item                | Version | Part number | Serial number | FRU model number |
| FPM                 | REV 08  | 760-030647  | EG1679        | CRAFT-PTX5000-S  |
| PDU 0               | Rev 05  | 740-032019  | ZE00006       | PWR-SAN-PDU-DC   |
| PSM 0               | Rev 05  | 740-032022  | ZJ00018       | PSM-PTX-DC-120-S |
| PSM 1               | Rev 04  | 740-032022  | ZC00052       | PWR-SAN-12-DC    |
| PSM 2               | Rev 04  | 740-032022  | ZD00051       | PWR-SAN-12-DC    |

|                  |        |            |              |                     |
|------------------|--------|------------|--------------|---------------------|
| PSM 3            | Rev 05 | 740-032022 | ZJ00060      | PSM-PTX-DC-120-S    |
| CCG 0            | REV 04 | 750-030653 | EG3703       | CCG-PTX-S           |
| CCG 1            | REV 04 | 750-030653 | EG3698       | CCG-PTX-S           |
| Routing Engine 0 | REV 05 | 740-026942 | P737A-002231 | RE-DUO-C2600-16G-S  |
| Routing Engine 1 | REV 06 | 740-026942 | P737A-002438 | RE-DUO-C2600-16G-S  |
| CB 0             | REV 08 | 750-030625 | EG5519       | CB-PTX-S            |
| CB 1             | REV 08 | 750-030625 | EG5516       | CB-PTX-S            |
| FPC 0            | REV 18 | 750-036844 | EJ3080       | FPC-PTX-P1-A        |
| FPC 2            | REV 13 | 750-036844 | EG5065       | FPC-PTX-P1-A        |
| PIC 0            | REV 14 | 750-031913 | EG5127       | P1-PTX-24-10GE-SFPP |
| FPC 3            | REV 13 | 750-036844 | EG5074       | FPC-PTX-P1-A        |
| FPC 5            |        |            |              |                     |
| PIC 0            | REV 14 | 750-031913 | EG5134       | P1-PTX-24-10GE-SFPP |
| FPC 6            | REV 18 | 750-036844 | EJ4391       | FPC-PTX-P1-A        |
| FPC 7            | REV 18 | 750-036844 | EJ4382       | FPC-PTX-P1-A        |
| SIB 0            | REV 07 | 750-030631 | EG4858       | SIB-I-PTX5008       |
| SIB 1            | REV 07 | 750-030631 | EG4872       | SIB-I-PTX5008       |
| SIB 2            | REV 07 | 750-030631 | EG4866       | SIB-I-PTX5008       |
| SIB 3            | REV 07 | 750-030631 | EG6011       | SIB-I-PTX5008       |
| SIB 4            | REV 07 | 750-030631 | EG4907       | SIB-I-PTX5008       |
| SIB 5            | REV 07 | 750-030631 | EG4879       | SIB-I-PTX5008       |
| SIB 6            | REV 07 | 750-030631 | EG4864       | SIB-I-PTX5008       |
| SIB 7            | REV 07 | 750-030631 | EG4899       | SIB-I-PTX5008       |
| SIB 8            | REV 07 | 750-030631 | EG4880       | SIB-I-PTX5008       |
| Fan Tray 1       | REV 04 | 760-030642 | EG1335       | FAN-PTX-H-S         |

### show chassis hardware extensive (PTX5000 Packet Transport Router)

```
user@switch> show chassis hardware extensive
```

```
Hardware inventory:
```

| Item                                                          | Version    | Part number       | Serial number  | Description         |
|---------------------------------------------------------------|------------|-------------------|----------------|---------------------|
| .....                                                         |            |                   |                |                     |
| PDU 0                                                         | Rev 04     | 740-032019        | UE0003         | DC Power Dist Unit  |
| Jedec Code:                                                   | 0x7fb0     | EEPROM Version:   | 0x02           |                     |
| P/N:                                                          | 740-032019 | S/N:              | S/N UE0003     |                     |
| Assembly ID:                                                  | 0x043d     | Assembly Version: | 04.00          |                     |
| Date:                                                         | 11-29-2010 | Assembly Flags:   | 0x00           |                     |
| Version:                                                      | Rev 04     | CLEI Code:        | 032022XXXX     |                     |
| ID: DC Power Dist Unit                                        |            | FRU Model Number: | PWR-SAN-PDU-DC |                     |
| Board Information Record:                                     |            |                   |                |                     |
| Address 0x00: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff |            |                   |                |                     |
| I2C Hex Data:                                                 |            |                   |                |                     |
| Address 0x00: 7f b0 02 ff 04 3d 04 00 52 65 76 20 30 34 00 00 |            |                   |                |                     |
| Address 0x10: 00 00 00 00 37 34 30 2d 30 33 32 30 31 39 00 00 |            |                   |                |                     |
| Address 0x20: 53 2f 4e 20 55 45 30 30 30 33 00 00 00 1d 0b 07 |            |                   |                |                     |
| Address 0x30: da ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff |            |                   |                |                     |
| Address 0x40: ff ff ff ff 01 30 33 32 30 32 32 58 58 58 58 50 |            |                   |                |                     |
| Address 0x50: 57 52 2d 53 41 4e 2d 50 44 55 2d 44 43 00 00 00 |            |                   |                |                     |
| Address 0x60: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 |            |                   |                |                     |
| Address 0x70: 00 00 00 a3 ff ff ff ff ff ff ff ff ff ff ff ff |            |                   |                |                     |
| PSM 0                                                         | Rev 04     | 740-032022        | YG00065        | DC 12V Power Supply |
| Module                                                        |            |                   |                |                     |
| Jedec Code:                                                   | 0x7fb0     | EEPROM Version:   | 0x02           |                     |
| P/N:                                                          | 740-032022 | S/N:              | S/N YG00065    |                     |
| Assembly ID:                                                  | 0x0440     | Assembly Version: | 04.00          |                     |
| Date:                                                         | 07-30-2010 | Assembly Flags:   | 0x00           |                     |
| Version:                                                      | Rev 04     | CLEI Code:        | 032022XXXX     |                     |
| ID: DC 12V Power Supply Module                                |            | FRU Model Number: | PWR-SAN-12-DC  |                     |
| Board Information Record:                                     |            |                   |                |                     |
| Address 0x00: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff |            |                   |                |                     |
| I2C Hex Data:                                                 |            |                   |                |                     |

```

Address 0x00: 7f b0 02 ff 04 40 04 00 52 65 76 20 30 34 00 00
Address 0x10: 00 00 00 00 37 34 30 2d 30 33 32 30 32 32 00 00
Address 0x20: 53 2f 4e 20 59 47 30 30 30 36 35 00 00 1e 07 07
Address 0x30: da ff ff ff ff ff ff ff ff ff ff ff ff ff ff
Address 0x40: ff ff ff ff 01 30 33 32 30 32 32 58 58 58 58 50
Address 0x50: 57 52 2d 53 41 4e 2d 31 32 2d 44 43 20 20 20 20
Address 0x60: 20 20 20 20 20 20 01 00 ff ff ff ff ff ff ff ff
Address 0x70: ff ff ff 0c ff ff ff ff ff ff ff ff ff ff ff ff

```

### show chassis hardware (MX Routers with Media Services Blade [MSB])

```

user@switch> show chassis hardware
Hardware inventory:
Item             Version  Part number  Serial number  Description
Chassis                      JN1100FB1AFB  MX480
Midplane             REV 05   710-017414   TR3310        MX480 Midplane
FPM Board            REV 02   710-017254   KG1872        Front Panel Display
PEM 2                Rev 02   740-017343   QCS0812A00N   DC Power Entry Module
PEM 3                Rev 02   740-017343   QCS0812A00U   DC Power Entry Module
Routing Engine 0     REV 07   740-015113   1000740938    RE-S-1300
CB 0                 REV 03   710-021523   KF4630        MX SCB
FPC 1                REV 11   750-037207   ZW9726        AS-MCC
CPU                  REV 04   711-038173   ZW4819        AS-MCC PMB
MIC 0                REV 06   750-037214   ZW3574        AS-MSC
  PIC 0              BUILTIN  BUILTIN      AS-MSC
MIC 1                REV 00   750-037211   BUILTIN      AS-MXC
  PIC 2              BUILTIN  BUILTIN      AS-MXC

```

### show chassis hardware extensive (MX Routers with Media Services Blade [MSB])

```

user@switch> show chassis hardware extensive
FPC 1                REV 11   750-037207   ZW9726        AS-MCC
Jedec Code: 0x7fb0   EEPROM Version: 0x02
P/N: 750-037207      S/N: S/N ZW9726
Assembly ID: 0x0b37  Assembly Version: 01.11
Date: 02-17-2012     Assembly Flags: 0x00
Version: REV 11      CLEI Code: PROTOXCLEI
ID: AS-MCC           FRU Model Number: 750-037207
Board Information Record:
Address 0x00: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
I2C Hex Data:
Address 0x00: 7f b0 02 ff 0b 37 01 0b 52 45 56 20 31 31 00 00
Address 0x10: 00 00 00 00 37 35 30 2d 30 33 37 32 30 37 00 00
Address 0x20: 53 2f 4e 20 5a 57 39 37 32 36 00 00 00 11 02 07
Address 0x30: dc ff ff ff ff ff ff ff ff ff ff ff ff ff ff
Address 0x40: ff ff ff ff 01 50 52 4f 54 4f 58 43 4c 45 49 37
Address 0x50: 35 30 2d 30 33 37 32 30 37 00 00 00 00 00 00 00
Address 0x60: 00 00 00 00 00 00 31 31 00 ff ff ff ff ff ff ff
Address 0x70: ff ff ff 5e ff ff ff ff ff ff ff ff ff ff ff ff
CPU                  REV 04   711-038173   ZW4819        AS-MCC-PMB
Jedec Code: 0x7fb0   EEPROM Version: 0x02
P/N: 711-038173      S/N: S/N ZW4819
Assembly ID: 0x0b38  Assembly Version: 01.04
Date: 12-30-2011     Assembly Flags: 0x00
Version: REV 04
ID: AS-MCC PMB
Board Information Record:
Address 0x00: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
I2C Hex Data:
Address 0x00: 7f b0 02 ff 0b 38 01 04 52 45 56 20 30 34 00 00

```

```

Address 0x10: 00 00 00 00 37 31 31 2d 30 33 38 31 37 33 00 00
Address 0x20: 53 2f 4e 20 5a 57 34 38 31 39 00 00 00 1e 0c 07
Address 0x30: db ff ff ff ff ff ff ff ff ff ff ff ff ff ff
Address 0x40: ff ff ff ff 00 50 52 4f 54 4f 58 43 4c 45 49 37
Address 0x50: 31 31 2d 30 33 38 31 37 33 00 00 00 00 00 00
Address 0x60: 00 00 00 00 00 00 30 34 00 ff ff ff ff ff ff
Address 0x70: ff ff ff 60 00 00 00 00 00 00 00 00 00 00 00
MIC 0          REV 06    750-037214    ZW3574          AS-MS
Jedec Code:    0x7fb0          EEPROM Version:    0x02
P/N:           750-037214      S/N:          S/N ZW3574
Assembly ID:   0x0a44          Assembly Version: 01.06
Date:          02-19-2012      Assembly Flags: 0x00
Version:       REV 06          CLEI Code:     PROTOXCLEI
ID: AS-MS      FRU Model Number: 750-037214
Board Information Record:
Address 0x00: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
I2C Hex Data:
Address 0x00: 7f b0 02 ff 0a 44 01 06 52 45 56 20 30 36 00 00
Address 0x10: 00 00 00 00 37 35 30 2d 30 33 37 32 31 34 00 00
Address 0x20: 53 2f 4e 20 5a 57 33 35 37 34 00 00 00 13 02 07
Address 0x30: dc ff ff ff ff ff ff ff ff ff ff ff ff ff ff
Address 0x40: ff ff ff ff 01 50 52 4f 54 4f 58 43 4c 45 49 37
Address 0x50: 35 30 2d 30 33 37 32 31 34 00 00 00 00 00 00
Address 0x60: 00 00 00 00 00 00 30 36 00 ff ff ff ff ff ff
Address 0x70: ff ff ff 60 c0 03 e5 f4 00 00 00 00 00 00 00
PIC 0          BUILTIN      BUILTIN          AS-MS
MIC 1          REV 00    750-037211          AS-MX
Jedec Code:    0x7fb0          EEPROM Version:    0x01
P/N:           750-037211
Assembly ID:   0x0a43          Assembly Version: 01.00
Date:          255-255-65535   Assembly Flags:    0x00
Version:       REV 00
ID: AS-MX
Board Information Record:
Address 0x00: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
I2C Hex Data:
Address 0x00: 7f b0 01 ff 0a 43 01 00 52 45 56 20 30 30 00 00
Address 0x10: 00 00 00 00 37 35 30 2d 30 33 37 32 31 31 00 00
Address 0x20: 00 00 00 00 00 00 00 00 00 00 00 00 00 ff ff ff
Address 0x30: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
Address 0x40: ff ff ff ff 00 ff ff ff ff ff ff ff ff ff ff
Address 0x50: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
Address 0x60: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
Address 0x70: ff ff ff ff c0 02 e6 6c 7f b0 02 ff 0a 44 01 06
PIC 2          BUILTIN      BUILTIN          AS-MX

```

## show chassis mac-addresses

---

|                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                                       | show chassis mac-addresses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Syntax (TX Matrix Router)</b>                                    | show chassis mac-addresses<br><lcc <i>number</i>   scc>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Syntax (TX Matrix Plus Router)</b>                               | show chassis mac-addresses<br><lcc <i>number</i>   sfc <i>number</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Syntax (MX Series Router)</b>                                    | show chassis mac-addresses<br><all-members><br><local><br><member <i>member-id</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Syntax (MX104, MX2010, and MX2020 3D Universal Edge Routers)</b> | show chassis mac-addresses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Syntax (QFX Series)</b>                                          | show chassis mac-addresses<br><interconnect-device <i>name</i> ><br><node-group <i>name</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Syntax (ACX Series Universal Access Routers)</b>                 | show chassis mac-addresses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>                                          | Command introduced before JUNOS Release 7.4.<br>Command introduced in JUNOS Release 9.0 for EX Series switches.<br><b>sfc</b> option introduced for the TX Matrix Plus router in JUNOS Release 9.6.<br>Command introduced in Junos OS Release 11.1 for QFX Series.<br>Command introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.<br>Command introduced in Junos OS Release 12.3 for MX2020 3D Universal Edge Routers.<br>Command introduced in Junos OS Release 12.3 for MX2010 3D Universal Edge Routers.<br>Command introduced in Junos OS Release 13.2 for MX104 3D Universal Edge Routers.                        |
| <b>Description</b>                                                  | Display the media access control (MAC) addresses for the router, switch chassis, or switch.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Options</b>                                                      | <b>none</b> —(TX Matrix, TX Matrix Plus routers, and the QFX Series) Display the MAC addresses for the router chassis or switch. On a TX Matrix router, display MAC addresses on the TX Matrix router and its attached T640 routers. On a TX Matrix Plus router, display MAC addresses on the TX Matrix Plus router and its attached routers.<br><br><b>all-members</b> —(MX Series routers only) (Optional) Display the MAC addresses for all the member routers of the Virtual Chassis configuration.<br><br><b>interconnect-device <i>name</i></b> —(QFabric systems only) (Optional) Display the MAC addresses for the Interconnect device. |

**lcc *number***—(TX Matrix and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display MAC addresses for a specified T640 router (line-card chassis) that is connected to the TX Matrix Plus router. On a TX Matrix Plus router, display MAC addresses for a specified router (line-card chassis) that is connected to the TX Matrix Plus router.

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

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**local**—(MX Series routers only) (Optional) Display the MAC addresses for the local Virtual Chassis member.

**member *member-id***—(MX Series routers only) (Optional) Display the MAC addresses for the specified member of the Virtual Chassis configuration. Replace *member-id* with a value of 0 or 1.

**node-group *name***—(QFabric systems only) (Optional) Display the MAC addresses for the specified Node group.

**scc**—(TX Matrix routers only) (Optional) Display MAC addresses for the TX Matrix router (switch-card chassis).

**sfc *number***—(TX Matrix Plus routers only) (Optional) Display MAC addresses for the TX Matrix Plus router (or switch-fabric chassis).

**Required Privilege Level**

view

**Related Documentation**

- [ACX2000 and ACX2100 Routers Hardware and CLI Terminology Mapping on page 13](#)

**List of Sample Output**

[show chassis mac-addresses on page 560](#)  
[show chassis mac-addresses \(MX104 Router\) on page 560](#)  
[show chassis mac-addresses \(MX2010 Router\) on page 560](#)  
[show chassis mac-addresses \(MX2020 Router\) on page 560](#)  
[show chassis mac-addresses \(TX Matrix Router\) on page 561](#)  
[show chassis mac-addresses \(TX Matrix Plus Router\) on page 561](#)  
[show chassis mac-addresses \(QFX3500 Switches\) on page 562](#)  
[show chassis mac-addresses interconnect-device \(QFabric Systems\) on page 562](#)  
[show chassis mac-addresses node-group \(QFabric Systems\) on page 562](#)  
[show chassis mac-addresses \(ACX2000 Universal Access Router\) on page 562](#)

**Output Fields** Table 39 on page 560 lists the output fields for the **show chassis mac-addresses** command. Output fields are listed in the approximate order in which they appear.

**Table 39: show chassis mac-addresses Output Fields**

| Field Name                     | Field Description                                                             |
|--------------------------------|-------------------------------------------------------------------------------|
| <b>MAC address information</b> |                                                                               |
| <b>Public base address</b>     | Base address of the MAC addresses allocated to this router or switch.         |
| <b>Public count</b>            | Number of allocated public addresses.                                         |
| <b>Private base address</b>    | Base address of the private MAC addresses allocated to this router or switch. |
| <b>Private count</b>           | Number of allocated private addresses.                                        |

## Sample Output

### show chassis mac-addresses

```
user@host> show chassis mac-addresses
MAC address information
  Public base address  0:90:69:0:4:0
  Public count         1008
  Private base address 0:90:69:0:7:f0
  Private count        16
```

### show chassis mac-addresses (MX104 Router)

```
user@host > show chassis mac-addresses
MAC address information:
  Public base address  b0:a8:6e:a1:e8:58
  Public count         2032
  Private base address b0:a8:6e:a1:f0:48
  Private count        16
```

### show chassis mac-addresses (MX2010 Router)

```
user@host> show chassis mac-addresses
MAC address information:
  Public base address  64:87:88:04:50:00
  Public count         1984
  Private base address 64:87:88:04:57:c0
  Private count        64
```

### show chassis mac-addresses (MX2020 Router)

```
user@host> show chassis mac-addresses
MAC address information:
  Public base address  2c:21:72:70:20:00
  Public count         4032
  Private base address 2c:21:72:70:2f:c0
  Private count        64
```



**show chassis mac-addresses (TX Matrix Router)**

```

user@host> show chassis mac-addresses
scc-re0:
-----
MAC address information:
  Public base address    00:05:85:9e:cc:00
  Public count           8064
  Private base address   00:05:85:9e:eb:80
  Private count          128
lcc0-re0:
-----
MAC address information:
  Public base address    00:05:85:68:98:00
  Public count           2032
  Private base address   00:05:85:68:9f:f0
  Private count          16
lcc2-re0:
-----
MAC address information:
  Public base address    00:05:85:68:78:00
  Public count           2032
  Private base address   00:05:85:68:7f:f0
  Private count          16

```

**show chassis mac-addresses (TX Matrix Plus Router)**

```

user@host> show chassis mac-addresses
sfc0-re0:
-----
MAC address information:
  Public base address    00:1d:b5:14:00:00
  Public count           65023
  Private base address   00:1d:b5:14:fd:ff
  Private count          512
lcc0-re0:
-----
MAC address information:
  Public base address    00:1f:12:7a:84:00
  Public count           2032
  Private base address   00:1f:12:7a:8b:f0
  Private count          16
lcc1-re0:
-----
MAC address information:
  Public base address    00:22:83:42:48:00
  Public count           2032
  Private base address   00:22:83:42:4f:f0
  Private count          16
lcc2-re0:
-----
MAC address information:
  Public base address    00:1f:12:c3:58:00
  Public count           2032
  Private base address   00:1f:12:c3:5f:f0
  Private count          16
lcc3-re0:

```

```
-----  
MAC address information:  
Public base address    00:21:59:ef:b8:00  
Public count           2032  
Private base address   00:21:59:ef:bf:f0  
Private count          16
```

#### show chassis mac-addresses (QFX3500 Switches)

```
user@switch> show chassis mac-addresses  
MAC address information:  
Public base address 02:00:08:00:00:00  
Public count 512  
Private base address 02:00:00:00:00:00  
Private count 64
```

#### show chassis mac-addresses interconnect-device (QFabric Systems)

```
user@switch> show chassis mac-addresses interconnect-device interconnect1  
MAC address information:  
Public base address    00:1f:12:30:9c:c0  
Public count           58  
Private base address   00:1f:12:30:9c:fa  
Private count          6
```

#### show chassis mac-addresses node-group (QFabric Systems)

```
user@switch> show chassis mac-addresses node-group NW-NG-0  
MAC address information:  
-----  
RE:  
FC MAC base    00:11:00:00:00:00  
FC MAC count   2  
VLAN MAC       00:11:00:00:00:09  
EC6007  
Base address   00:00:01:76:00:00  
Count         64  
EC6008  
Base address   00:22:83:22:52:ae  
Count         260
```

#### show chassis mac-addresses (ACX2000 Universal Access Router)

```
user@switch> show chassis mac-addresses  
MAC address information:  
Public base address    84:18:88:c0:2b:00  
Public count           112  
Private base address   84:18:88:c0:2b:70  
Private count          16
```

## show chassis pic

|                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                               | <code>show chassis pic fpc-slot <i>slot-number</i> pic-slot <i>slot-number</i></code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Syntax (TX Matrix and TX Matrix Plus Routers)</b>        | <code>show chassis pic fpc-slot <i>slot-number</i> pic-slot <i>slot-number</i> &lt;fcc <i>number</i>&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Syntax (MX Series Routers)</b>                           | <code>show chassis pic fpc-slot <i>slot-number</i> pic-slot <i>slot-number</i> &lt;all-members&gt; &lt;local&gt; &lt;member <i>member-id</i>&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Syntax (MX2010 and MX2020 3D Universal Edge Routers)</b> | <code>show chassis pic fpc-slot <i>slot-number</i> pic-slot <i>slot-number</i></code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Syntax (PTX Series Packet Transport Router)</b>          | <code>show chassis pic transport fpc-slot <i>slot-number</i> pic-slot <i>slot-number</i></code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Syntax (QFX Series)</b>                                  | <code>show chassis pic &lt;interconnect-device <i>name</i> (fpc-slot <i>slot-number</i>   pic-slot <i>slot-number</i>)&gt; &lt;node-device <i>name</i> pic-slot <i>slot-number</i>&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Syntax (ACX Series Universal Access Routers)</b>         | <code>show chassis pic fpc-slot <i>slot-number</i> pic-slot <i>slot-number</i></code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>                                  | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.1 for QFX Series.</p> <p>Command introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.</p> <p>Command introduced in Junos OS Release 12.3 for MX2020 3D Universal Edge Routers.</p> <p>Command introduced in Junos OS Release 12.3 for MX2010 3D Universal Edge Routers.</p> <p>Command introduced in Junos OS Release 13.2 for PTX Series Packet Transport Routers.</p>                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>                                          | Display status information about the PIC installed in the specified Flexible PIC Concentrator (FPC) and PIC slot.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>                                              | <p><b>fpc-slot <i>slot-number</i></b>—Display information about the PIC in this particular FPC slot:</p> <ul style="list-style-type: none"> <li>On a TX Matrix router, if you specify the number of the T640 router by using the <b>fcc <i>number</i></b> option (the recommended method), replace <b><i>slot-number</i></b> with a value from 0 through 7. Otherwise, replace <b><i>slot-number</i></b> with a value from 0 through 31.</li> </ul> <p>Likewise, on a TX Matrix Plus router, if you specify the number of the T1600 router by using the <b>fcc <i>number</i></b> option (the recommended method), replace <b><i>slot-number</i></b> with a value from 0 through 7. Otherwise, replace <b><i>slot-number</i></b> with a value from 0 through 31. For example, the following commands have the same result:</p> <pre> user@host&gt; show chassis pic fpc-slot 1 fcc 1 pic-slot 1 user@host&gt; show chassis pic fpc-slot 9 pic-slot 1 </pre> |

- M120 routers only—Replace **slot-number** with a value from 0 through 5.
- MX80 routers only—Replace **slot-number** with a value from 0 through 1.
- MX240 routers only—Replace **slot-number** with a value from 0 through 2.
- MX480 routers only—Replace **slot-number** with a value from 0 through 5.
- MX960 routers only—Replace **slot-number** with a value from 0 through 11.
- MX2010 routers only—Replace **slot-number** with a value from 0 through 9.
- MX2020 routers only—Replace **slot-number** with a value from 0 through 19.
- Other routers—Replace **slot-number** with a value from 0 through 7.
- EX Series switches:
  - EX3200 switches and EX4200 standalone switches—Replace **slot-number** with 0.
  - EX4200 switches in a Virtual Chassis configuration—Replace **slot-number** with a value from 0 through 9 (switch's member ID).
  - EX8208 switches—Replace **slot-number** with a value from 0 through 7 (line card).
  - EX8216 switches—Replace **slot-number** with a value from 0 through 15 (line card).
- QFX Series:
  - QFX3500 switches—Replace **slot-number** with 0. In the command output, FPC refers to a line card. The FPC number equals the slot number for the line card.
  - QFabric systems—Replace **slot-number** with any number between 0 and 15. In the command output, FPC refers to a line card. The FPC number equals the slot number for the line card.

**all-members**—(MX Series routers and EX Series switches only) (Optional) Display PIC information for all member routers in the Virtual Chassis configuration.

**interconnect-device name**—(QFabric systems only) (Optional) Display PIC information for a specified Interconnect device.

**lcc number**—(TX Matrix and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display PIC information for a specified T640 router (line-card chassis) that is connected to the TX Matrix router. On a TX Matrix Plus router, display PIC information for a specified router (line-card chassis) that is connected to the TX Matrix Plus router.

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

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

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

**local**—(MX Series routers and EX Series switches only) (Optional) Display PIC information for the local Virtual Chassis member.

**member *member-id***—(MX Series routers and EX Series switches only) (Optional) Display PIC information for the specified member of the Virtual Chassis configuration. Replace *member-id* with a value of 0 or 1.

**node-device *name***—(QFabric systems only) (Optional) Display PIC information for a specified Node device.

**pic-slot *slot-number***—Display information about the PIC in this particular PIC slot. For routers, replace *slot-number* with a value from 0 through 3. For EX3200 and EX4200 switches, replace *slot-number* with 0 for built-in network interfaces and 1 for interfaces on uplink modules. For EX8208 and EX8216 switches, replace *slot-number* with 0. For the QFX3500 standalone switch and the QFabric system, replace *slot-number* with 0 or 1.

**transport**—Display PIC information for optical transport network.

**Required Privilege Level** view

**Related Documentation**

- *request chassis pic*
- [show chassis hardware on page 439](#)
- *Configuring the PIC Type*
- *100-Gigabit Ethernet Type 4 PIC with CFP Overview*

**List of Sample Output**

- [show chassis pic fpc-slot pic-slot on page 568](#)
- [show chassis pic fpc-slot pic-slot \(PIC Offline\) on page 568](#)
- [show chassis pic fpc-slot pic-slot \(FPC Offline\) on page 568](#)
- [show chassis pic fpc-slot pic-slot \(FPC Not Present\) on page 568](#)
- [show chassis pic fpc-slot pic-slot \(PIC Not Present\) on page 569](#)
- [show chassis pic fpc-slot pic-slot \(M120 Router\) on page 569](#)
- [show chassis pic fpc-slot pic-slot \(MX960 Router Bidirectional Optics\) on page 569](#)
- [show chassis pic fpc-slot pic-slot \(MX480 Router with 100-Gigabit Ethernet MIC\) on page 569](#)
- [show chassis pic fpc-slot pic-slot \(MX240, MX480, MX960 Routers with Application Services Modular Line Card\) on page 570](#)
- [show chassis pic fpc-slot pic-slot \(MX480 Router with MPC4E\) on page 570](#)
- [show chassis pic fpc-slot pic-slot \(MX2010 Router\) on page 570](#)
- [show chassis pic fpc-slot pic-slot \(MX2020 Router\) on page 570](#)
- [show chassis pic fpc-slot pic-slot \(MX2020 Routers with MPC4E\) on page 571](#)

[show chassis pic fpc-slot pic-slot \(T1600 Router with 100-Gigabit Ethernet PIC\) on page 571](#)  
[show chassis pic fpc-slot pic-slot lcc \(TX Matrix Router\) on page 571](#)  
[show chassis pic fpc-slot pic-slot lcc \(TX Matrix Plus Router\) on page 571](#)  
[show chassis pic fpc-slot pic-slot \(Next-Generation SONET/SDH SFP\) on page 572](#)  
[show chassis pic fpc-slot pic-slot \(12-Port T1/E1\) on page 572](#)  
[show chassis pic fpc-slot pic-slot \(4x CHOC3 SONET CE SFP\) on page 572](#)  
[show chassis pic fpc-slot pic-slot \(SONET/SDH OC3/STM1 \[Multi-Rate\] MIC with SFP\) on page 573](#)  
[show chassis pic fpc-slot pic-slot \(8-port Channelized SONET/SDH OC3/STM1 \[Multi-Rate\] MIC with SFP\) on page 573](#)  
[show chassis pic fpc-slot pic-slot \(4-port Channelized SONET/SDH OC3/STM1 \[Multi-Rate\] MIC with SFP\) on page 573](#)  
[show chassis pic fpc-slot pic-slot \(1-port OC192/STM64 MIC with XFP\) on page 573](#)  
[show chassis pic fpc-slot 1 pic-slot 2 \(8-port DS3/E3 MIC\) on page 574](#)  
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[show chassis pic fpc-slot pic-slot \(MX Routers with Media Services Blade \[MSB\]\) on page 575](#)  
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[show chassis pic transport fpc-slot pic-slot \(PTX Series Packet Transport Routers\) on page 576](#)

**Output Fields** [Table 40 on page 566](#) lists the output fields for the **show chassis pic** command. Output fields are listed in the approximate order in which they appear.

**Table 40: show chassis pic Output Fields**

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                           |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Type</b>                    | <p>PIC type.</p> <p><b>NOTE:</b> On the 1-port OC192/STM64 MICs with the SDH framing mode, the type is displayed as <b>MIC-3D-1STM64-XFP</b> and with the SONET framing mode, the type is displayed as <b>MIC-3D-1OC192-XFP</b>. By default, the 1-port OC192/STM64 MICs displays the type as <b>MIC-3D-1OC192-XFP</b>.</p> |
| <b>Account Layer2 Overhead</b> | (MX Series routers) Indicates whether functionality to count the Layer 2 overhead bytes in the interface statistics at the PIC level is enabled or disabled.                                                                                                                                                                |
| <b>ASIC type</b>               | Type of ASIC on the PIC.                                                                                                                                                                                                                                                                                                    |
| <b>State</b>                   | <p>Status of the PIC. State is displayed only when a PIC is in the slot.</p> <ul style="list-style-type: none"> <li>• <b>Online</b>— PIC is online and running.</li> <li>• <b>Offline</b>—PIC is powered down.</li> </ul>                                                                                                   |

Table 40: show chassis pic Output Fields (*continued*)

| Field Name                                                                  | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>PIC version</b>                                                          | PIC hardware version.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Uptime</b>                                                               | How long the PIC has been online.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Package</b>                                                              | (Multiservices PICs only) Services package supported: <b>Layer-2</b> or <b>Layer-3</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Port Number</b>                                                          | Port number for the PIC.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Cable Type</b>                                                           | Type of cable connected to the port: <b>LH</b> , <b>LX</b> , or <b>SX</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>PIC Port Information<br/>(MX480 Router 100-Gigabit<br/>Ethernet CFP)</b> | Port-level information for the PIC. <ul style="list-style-type: none"> <li>• Port—Port number</li> <li>• Cable type—Type of optical transceiver installed.</li> <li>• Fiber type—Type of fiber. SM is single-mode.</li> <li>• Xcvr vendor—Transceiver vendor name.</li> <li>• Xcvr vendor part number—Transceiver vendor part number.</li> <li>• Wavelength—Wavelength of the transmitted signal. Uplinks and downlinks are always 1550 nm. There is a separate fiber for each direction</li> </ul>                                                                                                                                                                                                                                                                    |
| <b>PIC Port Information<br/>(MX960 Router<br/>Bidirectional Optics )</b>    | Port-level information for the PIC. <ul style="list-style-type: none"> <li>• Port—Port number</li> <li>• Cable type—Type of small form-factor pluggable (SFP) optical transceiver installed. Uplink interfaces display -U. Down link interfaces display -D.</li> <li>• Fiber type—Type of fiber. SM is single-mode.</li> <li>• Xcvr vendor—Transceiver vendor name.</li> <li>• Xcvr vendor part number—Transceiver vendor part number.               <ul style="list-style-type: none"> <li>• BX10-10-km bidirectional optics.</li> <li>• BX40-40-km bidirectional optics.</li> <li>• SFP-LX-40-km SFP optics.</li> </ul> </li> <li>• Wavelength—Wavelength of the transmitted signal. Uplinks are always 1310 nm. Downlinks are either 1490 nm or 1550 nm.</li> </ul> |

Table 40: show chassis pic Output Fields (*continued*)

| Field Name                                                  | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>PIC Port Information (Next-Generation SONET/SDH SFP)</b> | <p>Port-level information for the next-generation SONET/SDH SFP PIC.</p> <ul style="list-style-type: none"> <li>Port—Port number.</li> <li>Cable type—Type of small form-factor pluggable (SFP) optical transceiver installed.</li> <li>Fiber type—Type of fiber: <b>SM</b> (single-mode) or <b>MM</b> (multimode).</li> <li>Xcvr vendor—Transceiver vendor name.</li> <li>Xcvr vendor part number—Transceiver vendor part number.</li> <li>Wavelength—Wavelength of the transmitted signal. Next-generation SONET/SDH SFPs use 1310 nm.</li> </ul> |
| <b>Multirate Mode</b>                                       | Rate-selectability status for the MIC: <b>Enabled</b> or <b>Disabled</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Channelization</b>                                       | Indicates whether channelization is enabled or disabled on the DS3/E3 MIC.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

## Sample Output

### show chassis pic fpc-slot pic-slot

```

user@host> show chassis pic fpc-slot 2 pic-slot 0
PIC fpc slot 2 pic slot 0 information:
  Type                10x 1GE(LAN), 1000 BASE
  ASIC type           H chip
  State               Online
  PIC version         1.1
  Uptime              1 day, 50 minutes, 58 seconds
PIC Port Information:
  Port      Cable      Xcvr      Xcvr Vendor
  Number    Type        Vendor Name Part Number
  0         GIGE 1000EX  FINISAR CORP.  FTRJ8519P1BNL-J3
  1         GIGE 1000EX  FINISAR CORP.  FTRJ-8519-7D-JUN

```

### show chassis pic fpc-slot pic-slot (PIC Offline)

```

user@host> show chassis pic fpc-slot 1 pic-slot 0
PIC fpc slot 1 pic slot 0 information:
  State              Offline

```

### show chassis pic fpc-slot pic-slot (FPC Offline)

```

user@host> show chassis pic fpc-slot 1 pic-slot 0
FPC 1 is not online

```

### show chassis pic fpc-slot pic-slot (FPC Not Present)

```

user@host> show chassis pic fpc-slot 4 pic-slot 0
FPC slot 4 is empty

```



**show chassis pic fpc-slot pic-slot (PIC Not Present)**

```
user@host> show chassis pic fpc-slot 5 pic-slot 2
FPC 5, PIC 2 is empty
```

**show chassis pic fpc-slot pic-slot (M120 Router)**

```
user@host> show chassis pic fpc-slot 3 pic-slot 0
PC slot 3, PIC slot 0 information:
  Type                2x G/E IQ, 1000 BASE
  ASIC type           IQ GE 2 VLAN-TAG FPGA
  State               Online
  PIC version         1.16
  Uptime              3 hours, 3 minutes

PIC Port Information:
  Port      Cable      Xcvr      Xcvr Vendor
  Number    Type        Vendor Name Part Number
  0         GIGE 1000SX  FINISAR CORP.  FTRJ8519P1BNL-J3
  1         GIGE 1000SX  FINISAR CORP.  FTRJ-8519-7D-JUN
```

**show chassis pic fpc-slot pic-slot (MX960 Router Bidirectional Optics)**

```
user@host> show chassis pic fpc-slot 4 pic-slot 1
FPC slot 4, PIC slot 1 information:
  Type                10x 1GE(LAN)
  Account Layer2 Overhead Enabled
  State               Online
  PIC version         0.0
  Uptime              18 days, 5 hours, 41 minutes, 54 seconds
```

```
PIC port information:
  Port  Cable type      Fiber type  Xcvr vendor      Xcvr vendor      Wavelength
  0     SFP-1000BASE-BX10-D SM SumitomoElectric SBP6H44-J3-BW-49 1490 nm
  1     SFP-1000BASE-BX10-D SM SumitomoElectric SBP6H44-J3-BW-49 1490 nm
  2     SFP-1000BASE-BX10-D SM SumitomoElectric SBP6H44-J3-BW-49 1490 nm
  3     SFP-1000BASE-BX10-D SM OCP              TRXBG1LXDBVM2-JW 1490 nm
  4     SFP-1000BASE-BX10-D SM OCP              TRXBG1LXDBVM2-JW 1490 nm
  5     SFP-1000BASE-BX10-U SM SumitomoElectric SBP6H44-J3-BW-31 1310 nm
  6     SFP-1000BASE-BX10-U SM SumitomoElectric SBP6H44-J3-BW-31 1310 nm
  7     SFP-1000BASE-BX10-U SM OCP              TRXBG1LXDBBMH-J1 1310 nm
  8     SFP-1000BASE-BX10-U SM OCP              TRXBG1LXDBBMH-J1 1310 nm
  9     SFP-1000BASE-BX10-U SM SumitomoElectric SBP6H44-J3-BW-31 1310 nm
```

**show chassis pic fpc-slot pic-slot (MX480 Router with 100-Gigabit Ethernet MIC)**

```
user@host> show chassis pic fpc-slot 1 pic-slot 2
FPC slot 1, PIC slot 2 information:
  Type                1X100GE CFP
  State               Online
  PIC version         2.10
  Uptime              4 minutes, 48 seconds

PIC port information:
  Fiber
  Port  Cable type      type  Xcvr vendor      Xcvr vendor      Wavelength
  0     100GBASE LR4    SM    FINISAR CORP.    FTLCL1181RDN3-J3 1310 nm

Xcvr vendor
```

```
firmware version
1.8
```

#### show chassis pic fpc-slot pic-slot (MX240, MX480, MX960 Routers with Application Services Modular Line Card)

```
user@host> show chassis pic fpc-slot 1 pic-slot 2
FPC slot 1, PIC slot 2 information:
  Type           AS-MXC
  State          Online
  PIC version     1.0
  Uptime         11 hours, 18 minutes, 3 seconds
```

#### show chassis pic fpc-slot pic-slot (MX480 Router with MPC4E)

```
user@host> show chassis pic fpc-slot 3 pic-slot 0
FPC slot 3, PIC slot 0 information:
  Type           4x10GE SFPP
  State          Online
  PIC version     0.0
  Uptime         41 seconds

PIC port information:

```

|          |            | Fiber |              | Xcvr vendor    | Wave-  | Xcvr |
|----------|------------|-------|--------------|----------------|--------|------|
| Port     | Cable type | type  | Xcvr vendor  | part number    | length |      |
| Firmware |            |       |              |                |        |      |
| 0        | 10GBASE SR | MM    | OPNEXT, INC. | TRS2001EM-0014 | 850 nm | 0.0  |
| 1        | 10GBASE SR | MM    | OPNEXT, INC. | TRS2001EM-0014 | 850 nm | 0.0  |

#### show chassis pic fpc-slot pic-slot (MX2010 Router)

```
user@host> show chassis pic fpc-slot 9 pic-slot 3
FPC slot 9, PIC slot 3 information:
  Type           1X100GE CFP
  Account Layer2 Overhead Enabled
  State          Online
  PIC version     0.0
  Uptime         14 hours, 51 seconds
```

#### show chassis pic fpc-slot pic-slot (MX2020 Router)

```
user@host> show chassis pic fpc-slot 19 pic-slot 3
FPC slot 19, PIC slot 3 information:
  Type           4x 10GE(LAN) SFP+
  Account Layer2 Overhead Enabled
  State          Online
  PIC version     0.0
  Uptime         1 day, 11 hours, 26 minutes, 36 seconds

PIC port information:

```

|          |            | Fiber |                  | Xcvr vendor    | Wave-  | Xcvr |
|----------|------------|-------|------------------|----------------|--------|------|
| Port     | Cable type | type  | Xcvr vendor      | part number    | length |      |
| Firmware |            |       |                  |                |        |      |
| 0        | 10GBASE SR | MM    | SumitomoElectric | SPP5200SR-J6-M | 850 nm | 0.0  |
| 1        | 10GBASE SR | MM    | SumitomoElectric | SPP5200SR-J6-M | 850 nm | 0.0  |
| 2        | 10GBASE SR | MM    | SumitomoElectric | SPP5200SR-J6-M | 850 nm | 0.0  |

```
3    10GBASE SR      MM    SumitomoElectric  SPP5200SR-J6-M    850 nm    0.0
```

### show chassis pic fpc-slot pic-slot (MX2020 Routers with MPC4E)

```
user@host> show chassis pic fpc-slot 14 pic-slot 0
FPC slot 14, PIC slot 2 information:
  Type                4x10GE SFPP
  State                Online
  PIC version          0.0
  Uptime               1 day, 14 hours, 49 minutes, 9 seconds

PIC port information:
```

| Port | Cable type | Fiber type | Xcvr vendor      | part number  | Wave-  | Xcvr |
|------|------------|------------|------------------|--------------|--------|------|
| 0    | 10GBASE SR | MM         | SumitomoElectric | SPP5100SR-J3 | 850 nm | 0.0  |
| 1    | 10GBASE SR | MM         | SumitomoElectric | SPP5100SR-J3 | 850 nm | 0.0  |
| 3    | 10GBASE SR | MM         | SumitomoElectric | SPP5100SR-J3 | 850 nm | 0.0  |

### show chassis pic fpc-slot pic-slot (T1600 Router with 100-Gigabit Ethernet PIC)

```
user@host> run show chassis pic fpc-slot 3 pic-slot 1
FPC slot 3, PIC slot 1 information:
  Type                100GE SLOT1
  ASIC type            Brooklyn 100GE FPGA
  State                Online
  PIC version          1.3
  Uptime               10 minutes, 44 seconds

PIC port information:
```

| Port | Cable type   | Fiber type | Xcvr vendor | part number      | Wavelength |
|------|--------------|------------|-------------|------------------|------------|
| 0    | 100GBASE LR4 | SM         | Opnext Inc. | TRC5E20ENFSF000F | 1310 nm    |

### show chassis pic fpc-slot pic-slot lcc (TX Matrix Router)

```
user@host> show chassis pic fpc-slot 1 pic-slot 1 lcc 0
lcc0-re0:
-----
PIC fpc slot 1 pic slot 1 information:
  Type                4x OC-3 SONET, SMIR
  ASIC type            D chip
  State                Online
  PIC version          1.2
  Uptime               5 days, 2 hours, 12 minutes, 8 seconds
```

### show chassis pic fpc-slot pic-slot lcc (TX Matrix Plus Router)

```
user@host> show chassis pic pic-slot 0 fpc-slot 8
lcc0-re0:
-----
FPC slot 8, PIC slot 0 information:
  Type                1x 10GE(LAN/WAN)
  State                Online
  Uptime               2 hours, 46 minutes, 23 seconds
```

## PIC port information:

| Port | Cable type | Fiber type | Xcvr vendor   | part number     | Wavelength |
|------|------------|------------|---------------|-----------------|------------|
| 0    | 10GBASE ZR | SM         | Opnext Inc.   | TRF7061BN-LF150 | 1550 nm    |
| 0    | 10GBASE ZR | SM         | FINISAR CORP. | FTRX-1811-3-J2  | 1550 nm    |

**show chassis pic fpc-slot pic-slot (Next-Generation SONET/SDH SFP)**

```
user@host> show chassis pic fpc-slot 4 pic-slot 0
```

```
FPC slot 4, PIC slot 0 information:
```

```
Type                4x OC-3 1x OC-12 SFP
ASIC type            D FPGA
State                Online
PIC version          1.3
Uptime               1 day, 50 minutes, 4 seconds
```

## PIC port information:

| Port | Cable type       | Fiber type | Xcvr vendor   | Xcvr vendor part number | Wavelength |
|------|------------------|------------|---------------|-------------------------|------------|
| 0    | OC48 short reach | SM         | FINISAR CORP. | FTRJ1321P1BTL-J2        | 1310 nm    |
| 1    | OC3 short reach  | MM         | OCP           | TRPA03MM3BAS-JE         | 1310 nm    |
| 2    | OC3 short reach  | MM         | OCP           | TRXA03MM3BAS-JW         | 1310 nm    |
| 3    | OC12 inter reach | SM         | FINISAR CORP. | FTLF1322P1BTR           | 1310 nm    |

**show chassis pic fpc-slot pic-slot (12-Port T1/E1)**

```
user@host> show chassis pic fpc-slot 0 pic-slot 3
```

```
FPC slot 0, PIC slot 3 information:
```

```
Type                12x T1/E1 CE
State                Online
PIC version          1.1
CPU load average     1 percent
Interrupt load average 0 percent
Total DRAM size      128 MB
Memory buffer utilization 100 percent
Memory heap utilization 4 percent
Uptime               1 day, 22 hours, 28 minutes, 12 seconds
Internal Clock Synchronization Normal
```

**show chassis pic fpc-slot pic-slot (4x CHOC3 SONET CE SFP)**

```
user@host> show chassis pic fpc-slot 0 pic-slot 1
```

```
FPC slot 0, PIC slot 1 information:
```

```
Type                4x CHOC3 SONET CE SFP
State                Online
PIC version          1.3
CPU load average     1 percent
Interrupt load average 0 percent
Total DRAM size      128 MB
Memory buffer utilization 99 percent
Memory heap utilization 4 percent
Uptime               1 day, 22 hours, 55 minutes, 37 seconds
Internal Clock Synchronization Normal
```

## PIC port information:

| Port | Cable type      | Fiber type | Xcvr vendor | Xcvr vendor part number | Wavelength |
|------|-----------------|------------|-------------|-------------------------|------------|
| 0    | OC3 short reach | MM         | AVAGO       | HFBR-57E0P-JU2          | n/a        |
| 1    | OC3 short reach | MM         | AVAGO       | HFBR-57E0P-JU2          | n/a        |
| 3    | OC3 long reach  | SM         | OPNEXT INC  | TRF5456AVLB314          | 1310 nm    |

**show chassis pic fpc-slot pic-slot (SONET/SDH OC3/STM1 [Multi-Rate] MIC with SFP)**

```

user@host> show chassis pic fpc-slot 0 pic-slot 0
FPC slot 0, PIC slot 0 information:
  Type          MIC-3D-80C30C12-40C48
  State         Online
  PIC version    1.8
  Uptime        3 days, 22 hours, 3 minutes, 50 seconds

PIC port information:

```

| Port | Cable type       | Fiber type | Xcvr vendor   | Xcvr vendor part number | Wavelength |
|------|------------------|------------|---------------|-------------------------|------------|
| 1    | OC12 inter reach | SM         | FINISAR CORP. | FTRJ1322P1BTR-J3        | 1310 nm    |
| 7    | OC12 inter reach | SM         | FINISAR CORP. | FTRJ1322P1BTR-J3        | 1310 nm    |

Multirate Mode Enabled

**show chassis pic fpc-slot pic-slot (8-port Channelized SONET/SDH OC3/STM1 [Multi-Rate] MIC with SFP)**

```

user@host> show chassis pic fpc-slot 3 pic-slot 0
FPC slot 3, PIC slot 0 information:
  Type          MIC-3D-8CHOC3-4CHOC12
  State         Online
  PIC version    1.9
  Uptime        1 hour, 21 minutes, 24 seconds

PIC port information:

```

| Port | Cable type       | Fiber type | Xcvr vendor   | Xcvr vendor part number | Wavelength |
|------|------------------|------------|---------------|-------------------------|------------|
| 0    | OC12 short reach | SM         | FINISAR CORP. | FTRJ1322P1BTR-J3        | 1310 nm    |
| 1    | OC12 short reach | SM         | FINISAR CORP. | FTRJ1322P1BTR-J3        | 1310 nm    |
| 2    | OC12 inter reach | SM         | FINISAR CORP. | FTRJ1322P1BTR-J2        | 1310 nm    |
| 4    | OC12 short reach | SM         | FINISAR CORP. | FTRJ1322P1BTR-J3        | 1310 nm    |
| 5    | OC12 short reach | SM         | FINISAR CORP. | FTRJ1322P1BTR-J3        | 1310 nm    |
| 6    | OC12 short reach | SM         | FINISAR CORP. | FTRJ1322P1BTR-J3        | 1310 nm    |
| 7    | OC12 short reach | SM         | FINISAR CORP. | FTRJ1322P1BTR-J3        | 1310 nm    |

**show chassis pic fpc-slot pic-slot (4-port Channelized SONET/SDH OC3/STM1 [Multi-Rate] MIC with SFP)**

```

user@host> show chassis pic fpc-slot 5 pic-slot 0
FPC slot 5, PIC slot 0 information:
  Type          MIC-3D-4CHOC3-2CHOC12
  State         Online
  PIC version    1.9
  Uptime        1 hour, 21 minutes

PIC port information:

```

| Port | Cable type       | Fiber type | Xcvr vendor   | Xcvr vendor part number | Wavelength |
|------|------------------|------------|---------------|-------------------------|------------|
| 1    | OC12 inter reach | SM         | FINISAR CORP. | FTRJ1322P1BTR-J3        | 1310 nm    |
| 2    | OC12 inter reach | SM         | FINISAR CORP. | FTRJ1322P1BTR-J3        | 1310 nm    |
| 3    | OC12 short reach | SM         | FINISAR CORP. | FTRJ1322P1BTR-J3        | 1310 nm    |

**show chassis pic fpc-slot pic-slot (1-port OC192/STM64 MIC with XFP)**

```

user@host> show chassis pic fpc-slot 1 pic-slot 0
FPC slot 1, PIC slot 0 information:
  Type          MIC-3D-10C192-XFP
  State         Online
  PIC version    1.2
  Uptime        1 day, 11 hours, 4 minutes, 6 seconds

```

## PIC port information:

| Port | Cable type        | Fiber type | Xcvr vendor   | Xcvr vendor part number | Wavelength |
|------|-------------------|------------|---------------|-------------------------|------------|
| 0    | OC192 short reach | n/a        | FINISAR CORP. | FTLX1412M3BCL-J3        | 1310 nm    |

## show chassis pic fpc-slot 1 pic-slot 2 (8-port DS3/E3 MIC)

```

user@host> show chassis pic fpc-slot 1 pic-slot 2
FPC slot 1, PIC slot 2 information:
  Type          MIC-3D-8DS3-E3
  State         Online
  PIC version   1.10
  Uptime       4 days, 1 hour, 29 minutes, 19 seconds
  Channelization Mode Disabled

```

## show chassis pic fpc-slot pic-slot (OTN)

```

user@host> show chassis pic fpc-slot 5 pic-slot 0
PIC fpc slot 5 pic slot 0 information:
  Type          1x10GE(LAN),OTN
  ASIC type     H chip
  State         Online
  PIC version   1.0
  Uptime       5 minutes, 50 seconds

```

## show chassis pic fpc-slot pic-slot (QFX3500 Switch)

```

user@switch> show chassis pic fpc-slot 0 pic-slot 0
FPC slot 0, PIC slot 0 information:
Type 48x 10G-SFP+ Builtin
State Online
Uptime 3 days, 3 hours, 5 minutes, 20 seconds

```

## show chassis pic interconnect-device fpc-slot pic-slot (QFabric Systems)

```

user@switch> show chassis pic interconnect-device interconnect1 fpc-slot 9 pic-slot 0
FPC slot 9, PIC slot 0 information:
  Type          16x 40G-GE Builtin
  State         Online
  Uptime       2 hours, 47 minutes, 40 seconds

```

## show chassis pic node-device fpc-slot pic-slot (QFabric System)

```

user@switch> show chassis pic node-device node1 pic-slot 0
FPC slot node1, PIC slot 0 information:
  Type          48x 10G-SFP+Builtin
  State         Online
  Uptime       2 hours, 52 minutes, 37 seconds

```

## PIC port information:

| Port | Cable type | Fiber type | Xcvr vendor      | Xcvr vendor part number | Wavelength |
|------|------------|------------|------------------|-------------------------|------------|
| 0    | 10GBASE SR | MM         | SumitomoElectric | SPP5101SR-J3            | 850 nm     |
| 1    | 10GBASE SR | MM         | SumitomoElectric | SPP5101SR-J3            | 850 nm     |
| 2    | 10GBASE SR | MM         | SumitomoElectric | SPP5101SR-J3            | 850 nm     |
| 3    | 10GBASE SR | MM         | SumitomoElectric | SPP5101SR-J3            | 850 nm     |
| 4    | 10GBASE SR | MM         | SumitomoElectric | SPP5101SR-J3            | 850 nm     |
| 5    | 10GBASE SR | MM         | SumitomoElectric | SPP5101SR-J3            | 850 nm     |
| 6    | 10GBASE SR | MM         | SumitomoElectric | SPP5101SR-J3            | 850 nm     |
| 7    | 10GBASE SR | MM         | SumitomoElectric | SPP5101SR-J3            | 850 nm     |
| 8    | 10GBASE SR | MM         | SumitomoElectric | SPP5101SR-J3            | 850 nm     |
| 9    | 10GBASE SR | MM         | SumitomoElectric | SPP5101SR-J3            | 850 nm     |

|    |            |    |                  |              |        |
|----|------------|----|------------------|--------------|--------|
| 10 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 11 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 12 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 13 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 14 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 15 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 16 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 17 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 18 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 19 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 20 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 21 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 22 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 23 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 24 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 25 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 26 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 27 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 28 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 29 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 30 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 31 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 32 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 33 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 34 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 35 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 36 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 37 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 38 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 39 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 40 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 41 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 42 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 43 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 44 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 45 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 46 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |
| 47 | 10GBASE SR | MM | SumitomoElectric | SPP5101SR-J3 | 850 nm |

#### show chassis pic fpc-slot pic-slot (ACX2000 Universal Access Router)

```

user@host> show chassis pic fpc-slot 0 pic-slot 1
FPC slot 0, PIC slot 1 information:
Type                               8x 1GE(LAN) RJ45 Builtin
State                              Online
Uptime                             6 days, 2 hours, 51 minutes, 11 seconds

```

#### show chassis pic fpc-slot pic-slot (MX Routers with Media Services Blade [MSB])

```

user@switch> show chassis pic fpc-slot 1 pic-slot 0
FPC slot 1, PIC slot 0 information:
Type                               AS-MSC
State                              Online
PIC version                         1.6
Uptime                             11 hours, 17 minutes, 56 seconds

```

#### show chassis pic FPC slot PIC slot (MX Routers with Media Services Blade [MSB])

```

user@switch> show chassis pic fpc-slot 1 pic-slot 2
Type                               AS-MXC
State                              Online

```

|             |                                 |
|-------------|---------------------------------|
| PIC version | 1.0                             |
| Uptime      | 11 hours, 18 minutes, 3 seconds |

**show chassis pic transport fpc-slot pic-slot (PTX Series Packet Transport Routers)**

```
user@host> show chassis pic transport fpc-slot 2 pic-slot 0
Administrative State:    In Service
Operational State:      Normal
```



## show chassis routing-engine

|                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                               | show chassis routing-engine<br><bios   <i>slot</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Syntax (EX Series Switches)</b>                          | show chassis routing-engine<br>< <i>slot</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Syntax (T Series routers)</b>                            | show chassis routing-engine<br><bios   <i>slot</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Syntax (TX Matrix Routers)</b>                           | show chassis routing-engine<br><bios   <i>slot</i> ><br><lcc <i>number</i>   scc>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Syntax (TX Matrix Plus Routers)</b>                      | show chassis routing-engine<br><bios   <i>slot</i> ><br><lcc <i>number</i>   sfc <i>number</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Syntax (QFX Series)</b>                                  | show chassis routing-engine<br><interconnect-device <i>name</i> ><br><node-device <i>name</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Syntax (MX Series Routers)</b>                           | show chassis routing-engine<br><bios   <i>slot</i> ><br><all-members><br><local><br><member <i>member-id</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Syntax (MX2010 and MX2020 3D Universal Edge Routers)</b> | show chassis routing-engine<br><bios   <i>slot</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Syntax (ACX Series Universal Access Routers)</b>         | show chassis routing-engine                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>                                  | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>sfc</b> option introduced for the TX Matrix Plus router in Junos OS Release in 9.6.</p> <p>Command introduced in Junos OS Release 11.1 for QFX Series.</p> <p>Command introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.</p> <p>Command introduced in Junos OS Release 12.3 for MX2020 3D Universal Edge Routers.</p> <p>Command introduced in Junos OS Release 12.3 for MX2010 3D Universal Edge Routers.</p> |
| <b>Description</b>                                          | Display the status of the Routing Engine.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Options</b>                                              | <b>none</b> —Display information about one or more Routing Engines. On a TX Matrix router, display information about all Routing Engines on the TX Matrix router and its attached T640 routers. On a TX Matrix Plus router, display information about all Routing Engines on the TX Matrix Plus router and its attached routers.                                                                                                                                                                                                                                                |

**all-members**—(MX Series routers only) (Optional) Display Routing Engine information for all members of the Virtual Chassis configuration.

**bios**—(Optional) Display the (BIOS) firmware version.

**interconnect-device *number***—(QFabric systems only) (Optional) Display Routing Engine information for a specified Interconnect device.

**lcc *number***—(TX Matrix and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display Routing Engine information for a specified T640 router (line-card chassis) that is connected to the TX Matrix router. On a TX Matrix Plus router, display Routing Engine information for a specified router (line-card chassis) that is connected to the TX Matrix Plus router.

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

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**local**—(MX Series routers only) (Optional) Display Routing Engine information for the local Virtual Chassis member.

**member *member-id***—(MX Series routers only) (Optional) Display Routing Engine information for the specified member of the Virtual Chassis configuration. For an MX Series Virtual Chassis, replace *member-id* with a value of 0 or 1.

**node-device *number***—(QFabric systems only) (Optional) Display Routing Engine information for a specified Node device.

**scc**—(TX Matrix routers only) (Optional) Display Routing Engine information for the TX Matrix router (switch-card chassis).

**sfc *number***—(TX Matrix Plus routers only) (Optional) Display Routing Engine information for the TX Matrix Plus router (or switch-fabric chassis). Replace *number* with 0.

**slot**—(Systems with multiple Routing Engines) (Optional) Display information for an individual Routing Engine. Replace *slot* with 0 or 1. For QFX3500 switches, there is only one Routing Engine, so you do not need to specify the slot number.

**Required Privilege Level**

view

**Related Documentation**

- *request chassis routing-engine master*
- *Configuring Routing Engine Redundancy*

- *Switching the Global Master and Backup Roles in a Virtual Chassis Configuration*

|                       |                                                                                              |
|-----------------------|----------------------------------------------------------------------------------------------|
| List of Sample Output | <a href="#">show chassis routing-engine (M5 Router) on page 581</a>                          |
|                       | <a href="#">show chassis routing-engine (M10 Router) on page 582</a>                         |
|                       | <a href="#">show chassis routing-engine (M20 Router) on page 582</a>                         |
|                       | <a href="#">show chassis routing-engine (M40 Router) on page 583</a>                         |
|                       | <a href="#">show chassis routing-engine (M120 Router) on page 583</a>                        |
|                       | <a href="#">show chassis routing-engine (M160 Router) on page 584</a>                        |
|                       | <a href="#">show chassis routing-engine (MX240 Router) on page 584</a>                       |
|                       | <a href="#">show chassis routing-engine (MX480 Router) on page 585</a>                       |
|                       | <a href="#">show chassis routing-engine (MX960 Router) on page 585</a>                       |
|                       | <a href="#">show chassis routing-engine (MX2010 Router) on page 586</a>                      |
|                       | <a href="#">show chassis routing-engine (MX2020 Router) on page 586</a>                      |
|                       | <a href="#">show chassis routing-engine (T320 router) on page 587</a>                        |
|                       | <a href="#">show chassis routing-engine (T640 router) on page 588</a>                        |
|                       | <a href="#">show chassis routing-engine (T1600 router) on page 589</a>                       |
|                       | <a href="#">show chassis routing-engine (T4000 router) on page 589</a>                       |
|                       | <a href="#">show chassis routing-engine (TX Matrix Router) on page 590</a>                   |
|                       | <a href="#">show chassis routing-engine lcc (TX Matrix Router) on page 591</a>               |
|                       | <a href="#">show chassis routing-engine bios (TX Matrix Router) on page 592</a>              |
|                       | <a href="#">show chassis routing-engine (TX Matrix Plus Router) on page 592</a>              |
|                       | <a href="#">show chassis routing-engine lcc (TX Matrix Plus Router) on page 593</a>          |
|                       | <a href="#">show chassis routing-engine bios (TX Matrix Plus Router) on page 594</a>         |
|                       | <a href="#">show chassis routing-engine (QFX Series) on page 594</a>                         |
|                       | <a href="#">show chassis routing-engine (PTX Series Packet Transport Router) on page 595</a> |
|                       | <a href="#">show chassis routing-engine (ACX2000 Universal Access Router) on page 595</a>    |
|                       | <a href="#">show chassis routing-engine (ACX1000 Universal Access Router) on page 596</a>    |

**Output Fields** Table 41 on page 579 lists the output fields for the **show chassis routing-engine** command. Output fields are listed in the approximate order in which they appear.

**Table 41: show chassis routing-engine Output Fields**

| Field Name               | Field Description                                                                                                                                                         |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Slot</b>              | (Systems with single and multiple Routing Engines) Slot number.                                                                                                           |
| <b>Current state</b>     | (Systems with multiple Routing Engines) Current state of the Routing Engine: <b>Master</b> , <b>Backup</b> , or <b>Disabled</b> .                                         |
| <b>Election priority</b> | (Systems with multiple Routing Engines) Election priority for the Routing Engine: <b>Master</b> or <b>Backup</b> .                                                        |
| <b>Temperature</b>       | Temperature of the air flowing past the Routing Engine.                                                                                                                   |
| <b>CPU Temperature</b>   | Temperature of the CPU.                                                                                                                                                   |
| <b>DRAM</b>              | Total DRAM available to the Routing Engine's processor.<br><br>Starting with Junos OS Release 12.3R1, the DRAM field displays both available memory and installed memory. |

Table 41: show chassis routing-engine Output Fields (*continued*)

| Field Name                  | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Memory utilization</b>   | Percentage of Routing Engine memory being used.                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>CPU utilization</b>      | Information about the Routing Engine's CPU utilization: <ul style="list-style-type: none"><li>• <b>User</b>—Percentage of CPU time being used by user processes.</li><li>• <b>Background</b>—Percentage of CPU time being used by background processes.</li><li>• <b>Kernel</b>—Percentage of CPU time being used by kernel processes.</li><li>• <b>Interrupt</b>—Percentage of CPU time being used by interrupts.</li><li>• <b>Idle</b>—Percentage of CPU time that is idle.</li></ul> |
| <b>Model</b>                | Routing Engine model number.                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Serial ID</b>            | (Systems with multiple Routing Engines) Identification number of the Routing Engine in this slot.                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Start time</b>           | Time at which the Routing Engine started running.                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Uptime</b>               | How long the Routing Engine has been running.                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Routing Engine BIOS Version | BIOS version being run by the Routing Engine.                                                                                                                                                                                                                                                                                                                                                                                                                                           |

Table 41: show chassis routing-engine Output Fields (*continued*)

| Field Name         | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Last reboot reason | <p>Reason for last reboot, including:</p> <ul style="list-style-type: none"> <li><b>power cycle/failure</b>—Halt of the Routing Engine using the <b>halt</b> command, powering down using the power button on the chassis or any other method (such as removal of the control board or Routing Engine), and then powering back the Routing Engine. A halt of the operating system also occurs if you enter the <b>request system halt</b> command. You can enter this command to halt the system operations on the chassis or specific Routing Engines. To restart the software, press any key on the keyboard.</li> <li><b>watchdog</b>—Reboot due to a hardware watchdog. A watchdog is a hardware monitoring process that examines the health and performance of the router to enable the device to recover from failures. A watchdog checks for problems at certain intervals, and reboots the routing engine if a problem is encountered.</li> <li><b>reset-button reset</b>—(Not available on the J Series router or EX Series switch) Reboot due to pressing of the reset button on the Routing Engine.</li> <li><b>power-button hard power off</b>—Reboot due to pressing of the power button on the chassis. A powering down of the software also occurs if you enter the <b>request system power-off</b> command. You can enter this command to power down the chassis or specific Routing Engines; you can then restart the software.</li> <li><b>misc hardware reason</b>—Reboot due to miscellaneous hardware reasons.</li> <li><b>thermal shutdown</b>—Reboot due to the router or switch reaching a critical temperature at which point it is unsafe to continue operations.</li> <li><b>hard disk failure</b>—Reboot due to a hard disk or solid-state drive (SSD) failure.</li> <li><b>reset from debugger</b>—Reboot due to reset from the debugger.</li> <li><b>chassis control reset</b>—Restart the chassis process that manages PICs, FPCs, and other hardware components. The chassis control module that runs the Routing Engine performs management and monitoring functions, and it provides a single access point for operational and maintenance functions. A reset of the chassis management process occurs when you enter the <b>restart chassis-control</b> command.</li> <li><b>bios auto recovery reset</b>—Reboot due to a BIOS auto-recovery reset.</li> <li><b>could not be determined</b>—Reboot due to an undetermined reason.</li> <li><b>Router rebooted after a normal shutdown</b>—Reboot due to a normal shutdown. This reason is displayed if the Routing Engine is powered down by pushing and holding the online/offline button on the Routing Engine faceplate for 30 seconds, and then powered back. A reboot of the software also occurs if you enter the <b>request system reboot</b> command. You can enter this command to reboot the chassis or specific Routing Engines.</li> </ul> |
| Load averages      | Routing Engine load averages for the last 1, 5, and 15 minutes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## Sample Output

### show chassis routing-engine (M5 Router)

```

user@host> show chassis routing-engine
Routing Engine status:
  Temperature                25 degrees C / 77 degrees F
  DRAM                       768 MB
  Memory utilization         21 percent
  CPU utilization:
    User                     0 percent
    Background               0 percent
    Kernel                   0 percent
    Interrupt                 0 percent

```

```
Idle 100 percent
Model RE-2.0
Serial ID 31000007349bf701
Start time 2003-12-04 09:42:17 PST
Uptime 26 days, 1 hour, 12 minutes, 27 seconds
Last reboot reason Router rebooted after a normal shutdown
Load averages: 1 minute 5 minute 15 minute
                0.00 0.01 0.00
```

### show chassis routing-engine (M10 Router)

```
user@host> show chassis routing-engine
Routing Engine status:
  Temperature 25 degrees C / 77 degrees F
  DRAM 768 MB
  Memory utilization 21 percent
  CPU utilization:
    User 0 percent
    Background 0 percent
    Kernel 0 percent
    Interrupt 0 percent
    Idle 100 percent
  Model RE-2.0
  Serial ID 31000007349bf701
  Start time 2003-12-04 09:42:17 PST
  Uptime 26 days, 1 hour, 12 minutes, 27 seconds
  Last reboot reason Router rebooted after a normal shutdown
  Load averages: 1 minute 5 minute 15 minute
                  0.00 0.01 0.00
```

### show chassis routing-engine (M20 Router)

```
user@host> show chassis routing-engine
Routing Engine status:
Slot 0:
  Current state Master
  Election priority Master (default)
  Temperature 29 degrees C / 84 degrees F
  DRAM 768 MB
  Memory utilization 20 percent
  CPU utilization:
    User 1 percent
    Background 0 percent
    Kernel 2 percent
    Interrupt 0 percent
    Idle 97 percent
  Model RE-2.0
  Serial ID 58000007348d9a01
  Start time 2003-12-30 07:05:47 PST
  Uptime 3 hours, 41 minutes, 14 seconds
  Last reboot reason Router rebooted after a normal shutdown
  Load averages: 1 minute 5 minute 15 minute
                  0.00 0.02 0.00

Routing Engine status:
Slot 1:
  Current state Backup
  Election priority Backup (default)
  Temperature 29 degrees C / 84 degrees F
  DRAM 768 MB
  Memory utilization 0 percent
  CPU utilization:
```

```

User                0 percent
Background          0 percent
Kernel              1 percent
Interrupt           0 percent
Idle                99 percent
Model               RE-2.0
Serial ID            d800000734745701
Start time          2003-06-17 16:37:33 PDT
Uptime              195 days, 18 hours, 47 minutes, 9 seconds
Last reboot reason   Router rebooted after a normal shutdown

```

### show chassis routing-engine (M40 Router)

```

user@host> show chassis routing-engine
Routing Engine status:
  Temperature        25 degrees C / 77 degrees F
  DRAM                768 MB
  Memory utilization  21 percent
  CPU utilization:
    User              0 percent
    Background        0 percent
    Kernel             0 percent
    Interrupt         0 percent
    Idle              100 percent
  Model              RE-2.0
  Serial ID           31000007349bf701
  Start time          2003-12-04 09:42:17 PST
  Uptime              26 days, 1 hour, 12 minutes, 27 seconds
  Last reboot reason   Router rebooted after a normal shutdown
  Load averages:      1 minute   5 minute  15 minute
                      0.00        0.01    0.00

```

### show chassis routing-engine (M120 Router)

```

user@host> show chassis routing-engine
Routing Engine status:
Slot 0:
  Current state      Master
  Election priority   Master (default)
  Temperature        46 degrees C / 114 degrees F
  CPU temperature     44 degrees C / 111 degrees F
  DRAM                2048 MB
  Memory utilization  18 percent
  CPU utilization:
    User              0 percent
    Background        0 percent
    Kernel             5 percent
    Interrupt         0 percent
    Idle              95 percent
  Model              RE-A-1000
  Serial ID           1000621154
  Start time          2006-10-31 17:10:05 PST
  Uptime              14 minutes, 31 seconds
  Last reboot reason   Router rebooted after a normal shutdown
  Load averages:      1 minute   5 minute  15 minute
                      0.02        0.07    0.07

Routing Engine status:
Slot 1:
  Current state      Backup
  Election priority   Backup (default)
  Temperature        45 degrees C / 113 degrees F

```

```
CPU temperature          42 degrees C / 107 degrees F
DRAM                    2048 MB
Memory utilization       15 percent
CPU utilization:
  User                   0 percent
  Background             0 percent
  Kernel                 0 percent
  Interrupt              0 percent
  Idle                   100 percent
Model                   RE-A-1000
Serial ID                1000621151
Start time              2006-10-31 17:10:04 PST
Uptime                  14 minutes, 30 seconds
Last reboot reason      Router rebooted after a normal shutdown
```

### show chassis routing-engine (M160 Router)

```
user@host> show chassis routing-engine
Routing Engine status:
Slot 0:
  Current state          Master
  Election priority      Master (default)
  Temperature            43 degrees C / 109 degrees F
  DRAM                   2048 MB
  Memory utilization     11 percent
  CPU utilization:
    User                 1 percent
    Background           0 percent
    Kernel               2 percent
    Interrupt            0 percent
    Idle                 97 percent
  Model                  RE-3.0
  Serial ID              210865700403
  Start time             2003-12-23 12:25:55 PST
  Uptime                 6 days, 22 hours, 33 minutes, 24 seconds
  Last reboot reason     Router rebooted after a normal shutdown
  Load averages:        1 minute   5 minute   15 minute
                        0.24       0.13       0.04

Routing Engine status:
Slot 1:
  Current state          Backup
  Election priority      Backup (default)
  Temperature            40 degrees C / 104 degrees F
  DRAM                   2048 MB
  Memory utilization     9 percent
  CPU utilization:
    User                 0 percent
    Background           0 percent
    Kernel               0 percent
    Interrupt            0 percent
    Idle                 100 percent
  Model                  RE-3.0
  Serial ID              210865700332
  Start time             2003-12-23 12:25:55 PST
  Uptime                 6 days, 22 hours, 33 minutes, 21 seconds
  Last reboot reason     Router rebooted after a normal shutdown
```

### show chassis routing-engine (MX240 Router)

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



```

Routing Engine status:
Slot 0:
  Current state           Backup
  Election priority       Master (default)
  Temperature             40 degrees C / 104 degrees F
  CPU temperature         47 degrees C / 116 degrees F
  DRAM                   3584 MB
  Memory utilization      7 percent
  CPU utilization:
    User                  0 percent
    Background            0 percent
    Kernel                0 percent
    Interrupt             0 percent
    Idle                  100 percent
  Model                   RE-S-2000
  Serial ID               1000703522
  Start time              2007-12-19 10:35:40 PST
  Uptime                  16 days, 3 hours, 15 minutes, 23 seconds
  Last reboot reason      Router rebooted after a normal shutdown

```

#### show chassis routing-engine (MX480 Router)

```

user@host> show chassis routing-engine
Routing Engine status:
Slot 0:
  Current state           Master
  Election priority       Master (default)
  Temperature             41 degrees C / 105 degrees F
  CPU temperature         38 degrees C / 100 degrees F
  DRAM                   2048 MB
  Memory utilization      13 percent
  CPU utilization:
    User                  0 percent
    Background            0 percent
    Kernel                2 percent
    Interrupt             0 percent
    Idle                  98 percent
  Model                   RE-S-1300
  Serial ID               1000697044
  Start time              2008-01-04 06:46:08 PST
  Uptime                  8 hours, 17 minutes, 16 seconds
  Last reboot reason      Router rebooted after a normal shutdown

```

#### show chassis routing-engine (MX960 Router)

```

user@host> show chassis routing-engine
Routing Engine status:
Slot 0:
  Current state           Master
  Election priority       Master (default)
  Temperature             37 degrees C / 98 degrees F
  CPU temperature         37 degrees C / 98 degrees F
  DRAM                   2048 MB
  Memory utilization      18 percent
  CPU utilization:
    User                  0 percent
    Background            0 percent
    Kernel                4 percent
    Interrupt             0 percent
    Idle                  96 percent
  Model                   RE-S-1300

```

|                    |                                         |
|--------------------|-----------------------------------------|
| Serial ID          | 1000617944                              |
| Start time         | 2006-10-26 12:37:13 PDT                 |
| Uptime             | 6 days, 4 hours, 59 minutes, 40 seconds |
| Last reboot reason | Router rebooted after a normal shutdown |
| Load averages:     | 1 minute    5 minute    15 minute       |
|                    | 0.16            0.08            0.02    |

### show chassis routing-engine (MX2010 Router)

user@host> show chassis routing-engine

#### Routing Engine status:

##### Slot 0:

|                    |                                          |
|--------------------|------------------------------------------|
| Current state      | Master                                   |
| Election priority  | Master (default)                         |
| Temperature        | 3 degrees C / 37 degrees F               |
| CPU temperature    | 3 degrees C / 37 degrees F               |
| DRAM               | 17152 MB                                 |
| Memory utilization | 13 percent                               |
| CPU utilization:   |                                          |
| User               | 0 percent                                |
| Background         | 0 percent                                |
| Kernel             | 4 percent                                |
| Interrupt          | 2 percent                                |
| Idle               | 95 percent                               |
| Model              | RE-S-1800x4                              |
| Serial ID          | 9009099704                               |
| Start time         | 2012-10-02 14:33:32 PDT                  |
| Uptime             | 14 hours, 39 minutes, 39 seconds         |
| Last reboot reason | Router rebooted after a normal shutdown. |
| Load averages:     | 1 minute    5 minute    15 minute        |
|                    | 0.06            0.05            0.01     |

#### Routing Engine status:

##### Slot 1:

|                    |                                          |
|--------------------|------------------------------------------|
| Current state      | Backup                                   |
| Election priority  | Backup (default)                         |
| Temperature        | 1 degrees C / 33 degrees F               |
| CPU temperature    | 2 degrees C / 35 degrees F               |
| DRAM               | 17152 MB                                 |
| Memory utilization | 11 percent                               |
| CPU utilization:   |                                          |
| User               | 0 percent                                |
| Background         | 0 percent                                |
| Kernel             | 0 percent                                |
| Interrupt          | 0 percent                                |
| Idle               | 100 percent                              |
| Model              | RE-S-1800x4                              |
| Serial ID          | 9009099706                               |
| Start time         | 2012-10-02 10:36:06 PDT                  |
| Uptime             | 18 hours, 36 minutes, 57 seconds         |
| Last reboot reason | Router rebooted after a normal shutdown. |
| Load averages:     | 1 minute    5 minute    15 minute        |
|                    | 0.01            0.00            0.00     |

### show chassis routing-engine (MX2020 Router)

user@host> show chassis routing-engine

#### Routing Engine status:

##### Slot 0:

|                   |                  |
|-------------------|------------------|
| Current state     | Master           |
| Election priority | Master (default) |

```

Temperature          6 degrees C / 42 degrees F
CPU temperature       6 degrees C / 42 degrees F
DRAM                 17152 MB
Memory utilization    14 percent
CPU utilization:
  User                1 percent
  Background          0 percent
  Kernel              7 percent
  Interrupt            2 percent
  Idle                91 percent
Model                RE-S-1800x4
Serial ID             9009089704
Start time            2012-10-02 11:05:24 PDT
Uptime                2 days, 15 hours, 49 minutes, 13 seconds
Last reboot reason    Router rebooted after a normal shutdown.
Load averages:        1 minute   5 minute   15 minute
                      0.10       0.05       0.01

Routing Engine status:
Slot 1:
  Current state        Backup
  Election priority     Backup (default)
  Temperature          7 degrees C / 44 degrees F
  CPU temperature       5 degrees C / 41 degrees F
  DRAM                 17152 MB
  Memory utilization    12 percent
  CPU utilization:
    User                0 percent
    Background          0 percent
    Kernel              0 percent
    Interrupt            0 percent
    Idle                99 percent
  Model                RE-S-1800x4
  Serial ID             9009094138
  Start time            2012-10-02 11:09:57 PDT
  Uptime                2 days, 15 hours, 44 minutes, 27 seconds
  Last reboot reason    Router rebooted after a normal shutdown.
  Load averages:        1 minute   5 minute   15 minute
                        0.00       0.00       0.00

```

### show chassis routing-engine (T320 router)

```

user@host> show chassis routing-engine
Slot 0:
  Current state        Master
  Election priority     Master (default)
  Temperature          51 degrees C / 123 degrees F
  CPU temperature       55 degrees C / 131 degrees F
  DRAM                 3584 MB
  Memory utilization    11 percent
  CPU utilization:
    User                0 percent
    Background          0 percent
    Kernel              2 percent
    Interrupt            0 percent
    Idle                97 percent
  Model                RE-A-2000
  Serial ID             9009010618
  Start time            2012-10-10 01:24:05 PDT
  Uptime                5 days, 10 hours, 49 minutes, 23 seconds
  Last reboot reason    0x1:power cycle/failure
  Load averages:        1 minute   5 minute   15 minute

```

```

                                0.00      0.05      0.04
Routing Engine status:
Slot 1:
  Current state                Backup
  Election priority            Backup (default)
  Temperature                  45 degrees C / 113 degrees F
  CPU temperature              48 degrees C / 118 degrees F
  DRAM                        3584 MB
  Memory utilization           9 percent
  CPU utilization:
    User                      0 percent
    Background                0 percent
    Kernel                    0 percent
    Interrupt                 0 percent
    Idle                      100 percent
  Model                       RE-A-2000
  Serial ID                   9009003642
  Start time                  2012-10-10 01:24:04 PDT
  Uptime                      5 days, 10 hours, 49 minutes, 28 seconds
  Last reboot reason          0x1:power cycle/failure

```

#### show chassis routing-engine (T640 router)

```

user@host> show chassis routing-engine
Routing Engine status:
Slot 0:
  Current state                Master
  Election priority            Master (default)
  Temperature                  50 degrees C / 122 degrees F
  CPU temperature              58 degrees C / 136 degrees F
  DRAM                        3584 MB
  Memory utilization           14 percent
  CPU utilization:
    User                      1 percent
    Background                0 percent
    Kernel                    4 percent
    Interrupt                 1 percent
    Idle                      95 percent
  Model                       RE-A-2000
  Serial ID                   1000686556
  Start time                  2012-10-10 01:24:02 PDT
  Uptime                      5 days, 10 hours, 50 minutes, 27 seconds
  Last reboot reason          0x1:power cycle/failure
  Load averages:             1 minute   5 minute   15 minute
                                1.24      0.33      0.12

Routing Engine status:
Slot 1:
  Current state                Backup
  Election priority            Backup (default)
  Temperature                  44 degrees C / 111 degrees F
  CPU temperature              49 degrees C / 120 degrees F
  DRAM                        3584 MB
  Memory utilization           12 percent
  CPU utilization:
    User                      0 percent
    Background                0 percent
    Kernel                    0 percent
    Interrupt                 1 percent
    Idle                      99 percent
  Model                       RE-A-2000
  Serial ID                   1000702739

```

```

Start time          2012-10-10 01:24:02 PDT
Uptime              5 days, 10 hours, 50 minutes, 26 seconds
Last reboot reason  0x1:power cycle/failure

```

### show chassis routing-engine (T1600 router)

```

user@host> show chassis routing-engine
Routing Engine status:
Slot 0:
  Current state          Master
  Election priority      Master (default)
  Temperature            48 degrees C / 118 degrees F
  CPU temperature        58 degrees C / 136 degrees F
  DRAM                   3584 MB
  Memory utilization     13 percent
  CPU utilization:
    User                  0 percent
    Background            0 percent
    Kernel                 3 percent
    Interrupt              1 percent
    Idle                   96 percent
  Model                  RE-A-2000
  Serial ID              1000704521
  Start time             2012-10-10 01:23:41 PDT
  Uptime                  5 days, 10 hours, 46 minutes, 56 seconds
  Last reboot reason      0x1:power cycle/failure
  Load averages:         1 minute   5 minute   15 minute
                        0.05         0.03         0.01

Routing Engine status:
Slot 1:
  Current state          Backup
  Election priority      Backup (default)
  Temperature            44 degrees C / 111 degrees F
  CPU temperature        48 degrees C / 118 degrees F
  DRAM                   3584 MB
  Memory utilization     12 percent
  CPU utilization:
    User                  0 percent
    Background            0 percent
    Kernel                 0 percent
    Interrupt              0 percent
    Idle                   100 percent
  Model                  RE-A-2000
  Serial ID              9009006579
  Start time             2012-10-10 01:23:42 PDT
  Uptime                  5 days, 10 hours, 46 minutes, 54 seconds
  Last reboot reason      0x1:power cycle/failure

```

### show chassis routing-engine (T4000 router)

```

user@host> show chassis routing-engine
Routing Engine status:
Slot 0:
  Current state          Master
  Election priority      Master (default)
  Temperature            33 degrees C / 91 degrees F
  CPU temperature        50 degrees C / 122 degrees F
  DRAM                   8960 MB
  Memory utilization     18 percent
  CPU utilization:
    User                  0 percent

```

```

        Background          0 percent
        Kernel              4 percent
        Interrupt           1 percent
        Idle                95 percent
    Model                  RE-DUO-1800
    Serial ID              P737F-002248
    Start time             2012-02-09 22:49:53 PST
    Uptime                 2 hours, 21 minutes, 35 seconds
    Last reboot reason     Router rebooted after a normal shutdown.
    Load averages:       1 minute   5 minute   15 minute
                           0.00       0.04       0.00

Routing Engine status:
Slot 1:
    Current state          Backup
    Election priority      Backup (default)
    Temperature            32 degrees C / 89 degrees F
    CPU temperature        46 degrees C / 114 degrees F
    DRAM                   8960 MB
    Memory utilization     24 percent
    CPU utilization:
        User               0 percent
        Background         0 percent
        Kernel             0 percent
        Interrupt          0 percent
        Idle               99 percent
    Model                  RE-DUO-1800
    Serial ID              P737F-002653
    Start time             2012-02-08 20:12:51 PST
    Uptime                 1 day, 4 hours, 58 minutes, 28 seconds
    Last reboot reason     Router rebooted after a normal shutdown.

```

### show chassis routing-engine (TX Matrix Router)

```

user@host> show chassis routing-engine
scc-re0:
-----
Routing Engine status:
Slot 0:
    Current state          Master
    Election priority      Master (default)
    Temperature            34 degrees C / 93 degrees F
    CPU temperature        33 degrees C / 91 degrees F
    DRAM                   2048 MB
    Memory utilization     12 percent
    CPU utilization:
        User               0 percent
        Background         0 percent
        Kernel             2 percent
        Interrupt          0 percent
        Idle               98 percent
    Model                  RE-4.0
    Serial ID              P11123900153
    Start time             2004-08-05 18:42:05 PDT
    Uptime                 9 days, 22 hours, 49 minutes, 50 seconds
    Last reboot reason     Router rebooted after a normal shutdown
    Load averages:       1 minute   5 minute   15 minute
                           0.00       0.08       0.07

lcc0-re0:
-----
Routing Engine status:

```

```

Slot 0:
  Current state           Master
  Election priority       Master (default)
  Temperature             33 degrees C / 91 degrees F
  CPU temperature         30 degrees C / 86 degrees F
  DRAM                   2048 MB
  Memory utilization      12 percent
  CPU utilization:
    User                  0 percent
    Background            0 percent
    Kernel                1 percent
    Interrupt             0 percent
    Idle                  98 percent
  Model                  RE-3.0
  Serial ID               210865700363
  Start time             2004-08-05 18:42:05 PDT
  Uptime                 9 days, 22 hours, 48 minutes, 20 seconds
  Last reboot reason     Router rebooted after a normal shutdown
  Load averages:        1 minute  5 minute 15 minute
                        0.00      0.02   0.00

```

```
lcc2-re0:
```

```
-----
Routing Engine status:
```

```

Slot 0:
  Current state           Master
  Election priority       Master (default)
  Temperature             34 degrees C / 93 degrees F
  CPU temperature         35 degrees C / 95 degrees F
  DRAM                   2048 MB
  Memory utilization      12 percent
  CPU utilization:
    User                  0 percent
    Background            0 percent
    Kernel                2 percent
    Interrupt             0 percent
    Idle                  98 percent
  Model                  RE-4.0
  Serial ID               P11123900126
  Start time             2004-08-05 18:42:05 PDT
  Uptime                 9 days, 22 hours, 49 minutes, 4 seconds
  Last reboot reason     Router rebooted after a normal shutdown
  Load averages:        1 minute  5 minute 15 minute
                        0.01      0.01   0.0

```

### show chassis routing-engine lcc (TX Matrix Router)

```
user@host> show chassis routing-engine 0 lcc 0
```

```
lcc0-re0:
```

```
-----
Routing Engine status:
```

```

Slot 0:
  Current state           Master
  Election priority       Master (default)
  Temperature             33 degrees C / 91 degrees F
  CPU temperature         30 degrees C / 86 degrees F
  DRAM                   2048 MB
  Memory utilization      12 percent
  CPU utilization:
    User                  0 percent
    Background            0 percent

```

```

Kernel                1 percent
Interrupt             0 percent
Idle                 98 percent
Model                RE-3.0
Serial ID            210865700363
Start time           2004-08-05 18:42:05 PDT
Uptime              7 days, 22 hours, 49 minutes, 6 seconds
Last reboot reason   Router rebooted after a normal shutdown
Load averages:      1 minute   5 minute   15 minute
                   0.00       0.00       0.00

```

### show chassis routing-engine bios (TX Matrix Router)

```

user@host> show chassis routing-engine bios
scc-re0:

```

```

-----
Routing Engine BIOS Version: V1.0.0
lcc0-re0:

```

```

-----
Routing Engine BIOS Version: V1.0.17
lcc2-re0:

```

```

-----
Routing Engine BIOS Version: V1.0.0

```

### show chassis routing-engine (TX Matrix Plus Router)

```

user@host> show chassis routing-engine
sfc0-re0:

```

```

-----
Routing Engine status:

```

Slot 0:

```

Current state          Master
Election priority      Master (default)
Temperature            27 degrees C / 80 degrees F
CPU temperature        42 degrees C / 107 degrees F
DRAM                  3327 MB
Memory utilization     12 percent
CPU utilization:
  User                 0 percent
  Background           0 percent
  Kernel               2 percent
  Interrupt            0 percent
  Idle                 98 percent
Model                 RE-TXP-SFC
Serial ID              737A-1024
Start time             2009-05-11 17:39:49 PDT
Uptime                3 hours, 45 minutes, 25 seconds
Last reboot reason     Router rebooted after a normal shutdown.
Load averages:        1 minute   5 minute   15 minute
                   0.00       0.00       0.00

```

```

Routing Engine status:

```

Slot 1:

```

Current state          Backup
Election priority      Backup (default)
Temperature            29 degrees C / 84 degrees F
CPU temperature        43 degrees C / 109 degrees F
DRAM                  3327 MB
Memory utilization     11 percent
CPU utilization:
  User                 0 percent
  Background           0 percent

```



```

Kernel                                0 percent
Interrupt                             0 percent
Idle                                  100 percent
Model                                 RE-TXP-SFC
Serial ID                             737A-1024
Start time                           2009-05-11 17:08:54 PDT
Uptime                                4 hours, 16 minutes, 52 seconds
Last reboot reason                     0x1:power cycle/failure

lcc0-re0:
-----
Routing Engine status:
Slot 0:
  Current state                        Master
  Election priority                    Master (default)
  Temperature                          30 degrees C / 86 degrees F
  CPU temperature                      43 degrees C / 109 degrees F
  DRAM                                3327 MB
  Memory utilization                   9 percent
  CPU utilization:
    User                              0 percent
    Background                        0 percent
    Kernel                            2 percent
    Interrupt                         0 percent
    Idle                              98 percent
  Model                               RE-TXP-LCC
  Serial ID                           737F-1024
  Start time                          2009-05-11 17:40:32 PDT
  Uptime                              3 hours, 44 minutes, 51 seconds
  Last reboot reason                  Router rebooted after a normal shutdown.
  Load averages:                     1 minute 5 minute 15 minute
                                      0.00      0.00      0.00

Routing Engine status:
Slot 1:
  Current state                        Backup
  Election priority                    Backup (default)
  Temperature                          30 degrees C / 86 degrees F
  CPU temperature                      43 degrees C / 109 degrees F
  DRAM                                3327 MB
  Memory utilization                   9 percent
  CPU utilization:
    User                              0 percent
    Background                        0 percent
    Kernel                            0 percent
    Interrupt                         0 percent
    Idle                              100 percent
  Model                               RE-TXP-LCC
  Serial ID                           737F-1024
  Start time                          2009-05-06 17:31:32 PDT
  Uptime                              5 days, 3 hours, 54 minutes, 19 seconds
  Last reboot reason                  Router rebooted after a normal shutdown.

```

#### show chassis routing-engine lcc (TX Matrix Plus Router)

```

user@host> show chassis routing-engine 0 lcc 0
lcc0-re0:
-----
Routing Engine status:
Slot 0:
  Current state                        Master
  Election priority                    Master (default)

```

```

Temperature          30 degrees C / 86 degrees F
CPU temperature       43 degrees C / 109 degrees F
DRAM                 3327 MB
Memory utilization    9 percent
CPU utilization:
  User                0 percent
  Background          0 percent
  Kernel              2 percent
  Interrupt            0 percent
  Idle                98 percent
Model                RE-TXP-LCC
Serial ID             737F-1024
Start time            2009-05-11 17:40:32 PDT
Uptime                3 hours, 45 minutes, 26 seconds
Last reboot reason    Router rebooted after a normal shutdown.
Load averages:        1 minute   5 minute   15 minute
                      0.00       0.00       0.00

Routing Engine status:
Slot 1:
  Current state        Backup
  Election priority    Backup (default)
  Temperature          30 degrees C / 86 degrees F
  CPU temperature       43 degrees C / 109 degrees F
  DRAM                 3327 MB
  Memory utilization    9 percent
  CPU utilization:
    User                0 percent
    Background          0 percent
    Kernel              0 percent
    Interrupt            0 percent
    Idle                100 percent
  Model                RE-TXP-LCC
  Serial ID             737F-1024
  Start time            2009-05-06 17:31:32 PDT
  Uptime                5 days, 3 hours, 54 minutes, 59 seconds
  Last reboot reason    Router rebooted after a normal shutdown.

```

#### show chassis routing-engine bios (TX Matrix Plus Router)

```

user@host> show chassis routing-engine bios
sfc0-re0:

```

```

-----
Routing Engine BIOS Version: V0.0.Z

```

```

lcc0-re0:

```

```

-----
Routing Engine BIOS Version: V0.0.N

```

#### show chassis routing-engine (QFX Series)

```

user@switch> show chassis routing-engine
Routing Engine status:
Slot 0:
  Current state Master
  Election priority Master (default)
  DRAM 2820 MB
  Memory utilization 49 percent
  CPU utilization:
    User 1 percent
    Background 0 percent
    Kernel 1 percent

```

```

Interrupt 0 percent
Idle 97 percent
Model QFX3500-48S4Q
Serial ID S/N ED3709
Uptime 3 days, 4 hours, 29 minutes, 42 seconds
Last reboot reason 0x200:chassis control reset
Load averages: 1 minute 5 minute 15 minute
0.37 0.26 0.19

```

### show chassis routing-engine (PTX Series Packet Transport Router)

```

user@switch> show chassis routing-engine
Routing Engine status:
Slot 0:
  Current state           Master
  Election priority       Master (default)
  Temperature             60 degrees C / 140 degrees F
  CPU temperature         76 degrees C / 168 degrees F
  DRAM                   17152 MB
  Memory utilization      11 percent
  CPU utilization:
    User                  0 percent
    Background            0 percent
    Kernel                4 percent
    Interrupt             0 percent
    Idle                  95 percent
  Model                  RE-DUO-2600
  Serial ID              P737A-002231
  Start time             2011-12-21 16:54:37 PST
  Uptime                 25 minutes, 44 seconds
  Last reboot reason     Router rebooted after a normal shutdown.
  Load averages:        1 minute   5 minute   15 minute
                        0.01       0.02       0.06

Routing Engine status:
Slot 1:
  Current state           Backup
  Election priority       Backup (default)
  Temperature             50 degrees C / 122 degrees F
  CPU temperature         64 degrees C / 147 degrees F
  DRAM                   17152 MB
  Memory utilization      10 percent
  CPU utilization:
    User                  0 percent
    Background            0 percent
    Kernel                0 percent
    Interrupt             0 percent
    Idle                  99 percent
  Model                  RE-DUO-2600
  Serial ID              P737A-002438
  Start time             2011-12-21 16:52:26 PST
  Uptime                 27 minutes, 49 seconds
  Last reboot reason     Router rebooted after a normal shutdown.

```

### show chassis routing-engine (ACX2000 Universal Access Router)

```

user@host> show chassis routing-engine
Routing Engine status:
  Temperature             53 degrees C / 127 degrees F
  DRAM                   1536 MB
  Memory utilization      25 percent
  CPU utilization:

```

```
User                0 percent
Background          0 percent
Kernel              0 percent
Interrupt            1 percent
Idle                99 percent
Model               RE-ACX-2000
Start time          2012-05-09 00:57:07 PDT
Uptime              5 days, 3 hours, 16 minutes, 15 seconds
Last reboot reason  Router rebooted after a normal shutdown.
Load averages:      1 minute   5 minute  15 minute
                   0.00       0.03     0.05
```

#### show chassis routing-engine (ACX1000 Universal Access Router)

```
user@host> show chassis routing-engine
Routing Engine status:
  Temperature        36 degrees C / 96 degrees F
  DRAM               768 MB
  Memory utilization  50 percent
  CPU utilization:
    User              3 percent
    Background        0 percent
    Kernel            6 percent
    Interrupt         0 percent
    Idle              91 percent
  Model              RE-ACX-1000
  Start time         2012-05-10 07:12:23 PDT
  Uptime             4 days, 10 hours, 46 minutes, 53 seconds
  Last reboot reason  Router rebooted after a normal shutdown.
  Load averages:    1 minute   5 minute  15 minute
                   0.00       0.00     0.00
```

## show chassis synchronization

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show chassis synchronization<br><extensive><br><backup   master>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>      | Command introduced in Junos OS Release 7.6 for M320 routers.<br>Command introduced in Junos OS Release 8.3 for M40e routers.<br>Command introduced in Junos OS Release 9.3 for M120 routers.<br>Command introduced in Junos OS Release 10.2 for T320, T640, and T1600 routers.<br>Command introduced in Junos OS Release 12.1 for PTX Series Packet Transport Routers.<br>Command introduced in Junos OS Release 12.2 for ACX Series routers.                                                                                                                 |
| <b>Description</b>              | (ACX Series, M320, M40e, M120, T320, T640, and T1600 routers and PTX Series Packet Transport Routers only) Display information about the external clock source currently used for chassis synchronization.                                                                                                                                                                                                                                                                                                                                                    |
| <b>Options</b>                  | <b>extensive</b> —(Optional) Display clock synchronization information in detail.<br><br><b>backup</b> —(Optional) Display clock synchronization information about the backup clock.<br><br><b>master</b> —(Optional) Display clock synchronization information about the master clock.                                                                                                                                                                                                                                                                       |
| <b>Required Privilege Level</b> | maintenance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>request chassis synchronization switch</i></li> <li>• <i>Configuring Clock Synchronization Interface for MX Series Routers</i></li> <li>• <i>show chassis synchronization (MX Series Routers)</i></li> <li>• <i>Supported Time Synchronization Standard</i></li> <li>• <a href="#">Configuring External Clock Synchronization for ACX Series Routers on page 221</a></li> </ul>                                                                                                                                   |
| <b>List of Sample Output</b>    | <a href="#">show chassis synchronization on page 599</a><br><a href="#">show chassis synchronization master on page 599</a><br><a href="#">show chassis synchronization backup on page 599</a><br><a href="#">show chassis synchronization extensive on page 599</a><br><a href="#">show chassis synchronization (T320, T640, and T1600 Routers) on page 600</a><br><a href="#">show chassis synchronization (PTX Series Packet Transport Routers) on page 600</a><br><a href="#">show chassis synchronization extensive (ACX Series Routers) on page 600</a> |
| <b>Output Fields</b>            | Table 42 on page 598 lists the output fields for the <b>show chassis synchronization</b> command. Output fields are listed in the approximate order in which they appear. <a href="#">show chassis synchronizations</a> <a href="#">show chassis synchronizations</a> <a href="#">show chassis synchronization</a>                                                                                                                                                                                                                                            |

Table 42: show chassis synchronization Output Fields

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Current state</b>           | <p>Indicates current status of external clock sources:</p> <ul style="list-style-type: none"> <li>• <b>backup</b>—Source is currently the backup clock source.</li> <li>• <b>master</b>—Source is currently the master clock source.</li> <li>• <b>Online-Master</b>—(PTX Series Packet Transport Routers) Source is the master clock. Source is online.</li> <li>• <b>Online-Standby</b>—(PTX Series Packet Transport Routers) Source is the standby (backup) clock. Source is online.</li> </ul>                         |
| <b>Current clock state</b>     | <p>Indicates current source of external synchronization:</p> <ul style="list-style-type: none"> <li>• <b>internal</b>—Source is providing its own clocking.</li> <li>• <b>locked to master CB</b>—(M320, M40e, and M120 routers) Source is locked to master clock source.</li> <li>• <b>locked to master SCG</b>—(T320, T640, and T1600 routers) Source is locked to master clock source.</li> <li>• <b>locked to master CCG</b>—(PTX Series Packet Transport Routers) Source is locked to master clock source.</li> </ul> |
| <b>Selected for</b>            | Number of seconds this clock has been the master or backup clock source.                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Selected since</b>          | Timestamp for establishment as master or backup clock source.                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Deviation (in ppm)</b>      | Difference in clock timing, in parts per million (ppm).                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Last deviation (in ppm)</b> | Previous difference in clock timing, if any, in ppm.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Configured sources</b>      | Information about clock sources eligible for selection as master clock.                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Source</b>                  | Information about external clock sources.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Priority</b>                | <p>Indicates priority of external clock sources:</p> <ul style="list-style-type: none"> <li>• <b>primary</b>—Source is a primary reference.</li> <li>• <b>secondary</b>—Source is a secondary reference.</li> </ul>                                                                                                                                                                                                                                                                                                        |
| <b>Deviation (in ppm)</b>      | <p>Current difference in clock timing, in ppm:</p> <ul style="list-style-type: none"> <li>• <b>measuring</b>—Establishing source deviation.</li> <li>• <b>number</b>—Deviation in ppm.</li> </ul>                                                                                                                                                                                                                                                                                                                          |
| <b>Last deviation (in ppm)</b> | <p>Previous difference in clock timing, in ppm:</p> <ul style="list-style-type: none"> <li>• <b>number</b>—Deviation in ppm.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Status</b>                  | <p>Indicates status of external sources:</p> <ul style="list-style-type: none"> <li>• <b>present</b>—Source is configured and present.</li> <li>• <b>qualified</b>—Source is eligible for synchronization source.</li> </ul>                                                                                                                                                                                                                                                                                               |

## Sample Output

### show chassis synchronization

```

user@host> show chassis synchronization
Clock Synchronization Status :
  Clock module on CB 0
    Current state      : master
    Current clock state : internal
    Selected for       : 18 hours, 12 minutes, 43 seconds
    Selected since     : 2008-09-10 03:27:47 PDT
    Deviation (in ppm) : +0.00
    Last deviation (in ppm): +0.00
  Clock Synchronization Status :
    Clock module on CB 1
      Current state      : backup
      Current clock state : locked to master CB
      Selected for       : 1 day, 12 hours, 49 minutes, 20 seconds
      Selected since     : 2008-09-09 08:51:10 PDT

```

### show chassis synchronization master

```

user@host> show chassis synchronization master
Clock Synchronization Status :
  Clock module on CB 0
    Current state      : master
    Current clock state : internal
    Selected for       : 8 days, 21 minutes, 12 seconds
    Selected since     : 2008-08-27 21:05:40 PDT
    Deviation (in ppm) : +0.00
    Last deviation (in ppm): +0.00

```

### show chassis synchronization backup

```

user@host> show chassis synchronization backup
Clock Synchronization Status :
  Clock module on CB 1
    Current state      : backup
    Current clock state : locked to master CB
    Selected for       : 34 days, 20 hours, 17 minutes, 8 seconds
    Selected since     : 2008-08-01 01:22:16 PDT

```

### show chassis synchronization extensive

```

user@host> show chassis synchronization extensive
Clock Synchronization Status :
  Clock module on CB 0
    Current state      : master
    Current clock state : internal
    Selected for       : 8 days, 36 minutes, 29 seconds
    Selected since     : 2008-08-27 21:05:40 PDT
    Deviation (in ppm) : +0.00
    Last deviation (in ppm): +0.00
  Clock Synchronization Status :
    Clock module on CB 1
      Current state      : backup
      Current clock state : locked to master CB
      Selected for       : 34 days, 20 hours, 19 minutes, 53 seconds
      Selected since     : 2008-08-01 01:22:16 PDT

```

### show chassis synchronization (T320, T640, and T1600 Routers)

```
user@host> show chassis synchronization
Clock Synchronization Status :
Clock module on SCG 0
  Current state           : master
  Current clock state     : locked to external-a
  Selected for            : 2 hours, 28 minutes, 4 seconds
  Selected since          : 2006-02-17 01:12:58 PST
Configured sources
  Source      Priority  Deviation    Last deviation  Status
                (in ppm)    (in ppm)
  external-a  primary   measuring    -0.10           in-use
  external-b  secondary -0.10        -0.10           qualified
Clock Synchronization Status :
Clock module on SCG 1
  Current state           : backup
  Current clock state     : locked to master SCG
  Selected for            : 19 hours, 49 minutes, 14 seconds
  Selected since          : 2006-02-16 07:51:48 PST
Configured sources
  Source      Priority  Deviation    Last deviation  Status
                (in ppm)    (in ppm)
  external-a  primary   -0.25        -0.25           qualified
  external-b  secondary -0.25        -0.25           qualified
```

### show chassis synchronization (PTX Series Packet Transport Routers)

```
user@host> show chassis synchronization
Clock Synchronization Status :
Clock module on CCG 0
  Current state           : Online - Master
  Current clock state     : internal
  Selected for            : 1 hour, 24 minutes, 21 seconds
  Selected since          : 2011-03-21 15:59:37 PDT
  Deviation (in ppm)      : +0.51
  Last deviation (in ppm) : +0.51
Clock Synchronization Status :
Clock module on CCG 1
  Current state           : Online - Standby
  Current clock state     : locked to master CCG
  Selected for            : 1 hour, 39 minutes, 12 seconds
  Selected since          : 2011-03-21 15:44:46 PDT
```

### show chassis synchronization extensive (ACX Series Routers)

```
user@host> show chassis synchronization extensive
Current clock status : Locked
Clock locked to      : Primary
Configured sources:
Interface           : ce1-0/0/4
Status              : Primary                               Index      : 132
Clock source state   : Clk qualified   Priority      : Default(8)
Configured QL        : PRC              ESMC QL      : Unknown
Clock source type     : ifd              Clock Event  : Clock locked
Kernel flags         : Up,pri,
```



## show class-of-service interface

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show class-of-service interface &lt;comprehensive   detail&gt; &lt;interface-name&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>      | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Forwarding class map information added in Junos OS Release 9.4.</p> <p>Command introduced in Junos OS Release 11.1 for the QFX Series.</p> <p>Command introduced in Junos OS Release 12.1 for the PTX Series Packet Transport Routers.</p> <p>Command introduced in Junos OS Release 12.2 for the ACX Series Universal Access routers.</p> <p>Options <b>detail</b> and <b>comprehensive</b> introduced in Junos OS Release 11.4.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>              | Display the logical and physical interface associations for the classifier, rewrite rules, and scheduler map objects.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Options</b>                  | <p><b>none</b>—Display CoS associations for all physical and logical interfaces.</p> <p><b>comprehensive</b>—(M Series, MX Series, and T Series routers) (Optional) Display comprehensive quality-of-service (QoS) information about all physical and logical interfaces.</p> <p><b>detail</b>—(M Series, MX Series, and T Series routers) (Optional) Display QoS and CoS information based on the interface.</p> <p>If the <b>interface</b> <i>interface-name</i> is a physical interface, the output includes:</p> <ul style="list-style-type: none"> <li>• Brief QoS information about the physical interface</li> <li>• Brief QoS information about the logical interface</li> <li>• CoS information about the physical interface</li> <li>• Brief information about filters or policers of the logical interface</li> <li>• Brief CoS information about the logical interface</li> </ul> <p>If the <b>interface</b> <i>interface-name</i> is a logical interface, the output includes:</p> <ul style="list-style-type: none"> <li>• Brief QoS information about the logical interface</li> <li>• Information about filters or policers for the logical interface</li> <li>• CoS information about the logical interface</li> </ul> <p><b>interface-name</b>—(Optional) Display class-of-service (CoS) associations for the specified interface.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>List of Sample Output</b>    | <a href="#">show class-of-service interface (Physical) on page 612</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

[show class-of-service interface \(Logical\) on page 612](#)  
[show class-of-service interface \(Gigabit Ethernet\) on page 613](#)  
[show class-of-service interface \(PPPoE Interface\) on page 613](#)  
[show class-of-service interface \(T4000 Routers with Type 5 FPCs\) on page 613](#)  
[show class-of-service interface detail on page 613](#)  
[show class-of-service interface comprehensive on page 614](#)  
[show class-of-service interface \(ACX Series Routers\) on page 624](#)

**Output Fields** Table 43 on page 602 describes the output fields for the **show class-of-service interface** command. Output fields are listed in the approximate order in which they appear.

**Table 43: show class-of-service interface Output Fields**

| Field Name                       | Field Description                                                                                                                                                                                                                                                                             |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Physical interface               | Name of a physical interface.                                                                                                                                                                                                                                                                 |
| Index                            | Index of this interface or the internal index of this object.                                                                                                                                                                                                                                 |
| Dedicated Queues                 | Status of dedicated queues configured on an interface. Supported only on Trio MPC/MIC interfaces on MX Series routers.                                                                                                                                                                        |
| Queues supported                 | Number of queues you can configure on the interface.                                                                                                                                                                                                                                          |
| Queues in use                    | Number of queues currently configured.                                                                                                                                                                                                                                                        |
| Total non-default queues created | Number of queues created in addition to the default queues. Supported only on Trio MPC/MIC interfaces on MX Series routers.                                                                                                                                                                   |
| Rewrite Input IEEE Code-point    | (QFX Series only) IEEE 802.1p code point (priority) rewrite value. Incoming traffic from the Fibre Channel (FC) SAN is classified into the forwarding class specified in the native FC interface (NP_Port) fixed classifier and uses the priority specified as the IEEE 802.1p rewrite value. |
| Shaping rate                     | Maximum transmission rate on the physical interface. You can configure the shaping rate on the physical interface, or on the logical interface, but not on both. Therefore, the <b>Shaping rate</b> field is displayed for either the physical interface or the logical interface.            |
| Scheduler map                    | Name of the output scheduler map associated with this interface.                                                                                                                                                                                                                              |
| Input shaping rate               | For Gigabit Ethernet IQ2 PICs, maximum transmission rate on the input interface.                                                                                                                                                                                                              |
| Input scheduler map              | For Gigabit Ethernet IQ2 PICs, name of the input scheduler map associated with this interface.                                                                                                                                                                                                |
| Chassis scheduler map            | Name of the scheduler map associated with the packet forwarding component queues.                                                                                                                                                                                                             |
| Rewrite                          | Name and type of the rewrite rules associated with this interface.                                                                                                                                                                                                                            |
| Classifier                       | Name and type of classifiers associated with this interface.                                                                                                                                                                                                                                  |
| Forwarding-class-map             | Name of the forwarding map associated with this interface.                                                                                                                                                                                                                                    |
| Congestion-notification          | (QFX Series only) Congestion notification state, <b>enabled</b> or <b>disabled</b> .                                                                                                                                                                                                          |

Table 43: show class-of-service interface Output Fields (*continued*)

| Field Name               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Logical interface</b> | Name of a logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Object</b>            | Category of an object: <b>Classifier</b> , <b>Fragmentation-map</b> (for LSQ interfaces only), <b>Scheduler-map</b> , <b>Rewrite</b> , or <b>Translation Table</b> (for IQE PICs only).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Name</b>              | Name of an object.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Type</b>              | Type of an object: <b>dscp</b> , <b>dscp-ipv6</b> , <b>exp</b> , <b>ieee-802.1</b> , <b>ip</b> , or <b>inet-precedence</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Link-level type</b>   | Encapsulation on the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>MTU</b>               | MTU size on the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Speed</b>             | Speed at which the interface is running.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Loopback</b>          | Whether loopback is enabled and the type of loopback.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Source filtering</b>  | Whether source filtering is enabled or disabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Flow control</b>      | Whether flow control is enabled or disabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Auto-negotiation</b>  | (Gigabit Ethernet interfaces) Whether autonegotiation is enabled or disabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Remote-fault</b>      | (Gigabit Ethernet interfaces) Remote fault status. <ul style="list-style-type: none"> <li>• <b>Online</b>—Autonegotiation is manually configured as online.</li> <li>• <b>Offline</b>—Autonegotiation is manually configured as offline.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Device flags</b>      | The <b>Device flags</b> field provides information about the physical device and displays one or more of the following values: <ul style="list-style-type: none"> <li>• <b>Down</b>—Device has been administratively disabled.</li> <li>• <b>Hear-Own-Xmit</b>—Device receives its own transmissions.</li> <li>• <b>Link-Layer-Down</b>—The link-layer protocol has failed to connect with the remote endpoint.</li> <li>• <b>Loopback</b>—Device is in physical loopback.</li> <li>• <b>Loop-Detected</b>—The link layer has received frames that it sent, thereby detecting a physical loopback.</li> <li>• <b>No-Carrier</b>—On media that support carrier recognition, no carrier is currently detected.</li> <li>• <b>No-Multicast</b>—Device does not support multicast traffic.</li> <li>• <b>Present</b>—Device is physically present and recognized.</li> <li>• <b>Promiscuous</b>—Device is in promiscuous mode and recognizes frames addressed to all physical addresses on the media.</li> <li>• <b>Quench</b>—Transmission on the device is quenched because the output buffer is overflowing.</li> <li>• <b>Recv-All-Multicasts</b>—Device is in multicast promiscuous mode and therefore provides no multicast filtering.</li> <li>• <b>Running</b>—Device is active and enabled.</li> </ul> |

Table 43: show class-of-service interface Output Fields (*continued*)

| Field Name             | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Interface flags</b> | <p>The <b>Interface flags</b> field provides information about the physical interface and displays one or more of the following values:</p> <ul style="list-style-type: none"> <li>• <b>Admin-Test</b>—Interface is in test mode and some sanity checking, such as loop detection, is disabled.</li> <li>• <b>Disabled</b>—Interface is administratively disabled.</li> <li>• <b>Down</b>—A hardware failure has occurred.</li> <li>• <b>Hardware-Down</b>—Interface is nonfunctional or incorrectly connected.</li> <li>• <b>Link-Layer-Down</b>—Interface keepalives have indicated that the link is incomplete.</li> <li>• <b>No-Multicast</b>—Interface does not support multicast traffic.</li> <li>• <b>No-receive No-transmit</b>—Passive monitor mode is configured on the interface.</li> <li>• <b>Point-To-Point</b>—Interface is point-to-point.</li> <li>• <b>Pop all MPLS labels from packets of depth</b>—MPLS labels are removed as packets arrive on an interface that has the <b>pop-all-labels</b> statement configured. The depth value can be one of the following: <ul style="list-style-type: none"> <li>• <b>1</b>—Takes effect for incoming packets with one label only.</li> <li>• <b>2</b>—Takes effect for incoming packets with two labels only.</li> <li>• <b>[ 1 2 ]</b>—Takes effect for incoming packets with either one or two labels.</li> </ul> </li> <li>• <b>Promiscuous</b>—Interface is in promiscuous mode and recognizes frames addressed to all physical addresses.</li> <li>• <b>Recv-All-Multicasts</b>—Interface is in multicast promiscuous mode and provides no multicast filtering.</li> <li>• <b>SNMP-Traps</b>—SNMP trap notifications are enabled.</li> <li>• <b>Up</b>—Interface is enabled and operational.</li> </ul> |
| <b>Flags</b>           | <p>The <b>Logical interface flags</b> field provides information about the logical interface and displays one or more of the following values:</p> <ul style="list-style-type: none"> <li>• <b>ACFC Encapsulation</b>—Address control field Compression (ACFC) encapsulation is enabled (negotiated successfully with a peer).</li> <li>• <b>Device-down</b>—Device has been administratively disabled.</li> <li>• <b>Disabled</b>—Interface is administratively disabled.</li> <li>• <b>Down</b>—A hardware failure has occurred.</li> <li>• <b>Clear-DF-Bit</b>—GRE tunnel or IPsec tunnel is configured to clear the Don't Fragment (DF) bit.</li> <li>• <b>Hardware-Down</b>—Interface protocol initialization failed to complete successfully.</li> <li>• <b>PFC</b>—Protocol field compression is enabled for the PPP session.</li> <li>• <b>Point-To-Point</b>—Interface is point-to-point.</li> <li>• <b>SNMP-Traps</b>—SNMP trap notifications are enabled.</li> <li>• <b>Up</b>—Interface is enabled and operational.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Encapsulation</b>   | Encapsulation on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Admin</b>           | Administrative state of the interface ( <b>Up</b> or <b>Down</b> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Link</b>            | Status of physical link ( <b>Up</b> or <b>Down</b> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Proto</b>           | Protocol configured on the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

Table 43: show class-of-service interface Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Input Filter</b>            | Names of any firewall filters to be evaluated when packets are received on the interface, including any filters attached through activation of dynamic service.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Output Filter</b>           | Names of any firewall filters to be evaluated when packets are transmitted on the interface, including any filters attached through activation of dynamic service.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Link flags</b>              | Provides information about the physical link and displays one or more of the following values: <ul style="list-style-type: none"> <li>• <b>ACFC</b>—Address control field compression is configured. The Point-to-Point Protocol (PPP) session negotiates the ACFC option.</li> <li>• <b>Give-Up</b>—Link protocol does not continue connection attempts after repeated failures.</li> <li>• <b>Loose-LCP</b>—PPP does not use the Link Control Protocol (LCP) to indicate whether the link protocol is operational.</li> <li>• <b>Loose-LMI</b>—Frame Relay does not use the Local Management Interface (LMI) to indicate whether the link protocol is operational.</li> <li>• <b>Loose-NCP</b>—PPP does not use the Network Control Protocol (NCP) to indicate whether the device is operational.</li> <li>• <b>Keepalives</b>—Link protocol keepalives are enabled.</li> <li>• <b>No-Keepalives</b>—Link protocol keepalives are disabled.</li> <li>• <b>PFC</b>—Protocol field compression is configured. The PPP session negotiates the PFC option.</li> </ul> |
| <b>Hold-times</b>              | Current interface hold-time up and hold-time down, in milliseconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>CoS queues</b>              | Number of CoS queues configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Last flapped</b>            | Date, time, and how long ago the interface went from down to up. The format is <b>Last flapped: year-month-day hour:minute:second:timezone (hour:minute:second ago)</b> . For example, <b>Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago)</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Statistics last cleared</b> | Number and rate of bytes and packets received and transmitted on the physical interface. <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>IPv6 transit statistics</b> | Number of IPv6 transit bytes and packets received and transmitted on the logical interface if IPv6 statistics tracking is enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

Table 43: show class-of-service interface Output Fields (*continued*)

| Field Name           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Input errors</b>  | <p>Input errors on the interface. The labels are explained in the following list:</p> <ul style="list-style-type: none"> <li>• <b>Errors</b>—Sum of the incoming frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Framing errors</b>—Number of packets received with an invalid frame checksum (FCS).</li> <li>• <b>Runts</b>—Number of frames received that are smaller than the runt threshold.</li> <li>• <b>Giants</b>—Number of frames received that are larger than the giant threshold.</li> <li>• <b>Bucket Drops</b>—Drops resulting from the traffic load exceeding the interface transmit or receive leaky bucket configuration.</li> <li>• <b>Policed discards</b>—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that Junos OS does not handle.</li> <li>• <b>L3 incompletes</b>—Number of incoming packets discarded because they failed Layer 3 (usually IPv4) sanity checks of the header. For example, a frame with less than 20 bytes of available IP header is discarded. Layer 3 incomplete errors can be ignored by configuring the <b>ignore-l3-incompletes</b> statement.</li> <li>• <b>L2 channel errors</b>—Number of times the software did not find a valid logical interface for an incoming frame.</li> <li>• <b>L2 mismatch timeouts</b>—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable.</li> <li>• <b>HS link CRC errors</b>—Number of errors on the high-speed links between the ASICs responsible for handling the router interfaces.</li> <li>• <b>HS link FIFO overflows</b>—Number of FIFO overflows on the high-speed links between the ASICs responsible for handling the router interfaces.</li> </ul> |
| <b>Output errors</b> | <p>Output errors on the interface. The labels are explained in the following list:</p> <ul style="list-style-type: none"> <li>• <b>Carrier transitions</b>—Number of times the interface has gone from <b>down</b> to <b>up</b>. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC is malfunctioning.</li> <li>• <b>Errors</b>—Sum of the outgoing frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> </ul> <p><b>NOTE:</b> Due to accounting space limitations on certain Type 3 FPCs (which are supported in M320 and T640 routers), the <b>Drops</b> field does not always use the correct value for queue 6 or queue 7 for interfaces on 10-port 1-Gigabit Ethernet PICs.</p> <ul style="list-style-type: none"> <li>• <b>Aged packets</b>—Number of packets that remained in shared packet SDRAM so long that the system automatically purged them. The value in this field should never increment. If it does, it is most likely a software bug or possibly malfunctioning hardware.</li> <li>• <b>HS link FIFO underflows</b>—Number of FIFO underflows on the high-speed links between the ASICs responsible for handling the router interfaces.</li> <li>• <b>MTU errors</b>—Number of packets whose size exceeds the MTU of the interface.</li> </ul>                                                                                                                                                                                                                                                                                                                |
| <b>Egress queues</b> | Total number of egress queues supported on the specified interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

Table 43: show class-of-service interface Output Fields (*continued*)

| Field Name                                  | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Queue counters</b>                       | <p>CoS queue number and its associated user-configured forwarding class name.</p> <ul style="list-style-type: none"> <li>• <b>Queued packets</b>—Number of queued packets.</li> <li>• <b>Transmitted packets</b>—Number of transmitted packets.</li> <li>• <b>Dropped packets</b>—Number of packets dropped by the ASIC's RED mechanism.</li> </ul> <p><b>NOTE:</b> Due to accounting space limitations on certain Type 3 FPCs (which are supported in M320 and T640 routers), the <b>Dropped packets</b> field does not always display the correct value for queue 6 or queue 7 for interfaces on 10-port 1-Gigabit Ethernet PICs.</p>                                                                                                                                                                                                                                   |
| <b>SONET alarms</b><br><b>SONET defects</b> | <p>(SONET) SONET media-specific alarms and defects that prevent the interface from passing packets. When a defect persists for a certain period, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router or light the red or yellow alarm LED on the craft interface. See these fields for possible alarms and defects: <b>SONET PHY</b>, <b>SONET section</b>, <b>SONET line</b>, and <b>SONET path</b>.</p>                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>SONET PHY</b>                            | <p>Counts of specific SONET errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. A state other than <b>OK</b> indicates a problem.</li> </ul> <p>The <b>SONET PHY</b> field has the following subfields:</p> <ul style="list-style-type: none"> <li>• <b>PLL Lock</b>—Phase-locked loop</li> <li>• <b>PHY Light</b>—Loss of optical signal</li> </ul>                                                                                                                                                                                                                                                                                        |
| <b>SONET section</b>                        | <p>Counts of specific SONET errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. A state other than <b>OK</b> indicates a problem.</li> </ul> <p>The <b>SONET section</b> field has the following subfields:</p> <ul style="list-style-type: none"> <li>• <b>BIP-BI</b>—Bit interleaved parity for SONET section overhead</li> <li>• <b>SEF</b>—Severely errored framing</li> <li>• <b>LOS</b>—Loss of signal</li> <li>• <b>LOF</b>—Loss of frame</li> <li>• <b>ES-S</b>—Errored seconds (section)</li> <li>• <b>SES-S</b>—Severely errored seconds (section)</li> <li>• <b>SEFS-S</b>—Severely errored framing seconds (section)</li> </ul> |

Table 43: show class-of-service interface Output Fields (*continued*)

| Field Name        | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>SONET line</b> | <p>Active alarms and defects, plus counts of specific SONET errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. A state other than <b>OK</b> indicates a problem.</li> </ul> <p>The <b>SONET line</b> field has the following subfields:</p> <ul style="list-style-type: none"> <li>• <b>BIP-B2</b>—Bit interleaved parity for SONET line overhead</li> <li>• <b>REI-L</b>—Remote error indication (near-end line)</li> <li>• <b>RDI-L</b>—Remote defect indication (near-end line)</li> <li>• <b>AIS-L</b>—Alarm indication signal (near-end line)</li> <li>• <b>BERR-SF</b>—Bit error rate fault (signal failure)</li> <li>• <b>BERR-SD</b>—Bit error rate defect (signal degradation)</li> <li>• <b>ES-L</b>—Errored seconds (near-end line)</li> <li>• <b>SES-L</b>—Severely errored seconds (near-end line)</li> <li>• <b>UAS-L</b>—Unavailable seconds (near-end line)</li> <li>• <b>ES-LFE</b>—Errored seconds (far-end line)</li> <li>• <b>SES-LFE</b>—Severely errored seconds (far-end line)</li> <li>• <b>UAS-LFE</b>—Unavailable seconds (far-end line)</li> </ul>      |
| <b>SONET path</b> | <p>Active alarms and defects, plus counts of specific SONET errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. A state other than <b>OK</b> indicates a problem.</li> </ul> <p>The <b>SONET path</b> field has the following subfields:</p> <ul style="list-style-type: none"> <li>• <b>BIP-B3</b>—Bit interleaved parity for SONET section overhead</li> <li>• <b>REI-P</b>—Remote error indication</li> <li>• <b>LOP-P</b>—Loss of pointer (path)</li> <li>• <b>AIS-P</b>—Path alarm indication signal</li> <li>• <b>RDI-P</b>—Path remote defect indication</li> <li>• <b>UNEQ-P</b>—Path unequipped</li> <li>• <b>PLM-P</b>—Path payload (signal) label mismatch</li> <li>• <b>ES-P</b>—Errored seconds (near-end STS path)</li> <li>• <b>SES-P</b>—Severely errored seconds (near-end STS path)</li> <li>• <b>UAS-P</b>—Unavailable seconds (near-end STS path)</li> <li>• <b>ES-PFE</b>—Errored seconds (far-end STS path)</li> <li>• <b>SES-PFE</b>—Severely errored seconds (far-end STS path)</li> <li>• <b>UAS-PFE</b>—Unavailable seconds (far-end STS path)</li> </ul> |



Table 43: show class-of-service interface Output Fields (*continued*)

| Field Name                             | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Received SONET overhead                | Values of the received and transmitted SONET overhead: <ul style="list-style-type: none"> <li>• <b>C2</b>—Signal label. Allocated to identify the construction and content of the STS-level SPE and for PDI-P.</li> <li>• <b>F1</b>—Section user channel byte. This byte is set aside for the purposes of users.</li> <li>• <b>K1</b> and <b>K2</b>—These bytes are allocated for APS signaling for the protection of the multiplex section.</li> <li>• <b>J0</b>—Section trace. This byte is defined for STS-1 number 1 of an STS-N signal. Used to transmit a 1-byte fixed-length string or a 16-byte message so that a receiving terminal in a section can verify its continued connection to the intended transmitter.</li> <li>• <b>S1</b>—Synchronization status. The S1 byte is located in the first STS-1 number of an STS-N signal.</li> <li>• <b>Z3</b> and <b>Z4</b>—Allocated for future use.</li> </ul>                                                                                                                                                                    |
| Transmitted SONET overhead             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Received path trace                    | SONET/SDH interfaces allow path trace bytes to be sent inband across the SONET/SDH link. Juniper Networks and other router manufacturers use these bytes to help diagnose misconfigurations and network errors by setting the transmitted path trace message so that it contains the system hostname and name of the physical interface. The received path trace value is the message received from the router at the other end of the fiber. The transmitted path trace value is the message that this router transmits.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Transmitted path trace                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| HDLC configuration                     | Information about the HDLC configuration. <ul style="list-style-type: none"> <li>• <b>Policing bucket</b>—Configured state of the receiving policer.</li> <li>• <b>Shaping bucket</b>—Configured state of the transmitting shaper.</li> <li>• <b>Giant threshold</b>—Giant threshold programmed into the hardware.</li> <li>• <b>Runt threshold</b>—Runt threshold programmed into the hardware.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Packet Forwarding Engine configuration | Information about the configuration of the Packet Forwarding Engine: <ul style="list-style-type: none"> <li>• <b>Destination slot</b>—FPC slot number.</li> <li>• <b>PLP byte</b>—Packet Level Protocol byte.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| CoS information                        | Information about the CoS queue for the physical interface. <ul style="list-style-type: none"> <li>• <b>CoS transmit queue</b>—Queue number and its associated user-configured forwarding class name.</li> <li>• <b>Bandwidth %</b>—Percentage of bandwidth allocated to the queue.</li> <li>• <b>Bandwidth bps</b>—Bandwidth allocated to the queue (in bps).</li> <li>• <b>Buffer %</b>—Percentage of buffer space allocated to the queue.</li> <li>• <b>Buffer usec</b>—Amount of buffer space allocated to the queue, in microseconds. This value is nonzero only if the buffer size is configured in terms of time.</li> <li>• <b>Priority</b>—Queue priority: <b>low</b> or <b>high</b>.</li> <li>• <b>Limit</b>—Displayed if rate limiting is configured for the queue. Possible values are <b>none</b> and <b>exact</b>. If <b>exact</b> is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If <b>none</b> is configured, the queue transmits beyond the configured bandwidth if bandwidth is available.</li> </ul> |
| Forwarding classes                     | Total number of forwarding classes supported on the specified interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Egress queues                          | Total number of egress queues supported on the specified interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

Table 43: show class-of-service interface Output Fields (*continued*)

| Field Name           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Queue                | Queue number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Forwarding classes   | Forwarding class name.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Queued Packets       | Number of packets queued to this queue.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Queued Bytes         | Number of bytes queued to this queue. The byte counts vary by PIC type.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Transmitted Packets  | Number of packets transmitted by this queue. When fragmentation occurs on the egress interface, the first set of packet counters shows the postfragmentation values. The second set of packet counters (displayed under the <b>Packet Forwarding Engine Chassis Queues</b> field) shows the prefragmentation values.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Transmitted Bytes    | Number of bytes transmitted by this queue. The byte counts vary by PIC type.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Tail-dropped packets | Number of packets dropped because of tail drop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| RED-dropped packets  | <p>Number of packets dropped because of random early detection (RED).</p> <ul style="list-style-type: none"> <li>• (M Series and T Series routers only) On M320 and M120 routers and the T Series routers, the total number of dropped packets is displayed. On all other M Series routers, the output classifies dropped packets into the following categories: <ul style="list-style-type: none"> <li>• <b>Low, non-TCP</b>—Number of low-loss priority non-TCP packets dropped because of RED.</li> <li>• <b>Low, TCP</b>—Number of low-loss priority TCP packets dropped because of RED.</li> <li>• <b>High, non-TCP</b>—Number of high-loss priority non-TCP packets dropped because of RED.</li> <li>• <b>High, TCP</b>—Number of high-loss priority TCP packets dropped because of RED.</li> </ul> </li> <li>• (MX Series routers with enhanced DPCs, and T Series routers with enhanced FPCs only) The output classifies dropped packets into the following categories: <ul style="list-style-type: none"> <li>• <b>Low</b>—Number of low-loss priority packets dropped because of RED.</li> <li>• <b>Medium-low</b>—Number of medium-low loss priority packets dropped because of RED.</li> <li>• <b>Medium-high</b>—Number of medium-high loss priority packets dropped because of RED.</li> <li>• <b>High</b>—Number of high-loss priority packets dropped because of RED.</li> </ul> </li> </ul> <p><b>NOTE:</b> Due to accounting space limitations on certain Type 3 FPCs (which are supported in M320 and T640 routers), this field does not always display the correct value for queue 6 or queue 7 for interfaces on 10-port 1-Gigabit Ethernet PICs.</p> |

Table 43: show class-of-service interface Output Fields (*continued*)

| Field Name        | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RED-dropped bytes | <p>Number of bytes dropped because of RED. The byte counts vary by PIC type.</p> <ul style="list-style-type: none"> <li>(M Series and T Series routers only) On M320 and M120 routers and the T Series routers, only the total number of dropped bytes is displayed. On all other M Series routers, the output classifies dropped bytes into the following categories: <ul style="list-style-type: none"> <li><b>Low, non-TCP</b>—Number of low-loss priority non-TCP bytes dropped because of RED.</li> <li><b>Low, TCP</b>—Number of low-loss priority TCP bytes dropped because of RED.</li> <li><b>High, non-TCP</b>—Number of high-loss priority non-TCP bytes dropped because of RED.</li> <li><b>High, TCP</b>—Number of high-loss priority TCP bytes dropped because of RED.</li> </ul> </li> </ul> <p><b>NOTE:</b> Due to accounting space limitations on certain Type 3 FPCs (which are supported in M320 and T640 routers), this field does not always display the correct value for queue 6 or queue 7 for interfaces on 10-port 1-Gigabit Ethernet PICs.</p> |
| Transmit rate     | Configured transmit rate of the scheduler. The rate is a percentage of the total interface bandwidth.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Rate Limit        | <p>Rate limiting configuration of the queue. Possible values are :</p> <ul style="list-style-type: none"> <li><b>None</b>—No rate limit.</li> <li><b>exact</b>—Queue transmits at the configured rate.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Buffer size       | Delay buffer size in the queue.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Priority          | Scheduling priority configured as <b>low</b> or <b>high</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Excess Priority   | Priority of the excess bandwidth traffic on a scheduler: <b>low</b> , <b>medium-low</b> , <b>medium-high</b> , <b>high</b> , or <b>none</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Drop profiles     | <p>Display the assignment of drop profiles.</p> <ul style="list-style-type: none"> <li><b>Loss priority</b>—Packet loss priority for drop profile assignment.</li> <li><b>Protocol</b>—Transport protocol for drop profile assignment.</li> <li><b>Index</b>—Index of the indicated object. Objects that have indexes in this output include schedulers and drop profiles.</li> <li><b>Name</b>—Name of the drop profile.</li> <li><b>Type</b>—Type of the drop profile: <b>discrete</b> or <b>interpolated</b>.</li> <li><b>Fill Level</b>—Percentage fullness of a queue.</li> <li><b>Drop probability</b>—Drop probability at this fill level.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                              |
| Excess Priority   | Priority of the excess bandwidth traffic on a scheduler.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

Table 43: show class-of-service interface Output Fields (*continued*)

| Field Name                    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Drop profiles</b>          | <p>Display the assignment of drop profiles.</p> <ul style="list-style-type: none"> <li>• <b>Loss priority</b>—Packet loss priority for drop profile assignment.</li> <li>• <b>Protocol</b>—Transport protocol for drop profile assignment.</li> <li>• <b>Index</b>—Index of the indicated object. Objects that have indexes in this output include schedulers and drop profiles.</li> <li>• <b>Name</b>—Name of the drop profile.</li> <li>• <b>Type</b>—Type of the drop profile: <b>discrete</b> or <b>interpolated</b>.</li> <li>• <b>Fill Level</b>—Percentage fullness of a queue.</li> <li>• <b>Drop probability</b>—Drop probability at this fill level.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Adjustment information</b> | <p>Display the assignment of shaping-rate adjustments on a scheduler node or queue.</p> <ul style="list-style-type: none"> <li>• <b>Adjusting application</b>—Application that is performing the shaping-rate adjustment. <ul style="list-style-type: none"> <li>• The adjusting application can appear as <b>ancp LS-0</b>, which is the Junos OS Access Node Control Profile process (<b>ancpd</b>) that performs shaping-rate adjustments on schedule nodes.</li> <li>• The adjusting application can also appear as <b>pppoe</b>, which adjusts the shaping-rate and overhead-accounting class-of-service attributes on dynamic subscriber interfaces in a broadband access network based on access line parameters in Point-to-Point Protocol over Ethernet (PPPoE) Tags [TR-101]. This feature is supported on MPC/MIC interfaces on MX Series routers. The shaping rate is based on the actual-data-rate-downstream attribute. The overhead accounting value is based on the access-loop-encapsulation attribute and specifies whether the access loop uses Ethernet (frame mode) or ATM (cell mode).</li> </ul> </li> <li>• <b>Adjustment type</b>—Type of adjustment: <b>absolute</b> or <b>delta</b>.</li> <li>• <b>Configured shaping rate</b>—Shaping rate configured for the scheduler node or queue.</li> <li>• <b>Adjustment value</b>—Value of adjusted shaping rate.</li> <li>• <b>Adjustment target</b>—Level of shaping-rate adjustment performed: <b>node</b> or <b>queue</b>.</li> <li>• <b>Adjustment overhead-accounting mode</b>—Configured shaping mode: <b>frame</b> or <b>cell</b>.</li> </ul> |

## Sample Output

### show class-of-service interface (Physical)

```

user@host> show class-of-service interface so-0/2/3
Physical interface: so-0/2/3, Index: 135
Queues supported: 8, Queues in use: 4
Total non-default queues created: 4
Scheduler map: <default>, Index: 2032638653

Logical interface: fe-0/0/1.0, Index: 68, Dedicated Queues: no
Shaping rate: 32000

```

| Object               | Name                 | Type | Index |
|----------------------|----------------------|------|-------|
| Scheduler-map        | <default>            |      | 27    |
| Rewrite              | exp-default          | exp  | 21    |
| Classifier           | exp-default          | exp  | 5     |
| Classifier           | ipprec-compatibility | ip   | 8     |
| Forwarding-class-map | exp-default          | exp  | 5     |

### show class-of-service interface (Logical)

```

user@host> show class-of-service interface so-0/2/3.0

```

```

Logical interface: so-0/2/3.0, Index: 68, Dedicated Queues: no
  Shaping rate: 32000
  Object      Name      Type      Index
  Scheduler-map <default>      27
  Rewrite     exp-default  exp       21
  Classifier  exp-default  exp       5
  Classifier  ipprec-compatibility ip        8
  Forwarding-class-map exp-default  exp       5

```

#### show class-of-service interface (Gigabit Ethernet)

```

user@host> show class-of-service interface ge-6/2/0
Physical interface: ge-6/2/0, Index: 175
Queues supported: 4, Queues in use: 4
  Scheduler map: <default>, Index: 2
  Input scheduler map: <default>, Index: 3
  Chassis scheduler map: <default-chassis>, Index: 4

```

#### show class-of-service interface (PPPoE Interface)

```

user@host> show class-of-service interface pp0.1
Logical interface: pp0.1, Index: 85
  Object      Name      Type      Index
  Traffic-control-profile tcp-pppoe.o.pp0.1 Output    2726446535
  Classifier  ipprec-compatibility ip        13

  Adjusting application: PPPoE
  Adjustment type: absolute
  Adjustment value: 5000000
  Adjustment overhead-accounting mode: cell
  Adjustment target: node

```

#### show class-of-service interface (T4000 Routers with Type 5 FPCs)

```

user@host> show class-of-service interface xe-4/0/0
Physical interface: xe-4/0/0, Index: 153
  Queues supported: 8, Queues in use: 4
  Shaping rate: 5000000000 bps
  Scheduler map: <default>, Index: 2
  Congestion-notification: Disabled

  Logical interface: xe-4/0/0.0, Index: 77
  Object      Name      Type
  Index
  13          Classifier  ipprec-compatibility ip

```

#### show class-of-service interface detail

```

user@host> show class-of-service interface ge-0/3/0 detail

Physical interface: ge-0/3/0, Enabled, Physical link is Up
  Link-level type: Ethernet, MTU: 1518, Speed: 1000mbps, Loopback: Disabled,
  Source filtering: Disabled, Flow control: Enabled, Auto-negotiation: Enabled,
  Remote fault: Online
  Device flags : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000

Physical interface: ge-0/3/0, Index: 138
Queues supported: 4, Queues in use: 5
Shaping rate: 50000 bps
Scheduler map: interface-scheduler-map, Index: 58414

```

```

Input shaping rate: 10000 bps
878674 Input scheduler map: scheduler-map, Index: 15103
Chassis scheduler map: <default-chassis>, Index: 4
Congestion-notification: Disabled

```

```

Logical interface ge-0/3/0.0
  Flags: SNMP-Traps 0x4000 VLAN-Tag [ 0x8100.1 ] Encapsulation: ENET2
  inet
  mpls

```

| Interface  | Admin | Link | Proto | Input Filter | Output Filter |
|------------|-------|------|-------|--------------|---------------|
| ge-0/3/0.0 | up    | up   | inet  |              |               |
|            |       |      | mpls  |              |               |

| Interface  | Admin | Link | Proto | Input Policer | Output Policer |
|------------|-------|------|-------|---------------|----------------|
| ge-0/3/0.0 | up    | up   | inet  |               |                |
|            |       |      | mpls  |               |                |

```

Logical interface: ge-0/3/0.0, Index: 68
Object      Name      Type      Index
Rewrite     exp-default exp (mpls-any) 33
Classifier  exp-default exp      10
Classifier  ipprec-compatibility ip      13

```

```

Logical interface ge-0/3/0.1
  Flags: SNMP-Traps 0x4000 VLAN-Tag [ 0x8100.2 ] Encapsulation: ENET2
  inet

```

| Interface  | Admin | Link | Proto | Input Filter | Output Filter |
|------------|-------|------|-------|--------------|---------------|
| ge-0/3/0.1 | up    | up   | inet  |              |               |

| Interface  | Admin | Link | Proto | Input Policer | Output Policer |
|------------|-------|------|-------|---------------|----------------|
| ge-0/3/0.1 | up    | up   | inet  |               |                |

```

Logical interface: ge-0/3/0.1, Index: 69
Object      Name      Type      Index
Classifier  ipprec-compatibility ip      13

```

### show class-of-service interface comprehensive

```

user@host> show class-of-service interface ge-0/3/0 comprehensive
Physical interface: ge-0/3/0, Enabled, Physical link is Up
  Interface index: 138, SNMP ifIndex: 601, Generation: 141
  Link-level type: Ethernet, MTU: 1518, Speed: 1000mbps, BPDU Error: None,
  MAC-REWRITE Error: None, Loopback: Disabled, Source filtering: Disabled, Flow
  control: Enabled,
  Auto-negotiation: Enabled, Remote fault: Online
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  CoS queues     : 4 supported, 4 maximum usable queues
  Schedulers     : 256
  Hold-times     : Up 0 ms, Down 0 ms
  Current address: 00:14:f6:f4:b4:5d, Hardware address: 00:14:f6:f4:b4:5d
  Last flapped   : 2010-09-07 06:35:22 PDT (15:14:42 ago)
  Statistics last cleared: Never
Traffic statistics:
  Input bytes : 0 0 bps
  Output bytes : 0 0 bps
  Input packets: 0 0 pps
  Output packets: 0 0 pps
IPv6 total statistics:
  Input bytes : 0
  Output bytes : 0
  Input packets: 0

```

```

Output packets:                                0
Ingress traffic statistics at Packet Forwarding Engine:
Input bytes :                                0          0 bps
Input packets:                             0          0 pps
Drop bytes :                                0          0 bps
Drop packets:                             0          0 pps
Label-switched interface (LSI) traffic statistics:
Input bytes :                                0          0 bps
Input packets:                             0          0 pps
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0, L3
incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0, FIFO errors: 0,
Resource errors: 0
Output errors:
Carrier transitions: 5, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0,
FIFO errors: 0, HS link CRC errors: 0, MTU errors: 0, Resource errors: 0
Ingress queues: 4 supported, 5 in use
Queue counters:      Queued packets  Transmitted packets      Dropped packets

0 af3                0                0                0
1 af2                0                0                0
2 ef2                0                0                0
3 ef1                0                0                0

Egress queues: 4 supported, 5 in use
Queue counters:      Queued packets  Transmitted packets      Dropped packets

0 af3                0                0                0
1 af2                0                0                0
2 ef2                0                0                0
3 ef1                0                0                0

Active alarms : None
Active defects : None
MAC statistics:
Total octets          Receive          Transmit
Total packets         0              0
Unicast packets       0              0
Broadcast packets     0              0
Multicast packets     0              0
CRC/Align errors      0              0
FIFO errors           0              0
MAC control frames    0              0
MAC pause frames      0              0
Oversized frames      0
Jabber frames         0
Fragment frames       0
VLAN tagged frames    0
Code violations        0
Filter statistics:
Input packet count    0
Input packet rejects  0
Input DA rejects      0
Input SA rejects      0
Output packet count   0

```

```

Output packet pad count                                0
Output packet error count                              0
CAM destination filters: 0, CAM source filters: 0
Autonegotiation information:
Negotiation status: Complete
Link partner:
Link mode: Full-duplex, Flow control: Symmetric/Asymmetric, Remote fault:
OK
Local resolution:
Flow control: Symmetric, Remote fault: Link OK
Packet Forwarding Engine configuration:
Destination slot: 0
CoS information:
Direction : Output
CoS transmit queue      Bandwidth      Buffer Priority
Limit
      %      bps      %      usec
2 ef2      39      19500      0      120      high
none
Direction : Input
CoS transmit queue      Bandwidth      Buffer Priority
Limit
      %      bps      %      usec
0 af3      30      3000      45      0      low
none

Physical interface: ge-0/3/0, Enabled, Physical link is Up
Interface index: 138, SNMP ifIndex: 601
Forwarding classes: 16 supported, 5 in use
Ingress queues: 4 supported, 5 in use
Queue: 0, Forwarding classes: af3
Queued:
Packets      :      0      0 pps
Bytes      :      0      0 bps
Transmitted:
Packets      :      0      0 pps
Bytes      :      0      0 bps
Tail-dropped packets : Not Available
RED-dropped packets :      0      0 pps
RED-dropped bytes  :      0      0 bps
Queue: 1, Forwarding classes: af2
Queued:
Packets      :      0      0 pps
Bytes      :      0      0 bps
Transmitted:
Packets      :      0      0 pps
Bytes      :      0      0 bps
Tail-dropped packets : Not Available
RED-dropped packets :      0      0 pps
RED-dropped bytes  :      0      0 bps
Queue: 2, Forwarding classes: ef2
Queued:
Packets      :      0      0 pps
Bytes      :      0      0 bps
Transmitted:
Packets      :      0      0 pps
Bytes      :      0      0 bps
Tail-dropped packets : Not Available
RED-dropped packets :      0      0 pps
RED-dropped bytes  :      0      0 bps
Queue: 3, Forwarding classes: ef1

```



```

Queued:
  Packets      :      0      0 pps
  Bytes       :      0      0 bps
Transmitted:
  Packets      :      0      0 pps
  Bytes       :      0      0 bps
  Tail-dropped packets : Not Available
  RED-dropped packets :      0      0 pps
  RED-dropped bytes  :      0      0 bps
Forwarding classes: 16 supported, 5 in use
Egress queues: 4 supported, 5 in use
Queue: 0, Forwarding classes: af3
  Queued:
    Packets      :      0      0 pps
    Bytes       :      0      0 bps
  Transmitted:
    Packets      :      0      0 pps
    Bytes       :      0      0 bps
    Tail-dropped packets : Not Available
    RL-dropped packets :      0      0 pps
    RL-dropped bytes  :      0      0 bps
    RED-dropped packets :      0      0 pps
    RED-dropped bytes  :      0      0 bps
Queue: 1, Forwarding classes: af2
  Queued:
    Packets      :      0      0 pps
    Bytes       :      0      0 bps
  Transmitted:
    Packets      :      0      0 pps
    Bytes       :      0      0 bps
    Tail-dropped packets : Not Available
    RL-dropped packets :      0      0 pps
    RL-dropped bytes  :      0      0 bps
    RED-dropped packets :      0      0 pps
    RED-dropped bytes  :      0      0 bps
Queue: 2, Forwarding classes: ef2
  Queued:
    Packets      :      0      0 pps
    Bytes       :      0      0 bps
  Transmitted:
    Packets      :      0      0 pps
    Bytes       :      0      0 bps
    Tail-dropped packets : Not Available
    RL-dropped packets :      0      0 pps
    RL-dropped bytes  :      0      0 bps
    RED-dropped packets :      0      0 pps
    RED-dropped bytes  :      0      0 bps
Queue: 3, Forwarding classes: ef1
  Queued:
    Packets      :      0      0 pps
    Bytes       :      0      0 bps
  Transmitted:
    Packets      :      0      0 pps
    Bytes       :      0      0 bps
    Tail-dropped packets : Not Available
    RL-dropped packets :      0      0 pps
    RL-dropped bytes  :      0      0 bps
    RED-dropped packets :      0      0 pps
    RED-dropped bytes  :      0      0 bps

```

Packet Forwarding Engine Chassis Queues:

```

Queues: 4 supported, 5 in use
Queue: 0, Forwarding classes: af3
  Queued:
    Packets      :                0                0 pps
    Bytes        :                0                0 bps
  Transmitted:
    Packets      :                0                0 pps
    Bytes        :                0                0 bps
    Tail-dropped packets :                0                0 pps
    RED-dropped packets : Not Available
    RED-dropped bytes  : Not Available
Queue: 1, Forwarding classes: af2
  Queued:
    Packets      :                0                0 pps
    Bytes        :                0                0 bps
  Transmitted:
    Packets      :                0                0 pps
    Bytes        :                0                0 bps
    Tail-dropped packets :                0                0 pps
    RED-dropped packets : Not Available
    RED-dropped bytes  : Not Available
Queue: 2, Forwarding classes: ef2
  Queued:
    Packets      :                0                0 pps
    Bytes        :                0                0 bps
  Transmitted:
    Packets      :                0                0 pps
    Bytes        :                0                0 bps
    Tail-dropped packets :                0                0 pps
    RED-dropped packets : Not Available
    RED-dropped bytes  : Not Available
Queue: 3, Forwarding classes: ef1
  Queued:
    Packets      :            108546                0 pps
    Bytes        :        12754752        376 bps
  Transmitted:
    Packets      :            108546                0 pps
    Bytes        :        12754752        376 bps
    Tail-dropped packets :                0                0 pps
    RED-dropped packets : Not Available
    RED-dropped bytes  : Not Available

Physical interface: ge-0/3/0, Index: 138
Queues supported: 4, Queues in use: 5
Shaping rate: 50000 bps

Scheduler map: interface-scheduler-map, Index: 58414

  Scheduler: ef2, Forwarding class: ef2, Index: 39155
    Transmit rate: 39 percent, Rate Limit: none, Buffer size: 120 us, Buffer
Limit: none, Priority: high
    Excess Priority: unspecified
    Drop profiles:
      Loss priority  Protocol  Index  Name
      Low           any       1      < default-drop-profile>
      Medium low    any       1      < default-drop-profile>
      Medium high   any       1      < default-drop-profile>
      High          any       1      < default-drop-profile>
    Drop profile: < default-drop-profile>, Type: discrete, Index: 1
      Fill level  Drop probability
      100         100

```

```

Drop profile: < default-drop-profile>, Type: discrete, Index: 1
  Fill level    Drop probability
    100          100
Drop profile: < default-drop-profile>, Type: discrete, Index: 1
  Fill level    Drop probability
    100          100
Drop profile: < default-drop-profile>, Type: discrete, Index: 1
  Fill level    Drop probability
    100          100
Input shaping rate: 10000 bps
Input scheduler map: scheduler-map

Scheduler map: scheduler-map, Index: 15103

Scheduler: af3, Forwarding class: af3, Index: 35058
  Transmit rate: 30 percent, Rate Limit: none, Buffer size: 45 percent, Buffer
Limit: none, Priority: low
  Excess Priority: unspecified
  Drop profiles:
    Loss priority  Protocol  Index  Name
    Low           any       40582  green
    Medium low    any       1      < default-drop-profile>
    Medium high   any       1      < default-drop-profile>
    High          any      18928  yellow
Drop profile: green, Type: discrete, Index: 40582
  Fill level    Drop probability
    50           0
    100          100
Drop profile: < default-drop-profile>, Type: discrete, Index: 1
  Fill level    Drop probability
    100          100
Drop profile: < default-drop-profile>, Type: discrete, Index: 1
  Fill level    Drop probability
    100          100
Drop profile: yellow, Type: discrete, Index: 18928
  Fill level    Drop probability
    50           0
    100          100
Chassis scheduler map: < default-drop-profile>
Scheduler map: < default-drop-profile>, Index: 4

Scheduler: < default-drop-profile>, Forwarding class: af3, Index: 25
  Transmit rate: 25 percent, Rate Limit: none, Buffer size: 25 percent, Buffer
Limit: none, Priority: low
  Excess Priority: low
  Drop profiles:
    Loss priority  Protocol  Index  Name
    Low           any       1      < default-drop-profile>
    Medium low    any       1      < default-drop-profile>
    Medium high   any       1      < default-drop-profile>
    High          any       1      < default-drop-profile>
Drop profile: < default-drop-profile>, Type: discrete, Index: 1
  Fill level    Drop probability
    100          100
Drop profile: < default-drop-profile>, Type: discrete, Index: 1
  Fill level    Drop probability
    100          100
Drop profile: < default-drop-profile>, Type: discrete, Index: 1
  Fill level    Drop probability
    100          100
Drop profile: < default-drop-profile>, Type: discrete, Index: 1

```

```

Fill level      Drop probability
    100              100

Scheduler: < default-drop-profile>, Forwarding class: af2, Index: 25
  Transmit rate: 25 percent, Rate Limit: none, Buffer size: 25 percent, Buffer
Limit: none, Priority: low
  Excess Priority: low
  Drop profiles:
    Loss priority  Protocol  Index  Name
    Low           any       1      < default-drop-profile>
    Medium low    any       1      < default-drop-profile>
    Medium high   any       1      < default-drop-profile>
    High          any       1      < default-drop-profile>
Drop profile: < default-drop-profile>, Type: discrete, Index: 1
  Fill level      Drop probability
    100              100
Drop profile: < default-drop-profile>, Type: discrete, Index: 1
  Fill level      Drop probability
    100              100
Drop profile: < default-drop-profile>, Type: discrete, Index: 1
  Fill level      Drop probability
    100              100
Drop profile: < default-drop-profile>, Type: discrete, Index: 1
  Fill level      Drop probability
    100              100

Scheduler: < default-drop-profile>, Forwarding class: ef2, Index: 25
  Transmit rate: 25 percent, Rate Limit: none, Buffer size: 25 percent, Buffer
Limit: none, Priority: low
  Excess Priority: low
  Drop profiles:
    Loss priority  Protocol  Index  Name
    Low           any       1      < default-drop-profile>
    Medium low    any       1      < default-drop-profile>
    Medium high   any       1      < default-drop-profile>
    High          any       1      < default-drop-profile>
Drop profile: < default-drop-profile>, Type: discrete, Index: 1
  Fill level      Drop probability
    100              100
Drop profile: < default-drop-profile>, Type: discrete, Index: 1
  Fill level      Drop probability
    100              100
Drop profile: < default-drop-profile>, Type: discrete, Index: 1
  Fill level      Drop probability
    100              100
Drop profile: < default-drop-profile>, Type: discrete, Index: 1
  Fill level      Drop probability
    100              100

Scheduler: < default-drop-profile>, Forwarding class: ef1, Index: 25
  Transmit rate: 25 percent, Rate Limit: none, Buffer size: 25 percent, Buffer
Limit: none, Priority: low
  Excess Priority: low
  Drop profiles:
    Loss priority  Protocol  Index  Name
    Low           any       1      < default-drop-profile>
    Medium low    any       1      < default-drop-profile>
    Medium high   any       1      < default-drop-profile>
    High          any       1      < default-drop-profile>
Drop profile: , Type: discrete, Index: 1
  Fill level      Drop probability
    100              100

```

```

    100          100
Drop profile: < default-drop-profile>, Type: discrete, Index: 1
  Fill level    Drop probability
    100          100
Drop profile: < default-drop-profile>, Type: discrete, Index: 1
  Fill level    Drop probability
    100          100
Drop profile: < default-drop-profile>, Type: discrete, Index: 1
  Fill level    Drop probability
    100          100
Congestion-notification: Disabled
Forwarding class
priority Policing priority      ID      Queue  Restricted queue  Fabric
af3      normal                0       0           0           low
af2      normal                1       1           1           low
ef2      normal                2       2           2           high
ef1      normal                3       3           3           high
af1      normal                4       4           0           low
          normal

Logical interface ge-0/3/0.0 (Index 68) (SNMP ifIndex 152) (Generation 159)
Flags: SNMP-Traps 0x4000 VLAN-Tag [ 0x8100.1 ] Encapsulation: ENET2
Traffic statistics:
  Input bytes :                0
  Output bytes :                0
  Input packets:                0
  Output packets:               0
Local statistics:
  Input bytes :                0
  Output bytes :                0
  Input packets:                0
  Output packets:               0
Transit statistics:
  Input bytes :                0           0 bps
  Output bytes :                0           0 bps
  Input packets:                0           0 pps
  Output packets:               0           0 pps
Protocol inet, MTU: 1500, Generation: 172, Route table: 0
  Flags: Sendbcst-pkt-to-re
  Input Filters: filter-in-ge-0/3/0.0-i,
  Policer: Input: p1-ge-0/3/0.0-inet-i
Protocol mpls, MTU: 1488, Maximum labels: 3, Generation: 173, Route table: 0

  Flags: Is-Primary
  Output Filters: exp-filter,,,,,

Logical interface ge-0/3/0.0 (Index 68) (SNMP ifIndex 152)
Flags: SNMP-Traps 0x4000 VLAN-Tag [ 0x8100.1 ] Encapsulation: ENET2
Input packets : 0
Output packets: 0

Interface      Admin Link Proto Input Filter      Output Filter
ge-0/3/0.0    up   up   inet  filter-in-ge-0/3/0.0-i
              mpls                      exp-filter
Interface      Admin Link Proto Input Policer      Output Policer
ge-0/3/0.0    up   up   inet  p1-ge-0/3/0.0-inet-i

```

```

mpls

Filter: filter-in-ge-0/3/0.0-i
Counters:
Name                                     Bytes      Packets
count-filter-in-ge-0/3/0.0-i           0           0

Filter: exp-filter
Counters:
Name                                     Bytes      Packets
count-exp-seven-match                   0           0
count-exp-zero-match                     0           0
Policers:
Name                                     Packets
p1-ge-0/3/0.0-inet-i                     0

Logical interface: ge-0/3/0.0, Index: 68
Object      Name                                     Type      Index

Rewrite      exp-default      exp (mpls-any)      33

Rewrite rule: exp-default, Code point type: exp, Index: 33
Forwarding class      Loss priority      Code point
af3                    low                000
af3                    high               001
af2                    low                010
af2                    high               011
ef2                    low                100
ef2                    high               101
ef1                    low                110
ef1                    high               111
Object      Name                                     Type      Index

Classifier      exp-default      exp      10

Classifier: exp-default, Code point type: exp, Index: 10
Code point      Forwarding class      Loss priority
000              af3                    low
001              af3                    high
010              af2                    low
011              af2                    high
100              ef2                    low
101              ef2                    high
110              ef1                    low
111              ef1                    high
Object      Name                                     Type      Index

Classifier      ipprec-compatibility  ip      13

Classifier: ipprec-compatibility, Code point type: inet-precedence, Index: 13
Code point      Forwarding class      Loss priority
000              af3                    low
001              af3                    high
010              af3                    low
011              af3                    high
100              af3                    low
101              af3                    high
110              ef1                    low
111              ef1                    high
Forwarding class      ID      Queue      Restricted queue      Fabric

```

| priority | Policing priority |   |   |   |      |
|----------|-------------------|---|---|---|------|
| af3      |                   | 0 | 0 | 0 | low  |
|          | normal            |   |   |   |      |
| af2      |                   | 1 | 1 | 1 | low  |
|          | normal            |   |   |   |      |
| ef2      |                   | 2 | 2 | 2 | high |
|          | normal            |   |   |   |      |
| ef1      |                   | 3 | 3 | 3 | high |
|          | normal            |   |   |   |      |
| af1      |                   | 4 | 4 | 0 | low  |
|          | normal            |   |   |   |      |

Logical interface ge-0/3/0.1 (Index 69) (SNMP ifIndex 154) (Generation 160)

Flags: SNMP-Traps 0x4000 VLAN-Tag [ 0x8100.2 ] Encapsulation: ENET2

Traffic statistics:

|                 |   |
|-----------------|---|
| Input bytes :   | 0 |
| Output bytes :  | 0 |
| Input packets:  | 0 |
| Output packets: | 0 |

Local statistics:

|                 |   |
|-----------------|---|
| Input bytes :   | 0 |
| Output bytes :  | 0 |
| Input packets:  | 0 |
| Output packets: | 0 |

Transit statistics:

|                 |   |       |
|-----------------|---|-------|
| Input bytes :   | 0 | 0 bps |
| Output bytes :  | 0 | 0 bps |
| Input packets:  | 0 | 0 pps |
| Output packets: | 0 | 0 pps |

Protocol inet, MTU: 1500, Generation: 174, Route table: 0

Flags: Sendbcst-pkt-to-re

Logical interface ge-0/3/0.1 (Index 69) (SNMP ifIndex 154)

Flags: SNMP-Traps 0x4000 VLAN-Tag [ 0x8100.2 ] Encapsulation: ENET2

Input packets : 0

Output packets: 0

| Interface  | Admin | Link | Proto | Input Filter  | Output Filter  |
|------------|-------|------|-------|---------------|----------------|
| ge-0/3/0.1 | up    | up   | mpls  |               |                |
| Interface  | Admin | Link | Proto | Input Policer | Output Policer |
| ge-0/3/0.1 | up    | up   |       |               |                |
|            |       |      | mpls  |               |                |

Logical interface: ge-0/3/0.1, Index: 69

| Object     | Name                 | Type | Index |
|------------|----------------------|------|-------|
| Classifier | ipprec-compatibility | ip   | 13    |

Classifier: ipprec-compatibility, Code point type: inet-precedence, Index: 13

| Code point       | Forwarding class  | Loss priority |                  |        |
|------------------|-------------------|---------------|------------------|--------|
| 000              | af3               | low           |                  |        |
| 001              | af3               | high          |                  |        |
| 010              | af3               | low           |                  |        |
| 011              | af3               | high          |                  |        |
| 100              | af3               | low           |                  |        |
| 101              | af3               | high          |                  |        |
| 110              | ef1               | low           |                  |        |
| 111              | ef1               | high          |                  |        |
| Forwarding class | ID                | Queue         | Restricted queue | Fabric |
| priority         | Policing priority |               |                  |        |

|     |        |   |   |   |      |
|-----|--------|---|---|---|------|
| af3 |        | 0 | 0 | 0 | low  |
|     | normal |   |   |   |      |
| af2 |        | 1 | 1 | 1 | low  |
|     | normal |   |   |   |      |
| ef2 |        | 2 | 2 | 2 | high |
|     | normal |   |   |   |      |
| ef1 |        | 3 | 3 | 3 | high |
|     | normal |   |   |   |      |
| af1 |        | 4 | 4 | 0 | low  |
|     | normal |   |   |   |      |

### show class-of-service interface (ACX Series Routers)

```

user@host-g11# show class-of-service interface
Physical interface: at-0/0/0, Index: 130
Queues supported: 4, Queues in use: 4
  Scheduler map: <default>, Index: 2
  Congestion-notification: Disabled

Logical interface: at-0/0/0.0, Index: 69

Logical interface: at-0/0/0.32767, Index: 70

Physical interface: at-0/0/1, Index: 133
Queues supported: 4, Queues in use: 4
  Scheduler map: <default>, Index: 2
  Congestion-notification: Disabled

Logical interface: at-0/0/1.0, Index: 71

Logical interface: at-0/0/1.32767, Index: 72

Physical interface: ge-0/1/0, Index: 146
Queues supported: 8, Queues in use: 5
  Scheduler map: <default>, Index: 2
  Congestion-notification: Disabled
Object      Name                Type                Index
Rewrite     dscp-default        dscp                31
Classifier   dl                  dscp                11331
Classifier   ci                  ieee8021p           583

Logical interface: ge-0/1/0.0, Index: 73
Object      Name                Type                Index
Rewrite     custom-exp          exp (mpls-any)      46413

Logical interface: ge-0/1/0.1, Index: 74

Logical interface: ge-0/1/0.32767, Index: 75

Physical interface: ge-0/1/1, Index: 147
Queues supported: 8, Queues in use: 5
  Scheduler map: <default>, Index: 2
  Congestion-notification: Disabled
Object      Name                Type                Index
Classifier   ipprec-compatibility ip                    13

Logical interface: ge-0/1/1.0, Index: 76

Physical interface: ge-0/1/2, Index: 148

```



```

Queues supported: 8, Queues in use: 5
  Scheduler map: <default>, Index: 2
  Congestion-notification: Disabled
Object      Name      Type      Index
Rewrite     ri      ieee8021p (outer)  35392
Classifier   ci      ieee8021p      583

Physical interface: ge-0/1/3, Index: 149
Queues supported: 8, Queues in use: 5
  Scheduler map: <default>, Index: 2
  Congestion-notification: Disabled
Object      Name      Type      Index
Classifier   ipprec-compatibility ip      13

  Logical interface: ge-0/1/3.0, Index: 77
Object      Name      Type      Index
Rewrite     custom-exp2 exp (mpls-any)  53581

Physical interface: ge-0/1/4, Index: 150
Queues supported: 8, Queues in use: 5
  Scheduler map: <default>, Index: 2
  Congestion-notification: Disabled
Object      Name      Type      Index
Classifier   ipprec-compatibility ip      13

Physical interface: ge-0/1/5, Index: 151
Queues supported: 8, Queues in use: 5
  Scheduler map: <default>, Index: 2
  Congestion-notification: Disabled
Object      Name      Type      Index
Classifier   ipprec-compatibility ip      13

Physical interface: ge-0/1/6, Index: 152
Queues supported: 8, Queues in use: 5
  Scheduler map: <default>, Index: 2
  Congestion-notification: Disabled
Object      Name      Type      Index
Classifier   ipprec-compatibility ip      13

Physical interface: ge-0/1/7, Index: 153
Queues supported: 8, Queues in use: 5
  Scheduler map: <default>, Index: 2
  Congestion-notification: Disabled
Object      Name      Type      Index
Classifier   d1      dscp      11331

Physical interface: ge-0/2/0, Index: 154
Queues supported: 8, Queues in use: 5
  Scheduler map: <default>, Index: 2
  Congestion-notification: Disabled
Object      Name      Type      Index
Classifier   ipprec-compatibility ip      13

Physical interface: ge-0/2/1, Index: 155
Queues supported: 8, Queues in use: 5
  Scheduler map: <default>, Index: 2
  Congestion-notification: Disabled
Object      Name      Type      Index
Classifier   ipprec-compatibility ip      13

  Logical interface: ge-0/2/1.0, Index: 78

```

Logical interface: ge-0/2/1.32767, Index: 79

Physical interface: xe-0/3/0, Index: 156

Queues supported: 8, Queues in use: 5

Scheduler map: <default>, Index: 2

Congestion-notification: Disabled

| Object     | Name                 | Type | Index |
|------------|----------------------|------|-------|
| Classifier | ipprec-compatibility | ip   | 13    |

Logical interface: xe-0/3/0.0, Index: 80

Physical interface: xe-0/3/1, Index: 157

Queues supported: 8, Queues in use: 5

Scheduler map: <default>, Index: 2

Congestion-notification: Disabled

| Object     | Name                 | Type | Index |
|------------|----------------------|------|-------|
| Classifier | ipprec-compatibility | ip   | 13    |

Logical interface: xe-0/3/1.0, Index: 81

[edit]

user@host-g11#

## show class-of-service system-defaults

**Syntax** show class-of-service system-defaults

**Release Information** Command introduced in Junos OS Release 12.2 for the ACX Series Universal Access routers.

**Description** Display classifiers configured under **system-defaults**.

**Options** —This command has no options.

### Additional Information

**Required Privilege Level** view

**Related Documentation**

- *system-defaults*

**List of Sample Output** [show class-of-service system-defaults on page 627](#)

**Output Fields** [Table 44 on page 627](#) describes the output fields for the **show class-of-service system-defaults** command. Output fields are listed in the order in which they appear.

**Table 44: show class-of-service system-defaults Output Fields**

| Field Name | Field Description                                       |
|------------|---------------------------------------------------------|
| Object     | Category of an object: <b>Classifier</b>                |
| Name       | Name of an object                                       |
| Type       | Type of an object: <b>exp</b> is the only type allowed. |
| Index      | Index of the indicated classifier                       |

### Sample Output

#### show class-of-service system-defaults

```

user@host#show class-of-service system-defaults
Object      Name      Type      Index
Classifier  e1        exp       9280

```

## show interfaces (ATM)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show interfaces at-<i>fpc/pic/port</i> &lt;brief   detail   extensive   terse&gt; &lt;descriptions&gt; &lt;media&gt; &lt;snmp-index <i>snmp-index</i>&gt; &lt;statistics&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Description</b>              | (M Series and T Series routers only) Display status information about the specified ATM interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Options</b>                  | <p><b>at-<i>fpc/pic/port</i></b>—Display standard information about the specified ATM interface.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>descriptions</b>—(Optional) Display interface description strings.</p> <p><b>media</b>—(Optional) Display media-specific information about network interfaces.</p> <p><b>snmp-index <i>snmp-index</i></b>—(Optional) Display the SNMP index of the interface.</p> <p><b>statistics</b>—(Optional) Display static interface statistics.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>List of Sample Output</b>    | <p><a href="#">show interfaces (ATM, IMA Group) on page 643</a></p> <p><a href="#">show interfaces extensive (ATM IMA Group) on page 644</a></p> <p><a href="#">show interfaces (ATM1, SONET Mode) on page 645</a></p> <p><a href="#">show interfaces brief (ATM1, SONET Mode) on page 646</a></p> <p><a href="#">show interfaces detail (ATM1, SONET Mode) on page 646</a></p> <p><a href="#">show interfaces extensive (ATM1, SONET Mode) on page 647</a></p> <p><a href="#">show interfaces (ATM2, SDH Mode) on page 649</a></p> <p><a href="#">show interfaces brief (ATM2, SDH Mode) on page 650</a></p> <p><a href="#">show interfaces detail (ATM2, SDH Mode) on page 651</a></p> <p><a href="#">show interfaces extensive (ATM2, SDH Mode) on page 652</a></p> <p><a href="#">show interfaces (ATM2, SONET Mode) on page 655</a></p> <p><a href="#">show interfaces brief (ATM2, SONET Mode) on page 656</a></p> <p><a href="#">show interfaces detail (ATM2, SONET Mode) on page 657</a></p> <p><a href="#">show interfaces extensive (ATM2, SONET Mode) on page 659</a></p> |
| <b>Output Fields</b>            | <p><a href="#">Table 45 on page 628</a> lists the output fields for the <b>show interfaces (ATM)</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

Table 45: ATM show interfaces Output Fields

| Field Name         | Field Description | Level of Output |
|--------------------|-------------------|-----------------|
| Physical Interface |                   |                 |

Table 45: ATM show interfaces Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Level of Output              |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Physical interface</b> | Name of the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | All levels                   |
| <b>Enabled</b>            | State of the interface. Possible values are described in the “Enabled Field” section under <i>Common Output Fields Description</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | All levels                   |
| <b>Description</b>        | Configured interface description.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | All levels                   |
| <b>Interface index</b>    | Physical interface's index number, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive</b> none |
| <b>SNMP ifIndex</b>       | SNMP index number for the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive</b> none |
| <b>Generation</b>         | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive</b>      |
| <b>Link-level type</b>    | Encapsulation being used on the physical interface: <ul style="list-style-type: none"> <li>• <b>ATM-CCC-CELL-RELAY</b>—ATM cell relay for CCC.</li> <li>• <b>ATM-CCC-VC-MUX</b>—ATM virtual circuit (VC) for CCC.</li> <li>• <b>ATM-CISCO-NLPID</b>—Cisco-compatible ATM NLPID encapsulation.</li> <li>• <b>ATM-MIPP-LLC</b>—ATM MLPPP over ATM Adaptation Layer 5 (AAL5)/logical link control (LLC).</li> <li>• <b>ATM-NLPID</b>—ATM NLPID encapsulation.</li> <li>• <b>ATM-PPP-LLC</b>—ATM PPP over AAL5/LLC.</li> <li>• <b>ATM-PPP-VC-MUX</b>—ATM PPP over raw AAL5.</li> <li>• <b>ATM-PVC</b>—ATM permanent virtual circuits.</li> <li>• <b>ATM-SNAP</b>—ATM LLC/SNAP encapsulation.</li> <li>• <b>ATM-TCC-SNAP</b>—ATM LLC/SNAP for translational cross-connection.</li> <li>• <b>ATM-TCC-VC-MUX</b>—ATM VC for translational cross-connection.</li> <li>• <b>ATM-VC-MUX</b>—ATM VC multiplexing.</li> <li>• <b>ETHER-OVER-ATM-LLC</b>—Ethernet over ATM (LLC/SNAP) encapsulation.</li> <li>• <b>ETHER-VPLS-OVER-ATM-LLC</b>—Ethernet VPLS over ATM (bridging) encapsulation.</li> </ul> | All levels                   |
| <b>MTU</b>                | MTU size on the physical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | All levels                   |
| <b>Clocking</b>           | Reference clock source: <b>Internal</b> or <b>External</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | All levels                   |
| <b>framing Mode</b>       | Framing mode: <b>SONET</b> or <b>SDH</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | All levels                   |
| <b>Speed</b>              | Speed at which the interface is running as represented by the interface type (for example, <b>OC3</b> , <b>ADSL2+</b> , and <b>SHDSL(2-wire)</b> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | All levels                   |
| <b>Loopback</b>           | Whether loopback is enabled and the type of loopback ( <b>local</b> or <b>remote</b> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | All levels                   |
| <b>Payload scrambler</b>  | Whether payload scrambling is enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | All levels                   |
| <b>Device flags</b>       | Information about the physical device. Possible values are described in the “Device Flags” section under <i>Common Output Fields Description</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | All levels                   |

Table 45: ATM show interfaces Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Level of Output              |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Link flags</b>              | Information about the link. Possible values are described in the “Link Flags” section under <i>Common Output Fields Description</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | All levels                   |
| <b>CoS queues</b>              | Number of CoS queues configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive none</b> |
| <b>Hold-times</b>              | Current interface hold-time up and hold-time down, in milliseconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive</b>      |
| <b>Current address</b>         | Ethernet MAC address for this interface for Ethernet over ATM encapsulation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive none</b> |
| <b>Last flapped</b>            | Date, time, and how long ago the interface went from down to up. The format is <b>Last flapped: year-month-day hour:minute:second timezone (hour:minute:second ago)</b> . For example, <b>Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago)</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive none</b> |
| <b>Input Rate</b>              | Input rate in bits per second (bps) and packets per second (pps).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | None specified               |
| <b>Output Rate</b>             | Output rate in bps and pps.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | None specified               |
| <b>Statistics last cleared</b> | Time when the statistics for the interface were last set to zero.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive</b>      |
| <b>Traffic statistics</b>      | Statistics for traffic on the interface. <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive</b>      |
| <b>Input errors</b>            | Input errors on the interface whose definitions are as follows: <ul style="list-style-type: none"> <li>• <b>Errors</b>—Sum of the incoming frame aborts and frame check sequence (FCS) errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's random early detection (RED) mechanism.</li> <li>• <b>Invalid VCs</b>—Number of cells that arrived for a nonexistent VC.</li> <li>• <b>Framing errors</b>—Sum of AAL5 packets that have FCS errors, reassembly timeout errors, and length errors.</li> <li>• <b>Policed discards</b>—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle.</li> <li>• <b>L3 incompletes</b>—Number of incoming packets discarded because they failed Layer 3 (usually IPv4) sanity checks of the header. For example, a frame with less than 20 bytes of available IP header is discarded.</li> <li>• <b>L2 channel errors</b>—Number of times the software did not find a valid logical interface for an incoming frame.</li> <li>• <b>L2 mismatch timeouts</b>—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b>             |

Table 45: ATM show interfaces Output Fields (*continued*)

| Field Name                                  | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Level of Output              |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Output errors</b>                        | <p>Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Carrier transitions</b>—Number of times the interface has gone from <b>down</b> to <b>up</b>. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and up, or another problem occurs. If the number of carrier transitions increments quickly, increasing only when the cable is unplugged, the far-end system is powered down and then up, or another problem occurs. If it increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC or PIM is malfunctioning.</li> <li>• <b>Errors</b>—Sum of the outgoing frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Aged packets</b>—Number of packets that remained so long in shared packet SDRAM that the system automatically purged them. The value in this field should never increment. If it does, it is most likely a software bug or possibly malfunctioning hardware.</li> <li>• <b>MTU errors</b>—Number of packets larger than the MTU threshold.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b>             |
| <b>Egress queues</b>                        | Total number of egress queues supported on the specified interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>detail extensive</b>      |
| <b>Queue counters</b>                       | <p>CoS queue number and its associated user-configured forwarding class name.</p> <ul style="list-style-type: none"> <li>• <b>Queued packets</b>—Number of queued packets.</li> <li>• <b>Transmitted packets</b>—Number of transmitted packets.</li> <li>• <b>Dropped packets</b>—Number of packets dropped by the ASIC's RED mechanism.</li> </ul> <p><b>NOTE:</b> Physical interface queue counters of ATM2 PICs displayed by the <b>show interfaces at-fpc/pic/port detail</b> command show the packet forwarding stream statistics associated with the ATM2 ports. Since multiple ports of the ATM2 PICs (except for the ATM2 dual-port OC12) share one packet forwarding stream, the physical interface queue counters reflect the aggregate of ATM2 port statistics.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive</b>      |
| <b>SONET alarms</b><br><b>SONET defects</b> | <p>SONET media-specific defects that prevent the interface from passing packets. When a defect persists for a certain period, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router or light the red or yellow alarm LED on the craft interface. See these fields for possible alarms and defects: <b>SONET PHY</b>, <b>SONET section</b>, <b>SONET line</b>, and <b>SONET path</b>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive none</b> |

Table 45: ATM show interfaces Output Fields (*continued*)

| Field Name           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Level of Output  |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>SONET PHY</b>     | <p>Counts of specific SONET errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>PLL Lock</b>—Phase-locked loop</li> <li>• <b>PHY Light</b>—Loss of optical signal</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>extensive</b> |
| <b>SONET section</b> | <p>Counts of specific SONET errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>BIP-B1</b>—Bit interleaved parity for SONET section overhead</li> <li>• <b>SEF</b>—Severely errored framing</li> <li>• <b>LOL</b>—Loss of light</li> <li>• <b>LOF</b>—Loss of frame</li> <li>• <b>ES-S</b>—Errored seconds (section)</li> <li>• <b>SES-S</b>—Severely errored seconds (section)</li> <li>• <b>SEFS-S</b>—Severely errored framing seconds (section)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>extensive</b> |
| <b>SONET line</b>    | <p>Active alarms and defects, plus counts of specific SONET errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>BIP-B2</b>—Bit interleaved parity for SONET line overhead</li> <li>• <b>REI-L</b>—Remote error indication (near-end line)</li> <li>• <b>RDI-L</b>—Remote defect indication (near-end line)</li> <li>• <b>AIS-L</b>—Alarm indication signal (near-end line)</li> <li>• <b>BERR-SF</b>—Bit error rate fault signal failure</li> <li>• <b>BERR-SD</b>—Bit error rate defect signal degradation</li> <li>• <b>ES-L</b>—Errored seconds (near-end line)</li> <li>• <b>SES-L</b>—Severely errored seconds (near-end line)</li> <li>• <b>UAS-L</b>—Unavailable seconds (near-end line)</li> <li>• <b>ES-LFE</b>—Errored seconds (far-end line)</li> <li>• <b>SES-LFE</b>—Severely errored seconds (far-end line)</li> <li>• <b>UAS-LFE</b>—Unavailable seconds (far-end line)</li> </ul> | <b>extensive</b> |



Table 45: ATM show interfaces Output Fields (*continued*)

| Field Name                                                              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Level of Output  |
|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>SONET path</b>                                                       | <p>Active alarms and defects, plus counts of specific SONET errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>BIP-B3</b>—Bit interleaved parity for SONET section overhead</li> <li>• <b>REI-P</b>—Remote error indication</li> <li>• <b>LOP-P</b>—Loss of pointer (path)</li> <li>• <b>AIS-P</b>—Path alarm indication signal</li> <li>• <b>RDI-P</b>—Path remote defect indication</li> <li>• <b>UNEQ-P</b>—Path unequipped</li> <li>• <b>PLM-P</b>—Path payload (signal) label mismatch</li> <li>• <b>ES-P</b>—Errored seconds (near-end STS path)</li> <li>• <b>SES-P</b>—Severely errored seconds (near-end STS path)</li> <li>• <b>UAS-P</b>—Unavailable seconds (near-end STS path)</li> <li>• <b>ES-PFE</b>—Errored seconds (far-end STS path)</li> <li>• <b>SES-PFE</b>—Severely errored seconds (far-end STS path)</li> <li>• <b>UAS-PFE</b>—Unavailable seconds (far-end STS path)</li> </ul> | <b>extensive</b> |
| <b>Received SONET overhead</b><br><br><b>Transmitted SONET overhead</b> | <p>Values of the received and transmitted SONET overhead:</p> <ul style="list-style-type: none"> <li>• <b>C2</b>—Signal label. Allocated to identify the construction and content of the STS-level SPE and for PDI-P.</li> <li>• <b>F1</b>—Section user channel byte. This byte is set aside for the purposes of users.</li> <li>• <b>K1 and K2</b>—These bytes are allocated for APS signaling for the protection of the multiplex section.</li> <li>• <b>J0</b>—Section trace. This byte is defined for STS-1 number 1 of an STS-<i>N</i> signal. Used to transmit a 1-byte fixed-length string or a 16-byte message so that a receiving terminal in a section can verify its continued connection to the intended transmitter.</li> <li>• <b>S1</b>—Synchronization status. The S1 byte is located in the first STS-1 of an STS-<i>N</i>.</li> <li>• <b>Z3 and Z4</b>—Allocated for future use.</li> </ul>                                                                                                                                                                                                                                                                                                                                                         | <b>extensive</b> |
| <b>SDH alarms</b><br><br><b>SDH defects</b>                             | <p>SDH media-specific defects that can prevent the interface from passing packets. When a defect persists for a certain period, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router or light the red or yellow alarm LED on the craft interface. See these fields for possible alarms and defects: <b>SDH PHY</b>, <b>SDH regenerator section</b>, <b>SDH multiplex section</b>, and <b>SDH path</b>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | All levels       |

Table 45: ATM show interfaces Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Level of Output  |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>SDH PHY</b>                 | <p>Active alarms and defects, plus counts of specific SDH errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>PLL Lock</b>—Phase-locked loop</li> <li>• <b>PHY Light</b>—Loss of optical signal</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>extensive</b> |
| <b>SDH regenerator section</b> | <p>Active alarms and defects, plus counts of specific SDH errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>RS-BIP8</b>—24-bit BIP for multiplex section overhead (B2 bytes)</li> <li>• <b>OOF</b>—Out of frame</li> <li>• <b>LOS</b>—Loss of signal</li> <li>• <b>LOF</b>—Loss of frame</li> <li>• <b>RS-ES</b>—Errored seconds (near-end regenerator section)</li> <li>• <b>RS-SES</b>—Severely errored seconds (near-end regenerator section)</li> <li>• <b>RS-SEFS</b>—Severely errored framing seconds (regenerator section)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>extensive</b> |
| <b>SDH multiplex section</b>   | <p>Active alarms and defects, plus counts of specific SDH errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>MS-BIP24</b>—8-bit BIP for high-order path overhead (B3 byte)</li> <li>• <b>MS-FEBE</b>—Far-end block error (multiplex section)</li> <li>• <b>MS-FERF</b>—Far-end remote fail (multiplex section)</li> <li>• <b>MS-AIS</b>—Alarm indication signal (multiplex section)</li> <li>• <b>BERR-SF</b>—Bit error rate fault (signal failure)</li> <li>• <b>BERR-SD</b>—Bit error rate defect (signal degradation)</li> <li>• <b>MS-ES</b>—Errored seconds (near-end multiplex section)</li> <li>• <b>MS-SES</b>—Severely errored seconds (near-end multiplex section)</li> <li>• <b>MS-UAS</b>—Unavailable seconds (near-end multiplex section)</li> <li>• <b>MS-ES-FE</b>—Errored seconds (far-end multiplex section)</li> <li>• <b>MS-SES-FE</b>—Severely errored seconds (far-end multiplex section)</li> <li>• <b>MS-UAS-FE</b>—Unavailable seconds (far-end multiplex section)</li> </ul> | <b>extensive</b> |

Table 45: ATM show interfaces Output Fields (*continued*)

| Field Name                                                          | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Level of Output  |
|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>SDH path</b>                                                     | <p>Active alarms and defects, plus counts of specific SDH errors with detailed information.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.</li> </ul> <p>Subfields are:</p> <ul style="list-style-type: none"> <li>• <b>HP-BIP8</b>—8-bit BIP for regenerator section overhead (B1 byte)</li> <li>• <b>HP-FEBE</b>—Far-end block error (high-order path)</li> <li>• <b>HP-LOP</b>—Loss of pointer (high-order path)</li> <li>• <b>HP-AIS</b>—High-order-path alarm indication signal</li> <li>• <b>HP-FERF</b>—Far-end remote fail (high-order path)</li> <li>• <b>HP-UNEQ</b>—Unequipped (high-order path)</li> <li>• <b>HP-PLM</b>—Payload label mismatch (high-order path)</li> <li>• <b>HP-ES</b>—Errored seconds (near-end high-order path)</li> <li>• <b>HP-SES</b>—Severely errored seconds (near-end high-order path)</li> <li>• <b>HP-UAS</b>—Unavailable seconds (near-end high-order path)</li> <li>• <b>HP-ES-FE</b>—Errored seconds (far-end high-order path)</li> <li>• <b>HP-SES-FE</b>—Severely errored seconds (far-end high-order path)</li> <li>• <b>HP-UAS-FE</b>—Unavailable seconds (far-end high-order path)</li> </ul> | <b>extensive</b> |
| <b>Received SDH overhead</b><br><br><b>Transmitted SDH overhead</b> | <p>Values of the received and transmitted SONET overhead:</p> <ul style="list-style-type: none"> <li>• <b>C2</b>—Signal label. This byte is allocated to identify the construction and content of the STS-level SPE and for PDI-P.</li> <li>• <b>F1</b>—Section user channel byte. This byte is set aside for the purposes of users.</li> <li>• <b>K1</b> and <b>K2</b>—These bytes are allocated for APS signaling for the protection of the multiplex section.</li> <li>• <b>J0</b>—Section trace. This byte is defined for STS-1 number 1 of an STS-<i>N</i> signal. This byte is used to transmit a 1-byte fixed-length string or a 16-byte message so that a receiving terminal in a section can verify its continued connection to the intended transmitter.</li> <li>• <b>S1</b>—Synchronization status. The S1 byte is located in the first STS-1 of an STS-<i>N</i>.</li> <li>• <b>Z3</b> and <b>Z4</b>—These bytes are allocated for future use.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>extensive</b> |
| <b>Received path trace</b><br><br><b>Transmitted path trace</b>     | <p>SONET/SDH interfaces allow path trace bytes to be sent inband across the SONET/SDH link. Juniper Networks and other router manufacturers use these bytes to help diagnose misconfigurations and network errors by setting the transmitted path trace message so that it contains the system hostname and name of the physical interface. The received path trace value is the message received from the router at the other end of the fiber. The transmitted path trace value is the message that this router transmits.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>extensive</b> |

Table 45: ATM show interfaces Output Fields (*continued*)

| Field Name        | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                               | Level of Output  |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>ATM Status</b> | ATM state information: <ul style="list-style-type: none"><li>• <b>HCS State</b>—Status of the header check sequence. ATM uses the HCS field in the cell header in the cell delineation process to frame ATM cell boundaries. The HCS is an FCS-8 calculation over the first four octets of the ATM cell header.</li><li>• <b>LOC</b>—Current loss of cell (LOC) delineation state. <b>OK</b> means that no LOC is currently asserted.</li></ul> | <b>extensive</b> |

Table 45: ATM show interfaces Output Fields (*continued*)

| Field Name                             | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Level of Output |
|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| ATM Statistics                         | <p>ATM statistics for the interface:</p> <ul style="list-style-type: none"> <li>• <b>Uncorrectable HCS errors</b>—Number of cells dropped because the cell delineation failed. These errors most likely indicate that a SONET/SDH layer problem has occurred.</li> <li>• <b>Correctable HCS errors</b>—Number of correctable HCS errors that occurred. The cell delineation process can recover from these errors and locate the ATM cell boundary, although the framing process is not quite stable. The ATM cell is not dropped. This counter increases when the cell delineation process changes its state from <b>present</b> to <b>sync</b> (for example, when a cable is plugged into the interface).</li> </ul> <p>The following error statistics are from the framer:</p> <ul style="list-style-type: none"> <li>• <b>Tx cell FIFO overruns</b>—Number of overruns in the transmit FIFO.</li> <li>• <b>Rx cell FIFO overruns</b>—Number of overruns in the receive FIFO.</li> <li>• <b>Rx cell FIFO underruns</b>—Number of underruns in the receive FIFO.</li> <li>• <b>Input cell count</b>—Number of ATM cells received by the interface (not including idle cells).</li> <li>• <b>Output cell count</b>—Number of ATM cells transmitted by the interface (including idle cells).</li> <li>• <b>Output idle cell count</b>—Number of idle cells sent by the port. When ATM has nothing to send, it sends idle cells to fill the time slot.</li> <li>• <b>Output VC queue drops</b>—Number of packets dropped by a port on the PIC. Packets are dropped because of queue limits on the VCs.</li> </ul> <p>The following error statistics are from the SAR:</p> <ul style="list-style-type: none"> <li>• <b>Input no buffers</b>—Number of AAL5 packets dropped because no channel blocks or buffers were available to handle them.</li> <li>• <b>Input length errors</b>—Number of AAL5 packets dropped because their length was incorrect. Usually, these errors occur because a cell has been corrupted or lost, or because the length field was corrupted. They can also mean the AAL5 length field was zero.</li> <li>• <b>Input timeouts</b>—Number of AAL5 packets dropped because of a reassembly timeout.</li> <li>• <b>Input invalid VCs</b>—Number of AAL5 packets dropped because the header was unrecognized (because the VC was not correct or not configured).</li> <li>• <b>Input bad CRCs</b>—Number of AAL5 packets dropped because of frame check sequence errors.</li> <li>• <b>Input OAM cell no buffers</b>—Number of received OAM cells or raw cells dropped because no buffers were available to handle them.</li> <li>• <b>L2 circuit out-of-sequence packets</b>—(Layer 2 AAL5 mode) Number of AAL5 packets that are out of sequential order.</li> <li>• <b>Denied packets count</b>—The number of packets dropped due to VLAN priority deny packets or due to an error forwarding configuration that might cause a negative frame length, that is, the stripping size is larger than the packet size.</li> </ul> | extensive       |
| Packet Forwarding Engine configuration | <p>Information about the configuration of the Packet Forwarding Engine:</p> <ul style="list-style-type: none"> <li>• <b>Destination slot</b>—FPC slot number.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | extensive       |

Table 45: ATM show interfaces Output Fields (*continued*)

| Field Name      | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Level of Output |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| CoS information | <p>Information about the CoS queue for the physical interface.</p> <ul style="list-style-type: none"><li>• <b>CoS transmit queue</b>—Queue number and its associated user-configured forwarding class name.</li><li>• <b>Bandwidth %</b>—Percentage of bandwidth allocated to the queue.</li><li>• <b>Bandwidth bps</b>—Bandwidth allocated to the queue (in bps).</li><li>• <b>Buffer %</b>—Percentage of buffer space allocated to the queue.</li><li>• <b>Buffer usec</b>—Amount of buffer space allocated to the queue, in microseconds. This value is nonzero only if the buffer size is configured in terms of time.</li><li>• <b>Priority</b>—Queue priority: <b>low</b> or <b>high</b>.</li><li>• <b>Limit</b>—Displayed if rate limiting is configured for the queue. Possible values are <b>none</b> and <b>exact</b>. If <b>exact</b> is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If <b>none</b> is configured, the queue transmits beyond the configured bandwidth if bandwidth is available.</li></ul> | extensive       |

Table 45: ATM show interfaces Output Fields (*continued*)

| Field Name               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Level of Output       |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| VPI                      | <p>(ATM2) Virtual path identifier information:</p> <ul style="list-style-type: none"> <li>• <b>Flags</b>—VPI flags can be one or more of the following: <ul style="list-style-type: none"> <li>• <b>Active</b> (virtual path is up)</li> <li>• <b>OAM</b> (operation and maintenance is enabled)</li> <li>• <b>Shaping</b> (shaping is configured)</li> </ul> </li> <li>• <b>CBR, Peak</b></li> <li>• <b>OAM, Period</b>—Interval at which OAM F4 loopback cells are sent.</li> <li>• <b>Up count</b>—Number of F4 OAM cells required to consider the virtual path up; the range is 1 through 255.</li> <li>• <b>Down count</b>—Number of F4 OAM cells required to consider the virtual path down; the range is 1 through 255.</li> <li>• <b>Total down time</b>—Total number of seconds the VPI has been down since it was opened, using the format <b>Total down time: hh:mm:ss</b> or <b>Never</b>.</li> <li>• <b>Last down</b>—Time of last <b>Down</b> transition, using the format <b>Last down: hh:mm:ss ago</b> or <b>Never</b>.</li> <li>• <b>OAM F4 cell statistics</b>—(Nonpromiscuous mode) OAM F4 statistics: <ul style="list-style-type: none"> <li>• <b>Total received</b>—Number of OAM F4 cells received.</li> <li>• <b>Total sent</b>—Number of OAM F4 cells sent.</li> <li>• <b>Loopback received</b>—Number of OAM F4 loopback cells received.</li> <li>• <b>Loopback sent</b>—Number of OAM F4 loopback cells sent.</li> <li>• <b>Last received</b>—Time at which the last OAM F4 cell was received.</li> <li>• <b>Last sent</b>—Time at which the last OAM F4 cell was sent.</li> <li>• <b>RDI received</b>—Number of OAM F4 cells received with the remote defect indication bit set.</li> <li>• <b>RDI sent</b>—Number of OAM F4 cells sent with the RDI bit set.</li> <li>• <b>AIS received</b>—Number of OAM F4 cells received with the alarm indication signal bit set.</li> <li>• <b>AIS sent</b>—Number of OAM F4 cells sent with the AIS bit set.</li> </ul> </li> </ul> <p><b>Traffic statistics:</b></p> <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the VPI.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the VPI.</li> <li>• <b>Input packets</b>—Number of packets received on the VPI.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the VPI.</li> </ul> | detail extensive none |
| <b>Logical Interface</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |
| Logical interface        | Name of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | All levels            |
| Index                    | Logical interface index number, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | detail extensive none |
| SNMP ifIndex             | Logical interface SNMP interface index number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | detail extensive none |
| Generation               | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | detail extensive      |

Table 45: ATM show interfaces Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                              | Level of Output              |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Flags</b>              | Information about the logical interface. Possible values are described in the "Logical Interface Flags" section under <i>Common Output Fields Description</i> .                                                                                                                                                                                                | All levels                   |
| <b>Input packets</b>      | Number of packets received on the logical interface.                                                                                                                                                                                                                                                                                                           | None specified               |
| <b>Output packets</b>     | Number of packets transmitted on the logical interface.                                                                                                                                                                                                                                                                                                        | None specified               |
| <b>Encapsulation</b>      | Encapsulation on the logical interface.                                                                                                                                                                                                                                                                                                                        | All levels                   |
| <b>Traffic statistics</b> | Total number of bytes and packets received and transmitted on the logical interface. These statistics are the sum of the local and transit statistics. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes a while (generally, less than 1 second) for this counter to stabilize. | <b>detail extensive</b>      |
| <b>Local statistics</b>   | Statistics for traffic received from and transmitted to the Routing Engine. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes a while (generally, less than 1 second) for this counter to stabilize.                                                                            | <b>detail extensive</b>      |
| <b>Transit statistics</b> | Statistics for traffic transiting the router. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes a while (generally, less than 1 second) for this counter to stabilize.                                                                                                          | <b>detail extensive</b>      |
| <b>Input packets</b>      | Number of packets received on the logical interface.                                                                                                                                                                                                                                                                                                           | None specified               |
| <b>Output packets</b>     | Number of packets transmitted on the logical interface.                                                                                                                                                                                                                                                                                                        | None specified               |
| <b>protocol-family</b>    | Protocol family configured on the logical interface. If the protocol is <b>inet</b> , the IP address of the interface is also displayed.                                                                                                                                                                                                                       | <b>brief</b>                 |
| <b>Protocol</b>           | Protocol family configured on the logical interface.                                                                                                                                                                                                                                                                                                           | <b>detail extensive none</b> |
| <b>MTU</b>                | MTU size on the logical interface.                                                                                                                                                                                                                                                                                                                             | <b>detail extensive none</b> |
| <b>Generation</b>         | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                              | <b>detail extensive</b>      |
| <b>Route table</b>        | Routing table in which the logical interface address is located. For example, <b>0</b> refers to the routing table inet.0.                                                                                                                                                                                                                                     | <b>detail extensive</b>      |
| <b>Flags</b>              | Information about the protocol family flags. Possible values are described in the "Family Flags" section under <i>Common Output Fields Description</i> .                                                                                                                                                                                                       | <b>detail extensive none</b> |
| <b>Addresses, Flags</b>   | Information about the address flags. Possible values are described in the "Addresses Flags" section under <i>Common Output Fields Description</i> .                                                                                                                                                                                                            | <b>detail extensive none</b> |
| <b>Destination</b>        | IP address of the remote side of the connection.                                                                                                                                                                                                                                                                                                               | <b>detail extensive none</b> |
| <b>Local</b>              | IP address of the logical interface.                                                                                                                                                                                                                                                                                                                           | <b>detail extensive none</b> |



Table 45: ATM show interfaces Output Fields (*continued*)

| Field Name        | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Level of Output              |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Broadcast</b>  | Broadcast address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive none</b> |
| <b>Generation</b> | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive</b>      |
| <b>VCI</b>        | Virtual circuit identifier number and information: <ul style="list-style-type: none"> <li>• <b>Flags</b>—VCI flags:               <ul style="list-style-type: none"> <li>• <b>Active</b>—VCI is up and in working condition.</li> <li>• <b>CCC down</b>—VCI CCC is not in working condition.</li> <li>• <b>Closed</b>—VCI is closed because the user disabled the logical or physical interface from the CLI.</li> <li>• <b>Configured</b>—VCI is configured.</li> <li>• <b>Down</b>—VCI is not in working condition. The VCI might have alarms, defects, F5 AIS/RDI, or no response to OAM loopback cells.</li> <li>• <b>ILMI</b>—VCI is up and in working condition.</li> <li>• <b>OAM</b>—OAM loopback is enabled.</li> <li>• <b>Multicast</b>—VCI is a multicast VCI or DLCI.</li> <li>• <b>Multipoint destination</b>—VCI is configured as a multipoint destination.</li> <li>• <b>None</b>—No VCI flags.</li> <li>• <b>Passive-OAM</b>—Passive OAM is enabled.</li> <li>• <b>Shaping</b>—Shaping is enabled.</li> <li>• <b>Sustained</b>—Shaping rate is set to <b>Sustained</b>.</li> <li>• <b>Unconfigured</b>—VCI is not configured.</li> </ul> </li> <li>• <b>Total down time</b>—Total number of seconds the VCI has been down, using the format <b>Total down time: hh:mm:ss</b> or <b>Never</b>.</li> <li>• <b>Last down</b>—Time of last <b>Down</b> transition, using the format <b>Last down: hh:mm:ss</b>.</li> <li>• <b>EPD threshold</b>—(ATM2 only) Threshold at which a packet is dropped when the queue size (in number of cells) exceeds the early packet-discard (EPD) value.</li> </ul> | All levels                   |

Table 45: ATM show interfaces Output Fields (*continued*)

| Field Name           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Level of Output       |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| VCI (continued)      | <ul style="list-style-type: none"> <li>• <b>Transmit weight cells</b>—(ATM2 only) Amount of bandwidth assigned to this queue.</li> <li>• <b>ATM per-VC transmit statistics:</b> <ul style="list-style-type: none"> <li>• <b>Tail queue packet drops</b>—Number of packets dropped because of bandwidth constraints. This value indicates that packets are queued to send out at a rate faster than allowed.</li> </ul> </li> <li>• <b>OAM F4 cell statistics</b>—(Nonpromiscuous mode) OAM F4 statistics: <ul style="list-style-type: none"> <li>• <b>Total received</b>—Number of OAM F4 cells received.</li> <li>• <b>Total sent</b>—Number of OAM F4 cells sent.</li> <li>• <b>Loopback received</b>—Number of OAM F4 loopback cells received.</li> <li>• <b>Loopback sent</b>—Number of OAM F4 loopback cells sent.</li> <li>• <b>Last received</b>—Time at which the last OAM F4 cell was received.</li> <li>• <b>Last sent</b>—Time at which the last OAM F4 cell was sent.</li> <li>• <b>RDI received</b>—Number of OAM F4 cells received with the remote defect indication bit set.</li> <li>• <b>RDI sent</b>—Number of OAM F4 cells sent with the RDI bit set.</li> <li>• <b>AIS received</b>—Number of OAM F4 cells received with the alarm indication signal bit set.</li> <li>• <b>AIS sent</b>—Number of OAM F4 cells sent with the AIS bit set.</li> </ul> </li> <li>• <b>Traffic statistics</b>—Number and rate of bytes and packets received and transmitted on the physical interface. <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul> </li> </ul> | All levels            |
| IMA group properties | <ul style="list-style-type: none"> <li>• <b>Version</b>—The specified IMA specification version, either IMA 1.0 or IMA 1.1.</li> <li>• <b>Frame length</b>—The specified frame size, which can be 32, 64, 128, or 256.</li> <li>• <b>Differential delay</b>—Maximum differential delay among links in milliseconds.</li> <li>• <b>Symmetry</b>—Either Common Transmit Clock or Independent Transmit Clock timing mode.</li> <li>• <b>Transmit clock</b>—The specified IMA clock mode, either common or independent.</li> <li>• <b>Minimum links</b>—The number of minimum active links specified in both transmit and receive directions. <ul style="list-style-type: none"> <li>• <b>Transmit</b>—The per-PIC limit on the number of minimum active links in the transmit direction.</li> <li>• <b>Receive</b>—The per-PIC limit on the number of minimum active links in the receive direction.</li> </ul> </li> <li>• <b>Frame synchronization</b>—The specified IMA frame synchronization state transition variables (Alpha, Beta, and Gamma) and their specified values. <ul style="list-style-type: none"> <li>• <b>Alpha</b>—The number of consecutive invalid ICP cells for IFSM.</li> <li>• <b>Beta</b>—The number of consecutive errored ICP cells for IFSM.</li> <li>• <b>Gamma</b>—The number of consecutive valid ICP cells for IFSM.</li> </ul> </li> <li>• <b>Links</b>—The number of IMA links assigned to the IMA group.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                             | detail extensive none |

Table 45: ATM show interfaces Output Fields (*continued*)

| Field Name        | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Level of Output       |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| IMA group alarms  | <ul style="list-style-type: none"> <li>• <b>Start-up-FE</b>—Far-end group alarm status</li> <li>• <b>Config-Aborted</b>—Near-end configuration aborted group alarm status</li> <li>• <b>Config-Aborted-FE</b>—Far-end configuration aborted group alarm status</li> <li>• <b>Insufficient-Links</b>—Near-end insufficient links group alarm status</li> <li>• <b>Insufficient-Links-FE</b>—Far-end insufficient links group alarm status</li> <li>• <b>Blocked-FE</b>—Far-end blocked group alarm status</li> <li>• <b>GR-Timing-Mismatch</b>—Group timing mismatch alarm status</li> </ul>        | detail extensive none |
| IMA group defects | <ul style="list-style-type: none"> <li>• <b>Start-up-FE</b>—Far-end group defect status</li> <li>• <b>Config-Aborted</b>—Near-end configuration aborted group defect status</li> <li>• <b>Config-Aborted-FE</b>—Far-end configuration aborted group defect status</li> <li>• <b>Insufficient-Links</b>—Near-end insufficient links group defect status</li> <li>• <b>Insufficient-Links-FE</b>—Far-end insufficient links group defect status</li> <li>• <b>Blocked-FE</b>—Far-end blocked group defect status</li> <li>• <b>GR-Timing-Mismatch</b>—Group timing mismatch defect status</li> </ul> | detail extensive none |
| IMA Group state   | Near-end and far-end group status                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | detail extensive none |
| IMA group media   | <p>IMA group media status, including seconds, count and state for the following media parameters:</p> <ul style="list-style-type: none"> <li>• FC</li> <li>• FC-FE</li> <li>• Addr-Mismatch</li> <li>• Running</li> <li>• UAS</li> </ul>                                                                                                                                                                                                                                                                                                                                                           | detail extensive none |

## Sample Output

### show interfaces (ATM, IMA Group)

```

user@host> show interfaces at-1/0/0
Physical interface: at-1/0/0, Enabled, Physical link is Up
  IMA group properties:
    Version           : 1.1
    Frame length      : 128
    Differential delay : 25 milliseconds
    Symmetry          : Symmetrical Configuration and Operation
    Transmit clock     : Common
    Minimum links      : Transmit: 1, Receive: 1
    Frame synchronization: Alpha: 2, Beta: 2, Gamma: 1
    Links              : None
  IMA group alarms   : Start-up-FE Config-Aborted Config-Aborted-FE
  Insufficient-Links Insufficient-Links-FE Blocked-FE GR-Timing-Mismatch
  IMA group defects  : Start-up-FE Config-Aborted Config-Aborted-FE
  Insufficient-Links Insufficient-Links-FE Blocked-FE GR-Timing-Mismatch
  IMA Group state:
    Near end : Start up
    Far end  : Start up
  IMA group media:      Seconds      Count  State

```

```

FC                                0
FC-FE                             0
Addr-Mismatch                     0
Running                           0
UAS                               0

```

### show interfaces extensive (ATM IMA Group)

```

user@host> show interfaces at-0/0/10 extensive
Physical interface: at-0/0/10, Enabled, Physical link is Up
  Interface index: 178, SNMP ifIndex: 540, Generation: 531
  Link-level type: ATM-PVC, MTU: 2048, Speed: Unspecified, Loopback: None, Payload
scrambler: Enabled
  Device flags   : Present Running
  Link flags     : None
  CoS queues     : 8 supported, 4 maximum usable queues
  Hold-times     : Up 0 ms, Down 0 ms
  Current address: 84:18:88:c0:33:0a
  Last flapped   : 2012-03-16 16:49:15 PDT (2d 07:12 ago)
  Statistics last cleared: 2012-03-16 16:56:58 PDT (2d 07:05 ago)
  Traffic statistics:
    Input bytes   : 0                                0 bps
    Output bytes  : 0                                0 bps
    Input packets : 0                                0 pps
    Output packets: 0                                0 pps
  IPv6 transit statistics:
    Input bytes   : 0
    Output bytes  : 0
    Input packets : 0
    Output packets: 0
  Input errors:
    Errors: 0, Drops: 0, Invalid VCs: 0, Framing errors: 0, Policed discards:
0, L3 incompletes: 0, L2 channel errors: 0,
    L2 mismatch timeouts: 0, Resource errors: 0
  Output errors:
    Carrier transitions: 0, Errors: 0, Drops: 0, Aged packets: 0, MTU errors:
0, Resource errors: 0
  IMA group properties:
    Version          : 1.1
    Frame length     : 128
    Differential delay : 25 milliseconds
    Symmetry         : Symmetrical Configuration and Operation
    Transmit clock    : Common
    Minimum links     : Transmit: 1, Receive: 1
    Frame synchronization: Alpha: 2, Beta: 2, Gamma: 1
    Link #1          : t1-0/0/4                      up
  IMA Group alarms   : None
  IMA Group defects  : None

  IMA Group state:
    Near end : Operational
    Far end  : Operational
  IMA group media:
    Seconds      Count  State
    FC           0
    FC-FE        0
    Addr-Mismatch 0
    Running      198306
    UAS          0
  ATM status:
    HCS state:   Sync
    LOC         :   OK

```

```

ATM Statistics:
  Uncorrectable HCS errors: 0, Correctable HCS errors: 0, Tx cell FIFO overruns:
0, Rx cell FIFO overruns: 0,
  Rx cell FIFO underruns: 0, Input cell count: 0, Output cell count: 0, Output
idle cell count: 0,
  Output VC queue drops: 0, Input no buffers: 0, Input length errors: 0, Input
timeouts: 0, Input invalid VCs: 0,
  Input bad CRCs: 0, Input OAM cell no buffers: 0
Packet Forwarding Engine configuration:
  Destination slot: 0
  VPI 2
  Flags: Active
  Total down time: 0 sec, Last down: Never
  Traffic statistics:
    Input bytes : 0
    Output bytes : 0
    Input packets: 0
    Output packets: 0

Logical interface at-0/0/10.602 (Index 71) (SNMP ifIndex 1057) (Generation
17226)
  Flags: Point-To-Point SNMP-Traps CCC-Down 0x0 Encapsulation:
ATM-CCC-Cell-Relay
  L2 circuit cell bundle size: 1, bundle timeout: 125 usec, timeout count: 0
  L2 circuit out-of-sequence count: 0, denied packets count: 0

```

#### show interfaces (ATM1, SONET Mode)

```

user@host> show interfaces at-1/0/0
Physical interface: at-1/0/0, Enabled, Physical link is Up
  Interface index: 300, SNMP ifIndex: 194
  Description: to allspice at-1/0/0
  Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, SONET mode,
  Speed: OC3, Loopback: None, Payload scrambler: Enabled
  Device flags : Present Running
  Link flags   : None
  CoS queues   : 4 supported, 4 maximum usable queues
  Current address: 00:05:85:02:38:7e
  Last flapped : 2006-02-24 14:28:12 PST (6d 01:51 ago)
  Input rate   : 0 bps (0 pps)
  Output rate  : 0 bps (0 pps)
  SONET alarms : None
  SONET defects : None

Logical interface at-1/0/0.0 (Index 64) (SNMP ifIndex 204)
  Flags: Point-To-Point SNMP-Traps Encapsulation: ATM-SNAP
  Input packets : 0
  Output packets: 0
  Protocol inet, MTU: 4470
    Flags: None
    Addresses, Flags: Is-Preferred Is-Primary
      Destination: 192.168.220.24/30, Local: 192.168.220.26,
      Broadcast: 192.168.220.27
  Protocol iso, MTU: 4470
    Flags: None
  VCI 0.128
    Flags: Active
    Total down time: 0 sec, Last down: Never

```

```
Input packets : 0
Output packets: 0
```

#### show interfaces brief (ATM1, SONET Mode)

```
user@host> show interfaces at-1/0/0 brief
Physical interface: at-1/0/0, Enabled, Physical link is Up
Description: to allspice at-1/0/0
Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, SONET mode,
Speed: OC3, Loopback: None, Payload scrambler: Enabled
Device flags   : Present Running
Link flags     : None

Logical interface at-1/0/0.0
Flags: Point-To-Point SNMP-Traps Encapsulation: ATM-SNAP
inet 192.168.220.26/30
iso
VCI 0.128
Flags: Active
Total down time: 0 sec, Last down: Never
```

#### show interfaces detail (ATM1, SONET Mode)

```
user@host> show interfaces at-1/0/0 detail
Physical interface: at-1/0/0, Enabled, Physical link is Up
Interface index: 300, SNMP ifIndex: 194, Generation: 183
Description: to allspice at-1/0/0
Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, SONET mode,
Speed: OC3, Loopback: None, Payload scrambler: Enabled
Device flags   : Present Running
Link flags     : None
CoS queues     : 4 supported, 4 maximum usable queues
Hold-times     : Up 0 ms, Down 0 ms
Current address: 00:05:85:02:38:7e
Last flapped   : 2006-02-24 14:28:12 PST (6d 01:55 ago)
Statistics last cleared: Never
Traffic statistics:
Input bytes   : 0          0 bps
Output bytes  : 0          0 bps
Input packets : 0          0 pps
Output packets: 0          0 pps
Egress queues: 4 supported, 4 in use
Queue counters:
  Queued packets  Transmitted packets  Dropped packets

  0 best-effort   0          0          0
  1 expedited-fo  0          0          0
  2 assured-forw  0          0          0
  3 network-cont  0          0          0

SONET alarms   : None
SONET defects   : None

Logical interface at-1/0/0.0 (Index 64) (SNMP ifIndex 204) (Generation 5)
Flags: Point-To-Point SNMP-Traps Encapsulation: ATM-SNAP
Traffic statistics:
Input bytes   : 0
Output bytes  : 0
Input packets : 0
```

```

Output packets:                0
Local statistics:
Input bytes :                  0
Output bytes :                  0
Input packets:                 0
Output packets:                0
Transit statistics:
Input bytes :                  0          0 bps
Output bytes :                  0          0 bps
Input packets:                 0          0 pps
Output packets:                0          0 pps
Protocol inet, MTU: 4470, Generation: 13, Route table: 0
Flags: None
Addresses, Flags: Is-Preferred Is-Primary
Destination: 192.168.220.24/30, Local: 192.168.220.26,
Broadcast: 192.168.220.27, Generation: 14
Protocol iso, MTU: 4470, Generation: 14, Route table: 0
Flags: None
VCI 0.128
Flags: Active
Total down time: 0 sec, Last down: Never
ATM per-VC transmit statistics:
Tail queue packet drops: 0
Traffic statistics:
Input bytes :                  0
Output bytes :                  0
Input packets:                 0
Output packets:                0

```

#### show interfaces extensive (ATM1, SONET Mode)

```

user@host> show interfaces at-1/0/0 extensive
Physical interface: at-1/0/0, Enabled, Physical link is Up
Interface index: 300, SNMP ifIndex: 194, Generation: 183
Description: to allspice at-1/0/0
Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, SONET mode,
Speed: OC3, Loopback: None, Payload scrambler: Enabled
Device flags : Present Running
Link flags    : None
CoS queues    : 4 supported, 4 maximum usable queues
Hold-times    : Up 0 ms, Down 0 ms
Current address: 00:05:85:02:38:7e
Last flapped  : 2006-02-24 14:28:12 PST (6d 01:56 ago)
Statistics last cleared: Never
Traffic statistics:
Input bytes :                  0          0 bps
Output bytes :                  0          0 bps
Input packets:                 0          0 pps
Output packets:                0          0 pps
Input errors:
Errors: 0, Drops: 0, Invalid VCs: 0, Framing errors: 0, Policed discards: 0,

L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
Resource errors: 0
Output errors:
Carrier transitions: 1, Errors: 0, Drops: 0, Aged packets: 0, MTU errors: 0,

Resource errors: 0
Egress queues: 4 supported, 4 in use
Queue counters:      Queued packets  Transmitted packets      Dropped packets

```

|                |   |   |   |
|----------------|---|---|---|
| 0 best-effort  | 0 | 0 | 0 |
| 1 expedited-fo | 0 | 0 | 0 |
| 2 assured-forw | 0 | 0 | 0 |
| 3 network-cont | 0 | 0 | 0 |

SONET alarms : None  
SONET defects : None

| SONET PHY: | Seconds | Count | State |
|------------|---------|-------|-------|
| PLL Lock   | 0       | 0     | OK    |
| PHY Light  | 0       | 0     | OK    |

SONET section:

|        |   |   |    |
|--------|---|---|----|
| BIP-B1 | 0 | 0 |    |
| SEF    | 0 | 0 | OK |
| LOS    | 0 | 0 | OK |
| LOF    | 0 | 0 | OK |
| ES-S   | 0 |   |    |
| SES-S  | 0 |   |    |
| SEFS-S | 0 |   |    |

SONET line:

|         |   |   |    |
|---------|---|---|----|
| BIP-B2  | 0 | 0 |    |
| REI-L   | 0 | 0 |    |
| RDI-L   | 0 | 0 | OK |
| AIS-L   | 0 | 0 | OK |
| BERR-SF | 0 | 0 | OK |
| BERR-SD | 0 | 0 | OK |
| ES-L    | 0 |   |    |
| SES-L   | 0 |   |    |
| UAS-L   | 0 |   |    |
| ES-LFE  | 0 |   |    |
| SES-LFE | 0 |   |    |
| UAS-LFE | 0 |   |    |

SONET path:

|         |   |   |    |
|---------|---|---|----|
| BIP-B3  | 0 | 0 |    |
| REI-P   | 0 | 0 |    |
| LOP-P   | 0 | 0 | OK |
| AIS-P   | 0 | 0 | OK |
| RDI-P   | 0 | 0 | OK |
| UNEQ-P  | 1 | 1 | OK |
| PLM-P   | 0 | 0 | OK |
| ES-P    | 1 |   |    |
| SES-P   | 1 |   |    |
| UAS-P   | 0 |   |    |
| ES-PFE  | 0 |   |    |
| SES-PFE | 0 |   |    |
| UAS-PFE | 0 |   |    |

Received SONET overhead:

|    |            |                 |            |        |
|----|------------|-----------------|------------|--------|
| F1 | : 0x00, J0 | : 0x00, K1      | : 0x00, K2 | : 0x00 |
| S1 | : 0x00, C2 | : 0x13, C2(cmp) | : 0x13, F2 | : 0x00 |
| Z3 | : 0x00, Z4 | : 0x00, S1(cmp) | : 0x00     |        |

Transmitted SONET overhead:

|    |            |            |            |        |
|----|------------|------------|------------|--------|
| F1 | : 0x00, J0 | : 0x01, K1 | : 0x00, K2 | : 0x00 |
| S1 | : 0x00, C2 | : 0x13, F2 | : 0x00, Z3 | : 0x00 |
| Z4 | : 0x00     |            |            |        |

ATM status:

|            |      |
|------------|------|
| HCS state: | Sync |
| LOC        | : OK |

ATM Statistics:

Uncorrectable HCS errors: 0, Correctable HCS errors: 0,



```

Tx cell FIFO overruns: 0, Rx cell FIFO overruns: 0,
Rx cell FIFO underruns: 0, Input cell count: 0, Output cell count: 0,
Output idle cell count: 0, Output VC queue drops: 0, Input no buffers: 0,
Input length errors: 0, Input timeouts: 0, Input invalid VCs: 0,
Input bad CRCs: 0, Input OAM cell no buffers: 0
Packet Forwarding Engine configuration:
  Destination slot: 1
CoS information:
  CoS transmit queue      Bandwidth      Buffer      Priority      Limit
                           %      bps      %      usec
0 best-effort      95      147744000      95      0      low      none
3 network-control  5       7776000       5      0      low      none

Logical interface at-1/0/0.0 (Index 64) (SNMP ifIndex 204) (Generation 5)
Flags: Point-To-Point SNMP-Traps Encapsulation: ATM-SNAP
Traffic statistics:
  Input bytes : 0
  Output bytes : 0
  Input packets: 0
  Output packets: 0
Local statistics:
  Input bytes : 0
  Output bytes : 0
  Input packets: 0
  Output packets: 0
Transit statistics:
  Input bytes : 0      0 bps
  Output bytes : 0      0 bps
  Input packets: 0      0 pps
  Output packets: 0      0 pps
Protocol inet, MTU: 4470, Generation: 13, Route table: 0
  Flags: None
  Addresses, Flags: Is-Preferred Is-Primary
    Destination: 192.168.220.24/30, Local: 192.168.220.26,
    Broadcast: 192.168.220.27, Generation: 14
Protocol iso, MTU: 4470, Generation: 14, Route table: 0
  Flags: None
VCI 0.128
  Flags: Active
  Total down time: 0 sec, Last down: Never
  ATM per-VC transmit statistics:
  Tail queue packet drops: 0
  Traffic statistics:
    Input bytes : 0
    Output bytes : 0
    Input packets: 0
    Output packets: 0

```

### show interfaces (ATM2, SDH Mode)

```

user@host> show interfaces at-0/2/1
Physical interface: at-0/2/1, Enabled, Physical link is Up
Interface index: 154, SNMP ifIndex: 42
Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, SDH mode, Speed: OC3,

Loopback: None, Payload scrambler: Enabled
Device flags : Present Running
Link flags : None
CoS queues : 4 supported, 4 maximum usable queues
Current address: 00:05:85:8f:30:3f
Last flapped : 2006-03-24 13:29:58 PST (00:04:48 ago)

```

```
Input rate      : 0 bps (0 pps)
Output rate     : 0 bps (0 pps)
SDH alarms     : None
SDH defects     : None
  VPI 0
    Flags: Active
    Total down time: 0 sec, Last down: Never
Traffic statistics:
  Input packets:          0
  Output packets:         0

Logical interface at-0/2/1.0 (Index 75) (SNMP ifIndex 51)
  Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: ATM-SNAP
  Input packets : 0
  Output packets: 0
  Protocol inet, MTU: 4470
    Flags: None
    Addresses, Flags: Is-Preferred Is-Primary
      Destination: 10.0.12.6, Local: 10.0.12.5
  Protocol iso, MTU: 4470
    Flags: None
  VCI 0.128
    Flags: Active
    Total down time: 0 sec, Last down: Never
    EPD threshold: 2129, Transmit weight cells: 0
      Input packets : 0
      Output packets: 0

Logical interface at-0/2/1.32767 (Index 76) (SNMP ifIndex 50)
  Flags: Point-To-Multipoint No-Multicast SNMP-Traps 0x4000
  Encapsulation: ATM-VCMUX
  Input packets : 0
  Output packets: 0
  VCI 0.4
    Flags: Active
    Total down time: 0 sec, Last down: Never
    EPD threshold: 0, Transmit weight cells: 0
      Input packets : 0
      Output packets: 0
```

#### show interfaces brief (ATM2, SDH Mode)

```
user@host> show interfaces at-0/2/1 brief
Physical interface: at-0/2/1, Enabled, Physical link is Up
  Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, SDH mode,
  Speed: OC3, Loopback: None, Payload scrambler: Enabled
  Device flags   : Present Running
  Link flags     : None
Logical interface at-0/2/1.0
  Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: ATM-SNAP
  inet 10.0.12.5    --> 10.0.12.6
  iso
  VCI 0.128
    Flags: Active
    Total down time: 0 sec, Last down: Never
    EPD threshold: 2129, Transmit weight cells: 0

Logical interface at-0/2/1.32767
  Flags: Point-To-Multipoint No-Multicast SNMP-Traps 0x4000
  Encapsulation: ATM-VCMUX
  VCI 0.4
```

```

Flags: Active
Total down time: 0 sec, Last down: Never
EPD threshold: 0, Transmit weight cells: 0

```

### show interfaces detail (ATM2, SDH Mode)

```

user@host> show interfaces at-0/2/1 detail
Physical interface: at-0/2/1, Enabled, Physical link is Up
  Interface index: 154, SNMP ifIndex: 42, Generation: 40
  Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, SDH mode, Speed: OC3,

  Loopback: None, Payload scrambler: Enabled
  Device flags   : Present Running
  Link flags     : None
  CoS queues     : 4 supported, 4 maximum usable queues
  Hold-times     : Up 0 ms, Down 0 ms
  Current address: 00:05:85:8f:30:3f
  Last flapped   : 2006-03-24 13:29:58 PST (00:05:10 ago)
  Statistics last cleared: Never
  Traffic statistics:
    Input bytes   :                0                0 bps
    Output bytes  :                0                0 bps
    Input packets :                0                0 pps
    Output packets:                0                0 pps
  Egress queues: 4 supported, 4 in use
  Queue counters:
    Queued packets  Transmitted packets  Dropped packets

    0 best-effort   0                  0                  0
    1 expedited-fo  0                  0                  0
    2 assured-forw  0                  0                  0
    3 network-cont  0                  0                  0

  SDH  alarms   : None
  SDH  defects  : None
  VPI 0
    Flags: Active
    Total down time: 0 sec, Last down: Never
    Traffic statistics:
      Input bytes   :                0
      Output bytes  :                0
      Input packets :                0
      Output packets:                0

  Logical interface at-0/2/1.0 (Index 75) (SNMP ifIndex 51) (Generation 25)
    Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: ATM-SNAP
    Traffic statistics:
      Input bytes   :                0
      Output bytes  :                0
      Input packets :                0
      Output packets:                0
    Local statistics:
      Input bytes   :                0
      Output bytes  :                0
      Input packets :                0
      Output packets:                0
    Transit statistics:
      Input bytes   :                0                0 bps
      Output bytes  :                0                0 bps

```

```

Input packets:                0                0 pps
Output packets:               0                0 pps
Protocol inet, MTU: 4470, Generation: 62, Route table: 0
  Flags: None
  Addresses, Flags: Is-Preferred Is-Primary
    Destination: 10.0.12.6, Local: 10.0.12.5, Broadcast: Unspecified,
    Generation: 58
Protocol iso, MTU: 4470, Generation: 63, Route table: 0
  Flags: None
VCI 0.128
  Flags: Active
  Total down time: 0 sec, Last down: Never
  EPD threshold: 2129, Transmit weight cells: 0
  ATM per-VC transmit statistics:
    Tail queue packet drops: 0
  Traffic statistics:
    Input bytes :                0
    Output bytes :               0
    Input packets:               0
    Output packets:              0
Logical interface at-0/2/1.32767 (Index 76) (SNMP ifIndex 50) (Generation 26)
  Flags: Point-To-Multipoint No-Multicast SNMP-Traps 0x4000
  Encapsulation: ATM-VCMUX
  Traffic statistics:
    Input bytes :                0
    Output bytes :               0
    Input packets:               0
    Output packets:              0
  Local statistics:
    Input bytes :                0
    Output bytes :               0
    Input packets:               0
    Output packets:              0
VCI 0.4
  Flags: Active
  Total down time: 0 sec, Last down: Never
  EPD threshold: 0, Transmit weight cells: 0
  ATM per-VC transmit statistics:
    Tail queue packet drops: 0
  Traffic statistics:
    Input bytes :                0
    Output bytes :               0
    Input packets:               0
    Output packets:              0

```

#### show interfaces extensive (ATM2, SDH Mode)

```

user@host> show interfaces at-0/2/1 extensive
Physical interface: at-0/2/1, Enabled, Physical link is Up
Interface index: 154, SNMP ifIndex: 42, Generation: 40
Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, SDH mode, Speed: OC3,

Loopback: None, Payload scrambler: Enabled
Device flags : Present Running
Link flags   : None
CoS queues   : 4 supported, 4 maximum usable queues
Hold-times   : Up 0 ms, Down 0 ms
Current address: 00:05:85:8f:30:3f
Last flapped : 2006-03-24 13:29:58 PST (00:06:49 ago)
Statistics last cleared: Never
Traffic statistics:

```

```

Input bytes :                0                0 bps
Output bytes :                0                0 bps
Input packets:               0                0 pps
Output packets:              0                0 pps
Input errors:
  Errors: 0, Drops: 0, Invalid VCs: 0, Framing errors: 0, Policed discards: 0,

  L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
  Resource errors: 0
Output errors:
  Carrier transitions: 3, Errors: 0, Drops: 0, Aged packets: 0, MTU errors: 0,

  Resource errors: 0
Egress queues: 4 supported, 4 in use
Queue counters:      Queued packets  Transmitted packets      Dropped packets

  0 best-effort                0                0                0
  1 expedited-fo                0                0                0
  2 assured-forw                0                0                0
  3 network-cont                0                0                0

SDH  alarms   : None
SDH  defects  : None
SDH PHY:      Seconds      Count  State
  PLL Lock      0          0  OK
  PHY Light     1          1  OK
SDH regenerator section:
  RS-BIP8        2          8828
  OOF            2          2  OK
  LOS            2          1  OK
  LOF            2          1  OK
  RS-ES          4
  RS-SES         3
  RS-SEFS        2
SDH multiplex section:
  MS-BIP24       2          771
  MS-FEBE        1         17476
  MS-FERF        2          1  OK
  MS-AIS         2          1  OK
  BERR-SF        0          0  OK
  BERR-SD        0          0  OK
  MS-ES          4
  MS-SES         2
  MS-UAS         0
  MS-ES-FE       3
  MS-SES-FE      2
  MS-UAS-FE      0
SDH path:
  HP-BIP8        1          6
  HP-FEBE        1         251
  HP-LOP         0          0  OK
  HP-AIS         2          1  OK
  HP-FERF        3          2  OK
  HP-UNEQ        1          1  OK
  HP-PLM         2          1  OK
  HP-ES          4
  HP-SES         3
  HP-UAS         0

```

```

HP-ES-FE                3
HP-SES-FE                3
HP-UAS-FE                0
Received SDH overhead:
F1      : 0x00, J0      : 0x00, K1      : 0x00, K2      : 0x00
S1      : 0x00, C2      : 0x13, C2(cmp) : 0x13, F2      : 0x00
Z3      : 0x00, Z4      : 0x00, S1(cmp) : 0x00
Transmitted SDH overhead:
F1      : 0x00, J0      : 0x01, K1      : 0x00, K2      : 0x00
S1      : 0x00, C2      : 0x13, F2      : 0x00, Z3      : 0x00
Z4      : 0x00
ATM status:
HCS state:      Sync
LOC      :      OK
ATM Statistics:
Uncorrectable HCS errors: 0, Correctable HCS errors: 0,
Tx cell FIFO overruns: 0, Rx cell FIFO overruns: 0,
Rx cell FIFO underruns: 0, Input cell count: 0, Output cell count: 0,
Output idle cell count: 0, Output VC queue drops: 0, Input no buffers: 0,
Input length errors: 0, Input timeouts: 0, Input invalid VCs: 0,
Input bad CRCs: 0, Input OAM cell no buffers: 0
Packet Forwarding Engine configuration:
Destination slot: 0
VPI 0
Flags: Active
Total down time: 0 sec, Last down: Never
Traffic statistics:
Input bytes      :      0
Output bytes     :      0
Input packets    :      0
Output packets   :      0
Logical interface at-0/2/1.0 (Index 75) (SNMP ifIndex 51) (Generation 25)
Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: ATM-SNAP
Traffic statistics:
Input bytes      :      0
Output bytes     :      0
Input packets    :      0
Output packets   :      0
Local statistics:
Input bytes      :      0
Output bytes     :      0
Input packets    :      0
Output packets   :      0
Transit statistics:
Input bytes      :      0      0 bps
Output bytes     :      0      0 bps
Input packets    :      0      0 pps
Output packets   :      0      0 pps
Protocol inet, MTU: 4470, Generation: 62, Route table: 0
Flags: None
Addresses, Flags: Is-Preferred Is-Primary
Destination: 10.0.12.6, Local: 10.0.12.5, Broadcast: Unspecified,
Generation: 58
Protocol iso, MTU: 4470, Generation: 63, Route table: 0
Flags: None
VCI 0.128
Flags: Active
Total down time: 0 sec, Last down: Never
EPD threshold: 2129, Transmit weight cells: 0
ATM per-VC transmit statistics:

```

```

    Tail queue packet drops: 0
    Traffic statistics:
      Input bytes : 0
      Output bytes : 0
      Input packets: 0
      Output packets: 0
    Logical interface at-0/2/1.32767 (Index 76) (SNMP ifIndex 50) (Generation 26)
    Flags: Point-To-Multipoint No-Multicast SNMP-Traps 0x4000
    Encapsulation: ATM-VCMUX
    Traffic statistics:
      Input bytes : 0
      Output bytes : 0
      Input packets: 0
      Output packets: 0
    Local statistics:
      Input bytes : 0
      Output bytes : 0
      Input packets: 0
      Output packets: 0
    VCI 0.4
    Flags: Active
    Total down time: 0 sec, Last down: Never
    EPD threshold: 0, Transmit weight cells: 0
    ATM per-VC transmit statistics:
      Tail queue packet drops: 0
    Traffic statistics:
      Input bytes : 0
      Output bytes : 0
      Input packets: 0
      Output packets: 0

```

#### show interfaces (ATM2, SONET Mode)

```

user@host> show interfaces at-0/3/1
Physical interface: at-0/3/1, Enabled, Physical link is Up
  Interface index: 139, SNMP ifIndex: 67
  Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, SONET mode,
  Speed: OC3, Loopback: None, Payload scrambler: Enabled
  Device flags : Present Running
  Link flags : None
  CoS queues : 4 supported, 4 maximum usable queues
  Current address: 00:14:f6:22:58:5e
  Last flapped : 2006-03-13 17:46:36 PST (16:01:12 ago)
  Input rate : 0 bps (0 pps)
  Output rate : 0 bps (0 pps)
  SONET alarms : None
  SONET defects : None
    VPI 0
      Flags: Active, OAM, Shaping
      CBR, Peak: 50kbps
      OAM, Period 30 sec, Up count: 10, Down count: 10
      Total down time: 0 sec, Last down: Never
      OAM F4 cell statistics:
        Total received: 4, Total sent: 4
        Loopback received: 4, Loopback sent: 4
        RDI received: 0, RDI sent: 0
        AIS received: 0
      Traffic statistics:
        Input packets: 4
        Output packets: 30
    VPI 10

```

```
Flags: Active
Total down time: 0 sec, Last down: Never
Traffic statistics:
  Input packets: 0
  Output packets: 0
Logical interface at-0/3/1.0 (Index 78) (SNMP ifIndex 77)
Flags: Point-To-Point Copy-PLP-To-CLP SNMP-Traps 0x4000
Encapsulation: ATM-SNAP
Input packets : 0
Output packets: 0
Protocol inet, MTU: 4470
  Flags: None
  Addresses, Flags: Is-Preferred Is-Primary
    Destination: 10.0.59.5, Local: 10.0.59.6
Protocol iso, MTU: 4470
  Flags: None
VCI 0.128
  Flags: Active
  Total down time: 0 sec, Last down: Never
  EPD threshold: 2129, Transmit weight cells: 10
  Input packets : 0
  Output packets: 0

Logical interface at-0/3/1.32767 (Index 79) (SNMP ifIndex 76)
Flags: Point-To-Multipoint Copy-PLP-To-CLP No-Multicast SNMP-Traps 0x4000
Encapsulation: ATM-VCMUX
Input packets : 4
Output packets: 30
VCI 0.16
  Flags: Active, ILMI
  Total down time: 0 sec, Last down: Never
  EPD threshold: 0, Transmit weight cells: 0
  Input packets : 0
  Output packets: 26
VCI 0.4
  Flags: Active, OAM
  OAM, Period 30 sec, Up count: 10, Down count: 10
  Total down time: 0 sec, Last down: Never
  EPD threshold: 2129, Transmit weight cells: 0
  Input packets : 4
  Output packets: 4
  OAM F4 cell statistics:
    Total received: 4, Total sent: 4
    Loopback received: 4, Loopback sent: 4
    RDI received: 0, RDI sent: 0
    AIS received: 0, AIS sent: 0
```

#### show interfaces brief (ATM2, SONET Mode)

```
user@host> show interfaces at-0/3/1 brief
Physical interface: at-0/3/1, Enabled, Physical link is Up
Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, SONET mode,
Speed: OC3, Loopback: None, Payload scrambler: Enabled
Device flags   : Present Running
Link flags     : None

Logical interface at-0/3/1.0
Flags: Point-To-Point Copy-PLP-To-CLP SNMP-Traps 0x4000
Encapsulation: ATM-SNAP
inet 10.0.59.6 --> 10.0.59.5
iso
```



```
VCI 0.128
  Flags: Active
  Total down time: 0 sec, Last down: Never
  EPD threshold: 2129, Transmit weight cells: 10
```

```
Logical interface at-0/3/1.32767
  Flags: Point-To-Multipoint Copy-PLP-To-CLP No-Multicast SNMP-Traps 0x4000
  Encapsulation: ATM-VCMUX
VCI 0.16
  Flags: Active, ILMI
  Total down time: 0 sec, Last down: Never
  EPD threshold: 0, Transmit weight cells: 0
VCI 0.4
  Flags: Active, OAM
  Total down time: 0 sec, Last down: Never
  EPD threshold: 2129, Transmit weight cells: 0
```

### show interfaces detail (ATM2, SONET Mode)

```
user@host> show interfaces at-0/3/1 detail
Physical interface: at-0/3/1, Enabled, Physical link is Up
  Interface index: 139, SNMP ifIndex: 67, Generation: 22
  Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, SONET mode,
  Speed: OC3, Loopback: None, Payload scrambler: Enabled
  Device flags   : Present Running
  Link flags     : None
  CoS queues     : 4 supported, 4 maximum usable queues
  Hold-times     : Up 0 ms, Down 0 ms
  Current address: 00:14:f6:22:58:5e
  Last flapped   : 2006-03-13 17:46:36 PST (16:02:39 ago)
  Statistics last cleared: Never
  Traffic statistics:
    Input bytes   :           312           0 bps
    Output bytes  :          2952           0 bps
    Input packets :             6           0 pps
    Output packets:            50           0 pps
  Egress queues: 4 supported, 4 in use
  Queue counters:

```

|                | Queued packets | Transmitted packets | Dropped packets |
|----------------|----------------|---------------------|-----------------|
| 0 best-effort  | 44             | 44                  | 0               |
| 1 expedited-fo | 0              | 0                   | 0               |
| 2 assured-forw | 0              | 0                   | 0               |
| 3 network-cont | 6              | 6                   | 0               |

```

  SONET alarms   : None
  SONET defects  : None
  VPI 0
    Flags: Active, OAM, Shaping
    CBR, Peak: 50kbps
    OAM, Period 30 sec, Up count: 10, Down count: 10
    Total down time: 0 sec, Last down: Never
  OAM F4 cell statistics:
    Total received: 6, Total sent: 6
    Loopback received: 6, Loopback sent: 6
    Last received: 00:00:29, Last sent: 00:00:29
    RDI received: 0, RDI sent: 0
    AIS received: 0
    Traffic statistics:

```

```

        Input bytes :          312
        Output bytes :         2952
        Input packets:          6
        Output packets:         50
VPI 10
  Flags: Active
  Total down time: 0 sec, Last down: Never
  Traffic statistics:
    Input bytes :          0
    Output bytes :          0
    Input packets:          0
    Output packets:         0

Logical interface at-0/3/1.0 (Index 78) (SNMP ifIndex 77) (Generation 20)
  Flags: Point-To-Point Copy-PLP-To-CLP SNMP-Traps 0x4000
  Encapsulation: ATM-SNAP
  Traffic statistics:
    Input bytes :          0
    Output bytes :          0
    Input packets:          0
    Output packets:         0
  Local statistics:
    Input bytes :          0
    Output bytes :          0
    Input packets:          0
    Output packets:         0
  Transit statistics:
    Input bytes :          0          0 bps
    Output bytes :          0          0 bps
    Input packets:          0          0 pps
    Output packets:         0          0 pps
  Protocol inet, MTU: 4470, Generation: 38, Route table: 0
    Flags: None
    Addresses, Flags: Is-Preferred Is-Primary
      Destination: 10.0.59.5, Local: 10.0.59.6, Broadcast: Unspecified,
      Generation: 44
  Protocol iso, MTU: 4470, Generation: 39, Route table: 0
    Flags: None
VCI 0.128
  Flags: Active
  Total down time: 0 sec, Last down: Never
  EPD threshold: 2129, Transmit weight cells: 10
  ATM per-VC transmit statistics:
    Tail queue packet drops: 0
  Traffic statistics:
    Input bytes :          0
    Output bytes :          0
    Input packets:          0
    Output packets:         0

Logical interface at-0/3/1.32767 (Index 79) (SNMP ifIndex 76) (Generation 21)
  Flags: Point-To-Multipoint Copy-PLP-To-CLP No-Multicast SNMP-Traps 0x4000
  Encapsulation: ATM-VCMUX
  Traffic statistics:
    Input bytes :          360
    Output bytes :         3302
    Input packets:          6
    Output packets:         50
  Local statistics:
    Input bytes :          360
    Output bytes :         3302
    Input packets:          6

```

```

Output packets:          50
VCI 0.16
  Flags: Active, ILMI
  Total down time: 0 sec, Last down: Never
  EPD threshold: 0, Transmit weight cells: 0
  ATM per-VC transmit statistics:
    Tail queue packet drops: 0
  Traffic statistics:
    Input bytes  :          0
    Output bytes :        2640
    Input packets:          0
    Output packets:        44
VCI 0.4
  Flags: Active, OAM
  OAM, Period 30 sec, Up count: 10, Down count: 10
  Total down time: 0 sec, Last down: Never
  EPD threshold: 2129, Transmit weight cells: 0
  ATM per-VC transmit statistics:
    Tail queue packet drops: 0
  Traffic statistics:
    Input bytes  :        312
    Output bytes :        312
    Input packets:         6
    Output packets:        6
OAM F4 cell statistics:
  Total received: 6, Total sent: 6
  Loopback received: 6, Loopback sent: 6
  Last received: 00:00:29, Last sent: 00:00:29
  RDI received: 0, RDI sent: 0
  AIS received: 0, AIS sent: 0

```

#### show interfaces extensive (ATM2, SONET Mode)

```

user@host> show interfaces at-0/3/1 extensive
Physical interface: at-0/3/1, Enabled, Physical link is Up
Interface index: 139, SNMP ifIndex: 67, Generation: 22
Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, SONET mode,
Speed: OC3, Loopback: None, Payload scrambler: Enabled
Device flags   : Present Running
Link flags     : None
CoS queues    : 4 supported, 4 maximum usable queues
Hold-times    : Up 0 ms, Down 0 ms
Current address: 00:14:f6:22:58:5e
Last flapped  : 2006-03-13 17:46:36 PST (16:04:12 ago)
Statistics last cleared: Never
Traffic statistics:
Input bytes  :          520          0 bps
Output bytes :        4240          0 bps
Input packets:         10          0 pps
Output packets:        72          0 pps
Input errors:
Errors: 0, Drops: 0, Invalid VCs: 0, Framing errors: 0, Policed discards: 0,

L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
Resource errors: 0
Output errors:
Carrier transitions: 1, Errors: 0, Drops: 0, Aged packets: 0, MTU errors: 0,

Resource errors: 0
Egress queues: 4 supported, 4 in use
Queue counters:      Queued packets  Transmitted packets      Dropped packets

```

|                |    |    |   |
|----------------|----|----|---|
| 0 best-effort  | 62 | 62 | 0 |
| 1 expedited-fo | 0  | 0  | 0 |
| 2 assured-forw | 0  | 0  | 0 |
| 3 network-cont | 10 | 10 | 0 |

SONET alarms : None

SONET defects : None

SONET PHY:

|           | Seconds | Count | State |
|-----------|---------|-------|-------|
| PLL Lock  | 0       | 0     | OK    |
| PHY Light | 0       | 0     | OK    |

SONET section:

|        |   |   |    |
|--------|---|---|----|
| BIP-B1 | 0 | 0 |    |
| SEF    | 0 | 0 | OK |
| LOS    | 0 | 0 | OK |
| LOF    | 0 | 0 | OK |
| ES-S   | 0 |   |    |
| SES-S  | 0 |   |    |
| SEFS-S | 0 |   |    |

SONET line:

|         |   |   |    |
|---------|---|---|----|
| BIP-B2  | 0 | 0 |    |
| REI-L   | 0 | 0 |    |
| RDI-L   | 0 | 0 | OK |
| AIS-L   | 0 | 0 | OK |
| BERR-SF | 0 | 0 | OK |
| BERR-SD | 0 | 0 | OK |
| ES-L    | 0 |   |    |
| SES-L   | 0 |   |    |
| UAS-L   | 0 |   |    |
| ES-LFE  | 0 |   |    |
| SES-LFE | 0 |   |    |
| UAS-LFE | 0 |   |    |

SONET path:

|         |   |   |    |
|---------|---|---|----|
| BIP-B3  | 0 | 0 |    |
| REI-P   | 0 | 0 |    |
| LOP-P   | 0 | 0 | OK |
| AIS-P   | 0 | 0 | OK |
| RDI-P   | 0 | 0 | OK |
| UNEQ-P  | 1 | 1 | OK |
| PLM-P   | 0 | 0 | OK |
| ES-P    | 1 |   |    |
| SES-P   | 1 |   |    |
| UAS-P   | 0 |   |    |
| ES-PFE  | 0 |   |    |
| SES-PFE | 0 |   |    |
| UAS-PFE | 0 |   |    |

Received SONET overhead:

|    |            |                 |            |        |
|----|------------|-----------------|------------|--------|
| F1 | : 0x00, J0 | : 0x00, K1      | : 0x00, K2 | : 0x00 |
| S1 | : 0x00, C2 | : 0x13, C2(cmp) | : 0x13, F2 | : 0x00 |
| Z3 | : 0x00, Z4 | : 0x00, S1(cmp) | : 0x00     |        |

Transmitted SONET overhead:

|    |            |            |            |        |
|----|------------|------------|------------|--------|
| F1 | : 0x00, J0 | : 0x01, K1 | : 0x00, K2 | : 0x00 |
| S1 | : 0x00, C2 | : 0x13, F2 | : 0x00, Z3 | : 0x00 |
| Z4 | : 0x00     |            |            |        |

ATM status:

|            |      |
|------------|------|
| HCS state: | Sync |
| LOC        | : OK |

ATM Statistics:

```

Uncorrectable HCS errors: 0, Correctable HCS errors: 0,
Tx cell FIFO overruns: 0, Rx cell FIFO overruns: 0,
Rx cell FIFO underruns: 0, Input cell count: 0, Output cell count: 0,
Output idle cell count: 0, Output VC queue drops: 0, Input no buffers: 0,
Input length errors: 0, Input timeouts: 0, Input invalid VCs: 0,
Input bad CRCs: 0, Input OAM cell no buffers: 0
Packet Forwarding Engine configuration:
Destination slot: 0
VPI 0
  Flags: Active, OAM, Shaping
  CBR, Peak: 50kbps
  OAM, Period 30 sec, Up count: 10, Down count: 10
  Total down time: 0 sec, Last down: Never
  OAM F4 cell statistics:
  Total received: 10, Total sent: 10
  Loopback received: 10, Loopback sent: 10
  Last received: 00:00:02, Last sent: 00:00:02
  RDI received: 0, RDI sent: 0
  AIS received: 0
  Traffic statistics:
    Input bytes :          520
    Output bytes :         4240
    Input packets:          10
    Output packets:         72
VPI 10
  Flags: Active
  Total down time: 0 sec, Last down: Never
  Traffic statistics:
    Input bytes :          0
    Output bytes :          0
    Input packets:          0
    Output packets:         0
Logical interface at-0/3/1.0 (Index 78) (SNMP ifIndex 77) (Generation 20)
  Flags: Point-To-Point Copy-PLP-To-CLP SNMP-Traps 0x4000
  Encapsulation: ATM-SNAP
  Traffic statistics:
    Input bytes :          0
    Output bytes :          0
    Input packets:          0
    Output packets:         0
  Local statistics:
    Input bytes :          0
    Output bytes :          0
    Input packets:          0
    Output packets:         0
  Transit statistics:
    Input bytes :          0          0 bps
    Output bytes :          0          0 bps
    Input packets:          0          0 pps
    Output packets:         0          0 pps
  Protocol inet, MTU: 4470, Generation: 38, Route table: 0
    Flags: None
    Addresses, Flags: Is-Preferred Is-Primary
      Destination: 10.0.59.5, Local: 10.0.59.6, Broadcast: Unspecified,
      Generation: 44
  Protocol iso, MTU: 4470, Generation: 39, Route table: 0
    Flags: None
  VCI 0.128
    Flags: Active
    Total down time: 0 sec, Last down: Never

```

EPD threshold: 2129, Transmit weight cells: 10  
ATM per-VC transmit statistics:  
Tail queue packet drops: 0  
Traffic statistics:  
Input bytes : 0  
Output bytes : 0  
Input packets: 0  
Output packets: 0

Logical interface at-0/3/1.32767 (Index 79) (SNMP ifIndex 76) (Generation 21)

Flags: Point-To-Multipoint Copy-PLP-To-CLP No-Multicast SNMP-Traps 0x4000

Encapsulation: ATM-VCMUX

Traffic statistics:  
Input bytes : 660  
Output bytes : 5473  
Input packets: 11  
Output packets: 83

Local statistics:  
Input bytes : 660  
Output bytes : 5473  
Input packets: 11  
Output packets: 83

VCI 0.16

Flags: Active, ILMI

Total down time: 0 sec, Last down: Never

EPD threshold: 0, Transmit weight cells: 0

ATM per-VC transmit statistics:

Tail queue packet drops: 0

Traffic statistics:  
Input bytes : 0  
Output bytes : 4320  
Input packets: 0  
Output packets: 72

VCI 0.4

Flags: Active, OAM

OAM, Period 30 sec, Up count: 10, Down count: 10

Total down time: 0 sec, Last down: Never

EPD threshold: 2129, Transmit weight cells: 0

ATM per-VC transmit statistics:

Tail queue packet drops: 0

Traffic statistics:  
Input bytes : 572  
Output bytes : 572  
Input packets: 11  
Output packets: 11

OAM F4 cell statistics:

Total received: 11, Total sent: 11

Loopback received: 11, Loopback sent: 11

Last received: 00:00:18, Last sent: 00:00:18

RDI received: 0, RDI sent: 0

AIS received: 0, AIS sent: 0

## show interfaces (T1, E1, or DS)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show interfaces <i>interface-type</i> &lt;brief   detail   extensive   terse&gt; &lt;descriptions&gt; &lt;media&gt; &lt;snmp-index <i>snmp-index</i>&gt; &lt;statistics&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | Display status information about the specified T1, E1, or DS interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>                  | <p><b><i>interface-type</i></b>—On ACX Series, M Series, MX Series, and T Series routers, the T1 interface type is <b>t1-<i>fpc/pic/port</i></b>, whereas the E1 interface type is <b>e1-<i>fpc/pic/port</i></b>, and DS interface type is <b>ds-<i>fpc/pic/port:channel</i></b>. On the J Series routers, the T1 interface type is <b>t1-<i>pim/O/port</i></b>, whereas the E1 interface type is <b>e1-<i>pim/O/port</i></b>.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>descriptions</b>—(Optional) Display interface description strings.</p> <p><b>media</b>—(Optional) Display media-specific information about network interfaces.</p> <p><b>snmp-index <i>snmp-index</i></b>—(Optional) Display information for the specified SNMP index of the interface.</p> <p><b>statistics</b>—(Optional) Display static interface statistics.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Understanding Interfaces on ACX Series Universal Access Routers on page 100</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>List of Sample Output</b>    | <a href="#">show interfaces (T1, IMA Link) on page 675</a><br><a href="#">show interfaces (T1, PPP) on page 676</a><br><a href="#">show interfaces detail (T1, PPP) on page 676</a><br><a href="#">show interfaces extensive (T1 CRC Errors) on page 677</a><br><a href="#">show interfaces extensive (T1, PPP) on page 677</a><br><a href="#">show interfaces (E1, Frame Relay) on page 679</a><br><a href="#">show interfaces detail (E1, Frame Relay) on page 680</a><br><a href="#">show interfaces extensive (E1, Frame Relay) on page 681</a><br><a href="#">show interfaces (E1, IMA Link) on page 683</a><br><a href="#">show interfaces extensive (T1, TDM-CCC-SATOP) on page 684</a><br><a href="#">show interfaces extensive (DS, TDM-CCC-CESoPSN) on page 685</a>                                                                                                                                    |
| <b>Output Fields</b>            | <p><a href="#">Table 46 on page 664</a> lists the output fields for the <b>show interfaces</b> (T1 or E1) command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

Table 46: T1 or E1 show interfaces Output Fields

| Field Name                | Field Description                                                                                                                                                                                                                                                                             | Level of Output              |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Physical Interface</b> |                                                                                                                                                                                                                                                                                               |                              |
| <b>Physical interface</b> | Name of the physical interface.                                                                                                                                                                                                                                                               | All levels                   |
| <b>Enabled</b>            | State of the interface. Possible values are described in the “Enabled Field” section under <i>Common Output Fields Description</i> .                                                                                                                                                          | All levels                   |
| <b>Interface index</b>    | Physical interface's index number, which reflects its initialization sequence.                                                                                                                                                                                                                | <b>detail extensive</b> none |
| <b>SNMP ifIndex</b>       | SNMP index number for the physical interface.                                                                                                                                                                                                                                                 | <b>detail extensive</b> none |
| <b>Generation</b>         | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                             | <b>detail extensive</b>      |
| <b>Link-level type</b>    | Encapsulation being used on the physical interface.                                                                                                                                                                                                                                           | All levels                   |
| <b>MTU</b>                | MTU size on the physical interface.                                                                                                                                                                                                                                                           | All levels                   |
| <b>Clocking</b>           | Reference clock source: <b>Internal</b> or <b>External</b> .                                                                                                                                                                                                                                  | All levels                   |
| <b>Speed</b>              | Speed at which the interface is running.                                                                                                                                                                                                                                                      | All levels                   |
| <b>Loopback</b>           | Whether loopback is enabled and the type of loopback ( <b>local</b> or <b>remote</b> ).                                                                                                                                                                                                       | All levels                   |
| <b>FCS</b>                | Frame check sequence on the interface (either <b>16</b> or <b>32</b> ). The default is <b>16</b> bits.                                                                                                                                                                                        | All levels                   |
| <b>Framing</b>            | Physical layer framing format used for the E1 interface on the link: <b>G704</b> , <b>G704-NO-CRC4</b> , or <b>Unframed</b> . The default is <b>G704</b> .<br><br>Physical layer framing format used for the T1 interface on the link: <b>SF</b> and <b>ESF</b> . The default is <b>ESF</b> . | All levels                   |
| <b>Device flags</b>       | Information about the physical device. Possible values are described in the “Device Flags” section under <i>Common Output Fields Description</i> .                                                                                                                                            | All levels                   |
| <b>Interface flags</b>    | Information about the interface. Possible values are described in the “Interface Flags” section under <i>Common Output Fields Description</i> .                                                                                                                                               | All levels                   |
| <b>Link flags</b>         | Information about the link. Possible values are described in the “Link Flags” section under <i>Common Output Fields Description</i> .                                                                                                                                                         | All levels                   |
| <b>Hold-times</b>         | Current interface hold-time up and hold-time down, in milliseconds.                                                                                                                                                                                                                           | <b>detail extensive</b>      |



Table 46: T1 or E1 show interfaces Output Fields (*continued*)

| Field Name              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Level of Output              |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>IMA Link alarms</b>  | Current active IMA link alarms, including the following: <ul style="list-style-type: none"> <li>• LIF</li> <li>• LODS</li> <li>• RFI-IMA</li> <li>• Tx-Mis-Connected</li> <li>• Tx-Unusable-FE</li> <li>• Rx-Unusable-FE</li> <li>• Link Fault</li> </ul>                                                                                                                                                                                                                                                                                                            | <b>detail extensive none</b> |
| <b>IMA Link defects</b> | Current active IMA link defects, including the following: <ul style="list-style-type: none"> <li>• LIF</li> <li>• LODS</li> <li>• RFI-IMA</li> <li>• Tx-Mis-Connected</li> <li>• Tx-Unusable-FE</li> <li>• Rx-Unusable-FE</li> <li>• Link Fault</li> </ul>                                                                                                                                                                                                                                                                                                           | <b>detail extensive none</b> |
| <b>IMA Link state</b>   | Current active IMA link status, including the following: <ul style="list-style-type: none"> <li>• <b>Line:</b> synchronized or not synchronized</li> <li>• <b>Near end:</b>—Status of near-end receive and transmit links <ul style="list-style-type: none"> <li>• <b>Rx:</b> Usable or Unusable</li> <li>• <b>Tx:</b> Usable or Unusable</li> </ul> </li> <li>• <b>Far end:</b>—Status of far-end receive and transmit links <ul style="list-style-type: none"> <li>• <b>Rx:</b> Usable or Unusable</li> <li>• <b>Tx:</b> Usable or Unusable</li> </ul> </li> </ul> | <b>detail extensive none</b> |

Table 46: T1 or E1 show interfaces Output Fields (*continued*)

| Field Name           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Level of Output       |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| IMA link media       | <p>IMA Link Media Status, which provides the seconds and count state for the following link media parameters:</p> <ul style="list-style-type: none"> <li>• LIF</li> <li>• LODS</li> <li>• Err-ICP</li> <li>• IV</li> <li>• Rx-FC</li> <li>• Tx-FC</li> <li>• FE-Defects</li> <li>• FE-Rx-FC</li> <li>• FE-Tx-FC</li> <li>• Rx-ICP</li> <li>• Rx-Stuff</li> <li>• Tx-ICP</li> <li>• Tx-Stuff</li> <li>• Rx-SES</li> <li>• Rx-UAS</li> <li>• Rx-UUS</li> <li>• Tx-UUS</li> <li>• FE-Rx-SES</li> <li>• FE-Rx-UAS</li> <li>• FE-Rx-UUS</li> <li>• FE-Tx-UUS</li> </ul>                                                                                                                                                                                                                         | detail extensive none |
| Keepalive settings   | <p>(PPP and HDLC) Configured settings for keepalives.</p> <ul style="list-style-type: none"> <li>• <b>interval seconds</b>—The time in seconds between successive keepalive requests. The range is 10 seconds through 32,767 seconds, with a default of 10 seconds.</li> <li>• <b>down-count number</b>—The number of keepalive packets a destination must fail to receive before the network takes a link down. The range is 1 through 255, with a default of 3.</li> <li>• <b>up-count number</b>—The number of keepalive packets a destination must receive to change a link's status from down to up. The range is 1 through 255, with a default of 1.</li> </ul>                                                                                                                      | detail extensive none |
| Keepalive statistics | <p>(PPP and HDLC) Information about keepalive packets. (When no level of output is specified, the word <b>statistics</b> is not part of the field name and the <b>last seen</b> text is not displayed.)</p> <ul style="list-style-type: none"> <li>• <b>Input</b>—Number of keepalive packets received by PPP. <ul style="list-style-type: none"> <li>• (last seen 00:00:00 ago)—Time since the last keepalive packet was received, in the format <i>hh:mm:ss</i>.</li> </ul> </li> <li>• <b>Output</b>—Number of keepalive packets sent by PPP and how long ago the last keepalive packets were sent and received. <ul style="list-style-type: none"> <li>• (last seen 00:00:00 ago)—Time since the last keepalive packet was sent, in the format <i>hh:mm:ss</i>.</li> </ul> </li> </ul> | detail extensive none |

Table 46: T1 or E1 show interfaces Output Fields (*continued*)

| Field Name            | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Level of Output              |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>LMI settings</b>   | <p>(Frame Relay) Settings for Local Management Interface (LMI) which can be either ANSI LMI settings or ITU LMI settings. ANSI LMI settings is the default. The format is <b>(ANSI or ITU) LMI settings: value, value... xx</b> seconds, where <i>value</i> can be:</p> <ul style="list-style-type: none"> <li>• <b>n391dte</b>—DTE full status polling interval (1–255)</li> <li>• <b>n392dce</b>—DCE error threshold (1–10)</li> <li>• <b>n392dte</b>—DTE error threshold (1–10)</li> <li>• <b>n393dce</b>—DCE monitored event count (1–10)</li> <li>• <b>n393dte</b>—DTE monitored event count (1–10)</li> <li>• <b>t391dte</b>—DTE polling timer (5–30 seconds)</li> <li>• <b>t392dce</b>—DCE polling verification timer (5–30 seconds)</li> </ul> | <b>detail extensive none</b> |
| <b>LMI</b>            | <p>(Frame Relay) Local Management Interface (LMI) packet statistics:</p> <ul style="list-style-type: none"> <li>• <b>Input</b>—Number of packets coming in on the interface (<i>nn</i>) and how much time has passed since the last packet arrived. The format is <b>Input: nn (last seen hh:mm:ss ago)</b>.</li> <li>• <b>Output</b>—Number of packets sent out on the interface (<i>nn</i>) and how much time has passed since the last packet was sent. The format is <b>Output: nn (last sent hh:mm:ss ago)</b>.</li> </ul>                                                                                                                                                                                                                        | <b>detail extensive none</b> |
| <b>DTE statistics</b> | <p>(Frame Relay) Statistics about messages transmitted from the data terminal equipment (DTE) to the data communications equipment (DCE):</p> <ul style="list-style-type: none"> <li>• <b>Enquiries sent</b>—Number of link status enquiries sent from the DTE to the DCE.</li> <li>• <b>Full enquiries sent</b>—Number of full enquiries sent from the DTE to the DCE.</li> <li>• <b>Enquiry responses received</b>—Number of enquiry responses received by the DTE from the DCE.</li> <li>• <b>Full enquiry responses received</b>—Number of full enquiry responses sent from the DTE to the DCE.</li> </ul>                                                                                                                                         | <b>detail extensive none</b> |
| <b>DCE statistics</b> | <p>(Frame Relay) Statistics about messages transmitted from the DCE to the DTE:</p> <ul style="list-style-type: none"> <li>• <b>Enquiries received</b>—Number of enquiries received by the DCE from the DTE.</li> <li>• <b>Full enquiries received</b>—Number of full enquiries received by the DCE from the DTE.</li> <li>• <b>Enquiry responses sent</b>—Number of enquiry responses sent from the DCE to the DTE.</li> <li>• <b>Full enquiry responses sent</b>—Number of full enquiry responses sent from the DCE to the DTE.</li> </ul>                                                                                                                                                                                                           | <b>detail extensive none</b> |

Table 46: T1 or E1 show interfaces Output Fields (*continued*)

| Field Name                       | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Level of Output              |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Common statistics</b>         | (Frame Relay) Statistics about messages sent between the DTE and the DCE: <ul style="list-style-type: none"> <li>• <b>Unknown messages received</b>—Number of received packets that do not fall into any category.</li> <li>• <b>Asynchronous updates received</b>—Number of link status peer changes received.</li> <li>• <b>Out-of-sequence packets received</b>—Number of packets for which the sequence of the packets received is different from the expected sequence.</li> <li>• <b>Keepalive responses timedout</b>—Number of keepalive responses that timed out when no Local Management Interface (LMI) packet was reported for <b>n392dte</b> or <b>n393dce</b> intervals. (See <b>LMI settings</b>.)</li> </ul>                                                             | <b>detail extensive none</b> |
| <b>Nonmatching DCE-end DLCIs</b> | (Frame Relay. Displayed only from the DTE.) Number of DLCIs configured from the DCE.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive none</b> |
| <b>LCP state</b>                 | (PPP) Link Control Protocol state. <ul style="list-style-type: none"> <li>• <b>Conf-ack-received</b>—Acknowledgement was received.</li> <li>• <b>Conf-ack-sent</b>—Acknowledgement was sent.</li> <li>• <b>Conf-req-sent</b>—Request was sent.</li> <li>• <b>Down</b>—LCP negotiation is incomplete (not yet completed or has failed).</li> <li>• <b>Not configured</b>—LCP is not configured on the interface.</li> <li>• <b>Opened</b>—LCP negotiation is successful.</li> </ul>                                                                                                                                                                                                                                                                                                      | <b>detail extensive none</b> |
| <b>NCP state</b>                 | (PPP) Network Control Protocol state. <ul style="list-style-type: none"> <li>• <b>Conf-ack-received</b>—Acknowledgement was received.</li> <li>• <b>Conf-ack-sent</b>—Acknowledgement was sent.</li> <li>• <b>Conf-req-sent</b>—Request was sent.</li> <li>• <b>Down</b>—NCP negotiation is incomplete (not yet completed or has failed).</li> <li>• <b>Not configured</b>—NCP is not configured on the interface.</li> <li>• <b>Opened</b>—NCP negotiation is successful.</li> </ul>                                                                                                                                                                                                                                                                                                   | <b>detail extensive none</b> |
| <b>CHAP state</b>                | (PPP) State of the Challenge Handshake Authentication Protocol (CHAP) during its transaction. <ul style="list-style-type: none"> <li>• <b>Chap-Chal-received</b>—Challenge was received but response is not yet sent.</li> <li>• <b>Chap-Chal-sent</b>—Challenge was sent.</li> <li>• <b>Chap-Resp-received</b>—Response was received for the challenge sent, but CHAP has not yet moved into the Success state. (Most likely with RADIUS authentication.)</li> <li>• <b>Chap-Resp-sent</b>—Response was sent for the challenge received.</li> <li>• <b>Down</b>—CHAP authentication is incomplete (not yet completed or has failed).</li> <li>• <b>Not-configured</b>—CHAP is not configured on the interface.</li> <li>• <b>Opened</b>—CHAP authentication was successful.</li> </ul> | <b>detail extensive none</b> |
| <b>Last flapped</b>              | Date, time, and how long ago the interface went from down to up. The format is <b>Last flapped: year-month-day hour:minute:second timezone (hour:minute:second ago)</b> . For example, <b>Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago)</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive none</b> |

Table 46: T1 or E1 show interfaces Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Level of Output              |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>CoS Queues</b>              | Number of CoS queues configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive</b> none |
| <b>Input rate</b>              | Input rate in bits per second (bps) and packets per second (pps).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | None specified               |
| <b>Output rate</b>             | Output rate in bps and pps.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | None specified               |
| <b>Statistics last cleared</b> | Time when the statistics for the interface were last set to zero.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive</b>      |
| <b>Traffic statistics</b>      | <p>Number and rate of bytes and packets received and transmitted on the physical interface.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive</b>      |
| <b>Input errors</b>            | <p>Input errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Errors</b>—Sum of the incoming frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Framing errors</b>—Number of packets received with an invalid frame checksum (FCS).</li> <li>• <b>Policed discards</b>—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle.</li> <li>• <b>L3 incompletes</b>—Number of incoming packets discarded because they failed Layer 3 (usually IPv4) sanity checks of the header. For example, a frame with less than 20 bytes of available IP header is discarded.</li> <li>• <b>L2 channel errors</b>—Number of times the software did not find a valid logical interface for an incoming frame.</li> <li>• <b>L2 mismatch timeouts</b>—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable.</li> <li>• <b>HS link CRC errors</b>—Number of errors on the high-speed links between the ASICs responsible for handling the router interfaces.</li> <li>• <b>SRAM errors</b>—Number of hardware errors that occurred in the static RAM (SRAM) on the PIC or PIM. If the value of this field increments, the PIC or PIM is malfunctioning.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b>             |

Table 46: T1 or E1 show interfaces Output Fields (*continued*)

| Field Name                              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Level of Output              |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Output errors</b>                    | <p>Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Carrier transitions</b>—Number of times the interface has gone from <b>down</b> to <b>up</b>. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC or PIM is malfunctioning.</li> <li>• <b>Errors</b>—Sum of the outgoing frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Aged packets</b>—Number of packets that remained in shared packet SDRAM so long that the system automatically purged them. The value in this field should never increment. If it does, it is most likely a software bug or possibly malfunctioning hardware.</li> <li>• <b>MTU errors</b>—Number of packets whose size exceeded the MTU of the interface.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b>             |
| <b>Queue counters</b>                   | <p>CoS queue number and its associated user-configured forwarding class name.</p> <ul style="list-style-type: none"> <li>• <b>Queued packets</b>—Number of queued packets.</li> <li>• <b>Transmitted packets</b>—Number of transmitted packets.</li> <li>• <b>Dropped packets</b>—Number of packets dropped by the ASIC's RED mechanism.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive</b>      |
| <b>DS1 alarms</b><br><b>DS1 defects</b> | <p>E1 media-specific defects that can prevent the interface from passing packets. When a defect persists for a certain amount of time, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router, or turn on the red or yellow alarm LED on the craft interface. The following lists all possible alarms and defects. For complete explanations of most of these alarms and defects, see <i>Bellcore Telcordia GR-499-CORE</i>.</p> <ul style="list-style-type: none"> <li>• <b>AIS</b>—Alarm indication signal.</li> <li>• <b>LOF</b>—Loss of frame.</li> <li>• <b>LOS</b>—Loss of signal.</li> <li>• <b>YLW</b>—Yellow alarm. Indicates errors at the remote site receiver.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive none</b> |

Table 46: T1 or E1 show interfaces Output Fields (*continued*)

| Field Name           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Level of Output |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| T1 media or E1 media | <p>Counts of T1 or E1 media-specific errors.</p> <ul style="list-style-type: none"> <li>• <b>Seconds</b>—Number of seconds the defect has been active.</li> <li>• <b>Count</b>—Number of times that the defect has gone from inactive to active.</li> <li>• <b>State</b>—State of the error. State other than <b>OK</b> indicates a problem.<br/>The T1 or E1 media-specific error types are:</li> <li>• <b>SEF</b>—Severely errored framing</li> <li>• <b>BEE</b>—Bit error</li> <li>• <b>AIS</b>—Alarm indication signal</li> <li>• <b>LOF</b>—Loss of frame</li> <li>• <b>LOS</b>—Loss of signal</li> <li>• <b>YELLOW</b>—Errors at the remote site receiver</li> <li>• <b>CRC Major</b>—Cyclic redundancy check major alarm threshold exceeded</li> <li>• <b>CRC Minor</b>—Cyclic redundancy check minor alarm threshold exceeded</li> <li>• <b>BPV</b>—Bipolar violation</li> <li>• <b>EXZ</b>—Excessive zeros</li> <li>• <b>LCV</b>—Line code violation</li> <li>• <b>PCV</b>—Pulse code violation</li> <li>• <b>CS</b>—Carrier state</li> <li>• <b>CRC</b>—Cyclic redundancy check</li> <li>• <b>FEBE</b>—Far-end block error (E1 only)</li> <li>• <b>LES</b>—Line error seconds</li> <li>• <b>ES</b>—Errored seconds</li> <li>• <b>BES</b>—Bursty errored seconds</li> <li>• <b>SES</b>—Severely errored seconds</li> <li>• <b>SEFS</b>—Severely errored framing seconds</li> <li>• <b>UAS</b>—Unavailable seconds</li> </ul> | extensive       |
| SAToP Configuration  | <p>Information about the SAToP configuration.</p> <ul style="list-style-type: none"> <li>• <b>payload-size</b>—Configure the payload size, in bytes (from 32 through 1024 bytes).</li> <li>• <b>idle-pattern</b>—An 8-bit hexadecimal pattern to replace TDM data in a lost packet (from 0 through 255).</li> <li>• <b>jitter-buffer-packets</b>—Number of packets in the jitter buffer (from 1 through 64 packets).</li> <li>• <b>jitter-buffer-latency</b>—Time delay in the jitter buffer (from 1 through 1000 milliseconds).</li> <li>• <b>excessive-packet-loss-rate</b>—Set packet loss options. The options are <b>groups</b>, <b>sample-period</b>, and <b>threshold</b>.</li> <li>• <b>sample-period</b>—Time required to calculate excessive packet loss rate (from 1000 through 65,535 milliseconds).</li> <li>• <b>threshold</b>—Percentile designating the threshold of excessive packet loss rate (1–100 percent).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | extensive       |

Table 46: T1 or E1 show interfaces Output Fields (*continued*)

| Field Name                                    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Level of Output              |
|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>CESoPSN Configuration</b>                  | <p>Information about the CESoPSN configuration.</p> <ul style="list-style-type: none"> <li>• <b>packetization-latency</b>—Time required to create packets (from 1000 through 8000 microseconds).</li> <li>• <b>idle-pattern</b>—An 8-bit hexadecimal pattern to replace TDM data in a lost packet (from 0 through 255).</li> <li>• <b>jitter-buffer-packets</b>—Number of packets in the jitter buffer (from 1 through 64 packets).</li> <li>• <b>jitter-buffer-latency</b>—Time delay in the jitter buffer (from 1 through 1000 milliseconds).</li> <li>• <b>excessive-packet-loss-rate</b>—Set packet loss options. The options are <b>sample-period</b> and <b>threshold</b>.</li> <li>• <b>sample-period</b>—Time required to calculate excessive packet loss rate (from 1000 through 65,535 milliseconds).</li> <li>• <b>threshold</b>—Percentile designating the threshold of excessive packet loss rate (1–100 percent).</li> </ul>                                                                                                                                                                            | <b>extensive</b>             |
| <b>HDLC configuration</b>                     | <p>Information about the HDLC configuration.</p> <ul style="list-style-type: none"> <li>• <b>Policing bucket</b>—Configured state of the receiving policer.</li> <li>• <b>Shaping bucket</b>—Configured state of the transmitting shaper.</li> <li>• <b>Giant threshold</b>—Giant threshold programmed into the hardware.</li> <li>• <b>Runt threshold</b>—Runt threshold programmed into the hardware.</li> <li>• <b>Timeslots</b>—Time slots configured on the interface.</li> <li>• <b>Buildout</b>—(T1 only) Buildout setting: 0-132, 133-265, 266-398, 399-531, or 532-655 feet.</li> <li>• <b>Timeslots</b>—Configured time slots for the interface.</li> <li>• <b>Byte encoding</b>—(T1 only) Byte encoding used: <b>Nx64K</b> or <b>Nx56K</b>.</li> <li>• <b>Line encoding</b>—Line encoding used. For T1, the value can be <b>B8ZS</b> or <b>AMI</b>. For E1, the value is <b>HDB3</b>.</li> <li>• <b>Data inversion</b>—HDLC data inversion setting: <b>Enabled</b> or <b>Disabled</b>.</li> <li>• <b>Idle cycle flag</b>—Idle cycle flags.</li> <li>• <b>Start end flag</b>—Start and end flag.</li> </ul> | <b>extensive</b>             |
| <b>DS1 BERT configuration</b>                 | <p>BERT (bit error rate test) checks the quality of the line. This output appears only when a BERT is run on the interface.</p> <ul style="list-style-type: none"> <li>• <b>BERT time period</b>—Configured total time period that the BERT is to run.</li> <li>• <b>Elapsed</b>—Actual time elapsed since the start of the BERT (in seconds).</li> <li>• <b>Induced error rate</b>—Configured rate at which the bit errors are induced in the BERT pattern.</li> <li>• <b>Algorithm</b>—Type of algorithm selected for the BERT.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail extensive none</b> |
| <b>Packet Forwarding Engine configuration</b> | <p>Information about the configuration of the Packet Forwarding Engine:</p> <ul style="list-style-type: none"> <li>• <b>Destination slot</b>—FPC slot number.</li> <li>• <b>PLP byte</b>—Packet Level Protocol byte.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>extensive</b>             |



Table 46: T1 or E1 show interfaces Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Level of Output              |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>CoS information</b>    | Information about the CoS queue for the physical interface. <ul style="list-style-type: none"> <li>• <b>CoS transmit queue</b>—Queue number and its associated user-configured forwarding class name.</li> <li>• <b>Bandwidth %</b>—Percentage of bandwidth allocated to the queue.</li> <li>• <b>Bandwidth bps</b>—Bandwidth allocated to the queue (in bps).</li> <li>• <b>Buffer %</b>—Percentage of buffer space allocated to the queue.</li> <li>• <b>Buffer usec</b>—Amount of buffer space allocated to the queue, in microseconds. This value is nonzero only if the buffer size is configured in terms of time.</li> <li>• <b>Priority</b>—Queue priority: <b>low</b> or <b>high</b>.</li> <li>• <b>Limit</b>—Displayed if rate limiting is configured for the queue. Possible values are <b>none</b> and <b>exact</b>. If <b>exact</b> is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If <b>none</b> is configured, the queue transmits beyond the configured bandwidth if bandwidth is available.</li> </ul> | <b>extensive</b>             |
| <b>Logical Interface</b>  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                              |
| <b>Logical interface</b>  | Name of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | All levels                   |
| <b>Index</b>              | Logical interface index number, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive none</b> |
| <b>SNMP ifIndex</b>       | Logical interface SNMP interface index number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail extensive none</b> |
| <b>Generation</b>         | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive</b>      |
| <b>Flags</b>              | Information about the interface. Possible values are described in the “Interface Flags” section under <i>Common Output Fields Description</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | All levels                   |
| <b>Encapsulation</b>      | Encapsulation on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels                   |
| <b>Input packets</b>      | Number of packets received on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | None specified               |
| <b>Output packets</b>     | Number of packets transmitted on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | None specified               |
| <b>Traffic statistics</b> | (Frame Relay) Number and rate of bytes and packets received and transmitted on the logical interface. <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive</b>      |
| <b>Local statistics</b>   | (Frame Relay) Statistics for traffic received from and transmitted to the Routing Engine. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes a while (generally, less than 1 second) for this counter to stabilize.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive</b>      |

Table 46: T1 or E1 show interfaces Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Level of Output              |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Transit statistics</b> | (Frame Relay) Statistics for traffic transiting the router. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. This counter normally stabilizes in less than 1 second.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>detail extensive</b>      |
| <b>Protocol</b>           | Protocol family configured on the logical interface, such as <b>iso</b> , <b>inet6</b> , <b>mlfr</b> , or <b>mpls</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive none</b> |
| <b>Multilink bundle</b>   | Interface name for the multilink bundle, if configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive none</b> |
| <b>MTU</b>                | MTU size on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive none</b> |
| <b>Generation</b>         | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive</b>      |
| <b>Route table</b>        | Routing table in which the logical interface address is located. For example, <b>0</b> refers to the routing table <b>inet.0</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive</b>      |
| <b>Flags</b>              | Information about the protocol family flags. Possible values are described in the “Family Flags” section under <i>Common Output Fields Description</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive none</b> |
| <b>Addresses, Flags</b>   | Information about the address flags. Possible values are described in the “Addresses Flags” section under <i>Common Output Fields Description</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>detail extensive none</b> |
| <b>Destination</b>        | IP address of the remote side of the connection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive none</b> |
| <b>Local</b>              | IP address of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail extensive none</b> |
| <b>Broadcast</b>          | Broadcast address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive none</b> |
| <b>Generation</b>         | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive none</b> |
| <b>DLCI</b>               | <p>(Frame Relay) DLCI number of the logical interface. The following DLCI information is displayed: <b>Flags</b>, <b>Total down time</b>, <b>Last down</b>, and <b>Traffic statistics</b> or (<b>Input packets</b>, <b>Output packets</b>). <b>Flags</b> can be one or more of the following:</p> <ul style="list-style-type: none"> <li>• <b>Active</b>—Set when the link is active and the DTE and DCE are exchanging information.</li> <li>• <b>Down</b>—Set when the link is active, but no information is received from the DCE.</li> <li>• <b>DCE-Unconfigured</b>—Set when the corresponding DLCI in the DCE is not configured.</li> <li>• <b>Configured</b>—Set when the corresponding DLCI in the DCE is configured.</li> <li>• <b>DCE-configured</b>—Displayed when the command is issued from the DTE.</li> </ul> | <b>detail extensive none</b> |
| <b>DLCI statistics</b>    | <p>(Frame Relay) Data-link connection identifier (DLCI) statistics.</p> <ul style="list-style-type: none"> <li>• <b>Active DLCI</b>—Number of active DLCIs.</li> <li>• <b>Inactive DLCI</b>—Number of inactive DLCIs.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive none</b> |

Table 46: T1 or E1 show interfaces Output Fields (*continued*)

| Field Name | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Level of Output |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| CE Info    | <p>Information related to the circuit emulation statistics.</p> <ul style="list-style-type: none"> <li>• <b>CE Tx</b>—Number of transmitted packets and bytes (TDM to PSN flow).</li> <li>• <b>CE Rx</b>—Number of received packets and bytes and forward bytes (PSN to TDM flow).</li> <li>• <b>CE Rx Forwarded</b>—Number of forwarded bytes.</li> <li>• <b>CE Strayed</b>—Number of stray packets.</li> <li>• <b>CE Lost</b>—Number of lost packets.</li> <li>• <b>CE Malformed</b>—Number of malformed packets</li> <li>• <b>CE Misinserted</b>—Number of misinserted packets.</li> <li>• <b>CE AIS dropped</b>—Number of dropped bytes due to buffer overrun (PSN to TDM).</li> <li>• <b>CE Dropped</b>—Number of dropped packets during resynchronization</li> <li>• <b>CE Overrun Events</b>—Number of overrun events.</li> <li>• <b>CE Underrun Events</b>—Number of underrun events.</li> </ul> | extensive       |

## Sample Output

### show interfaces (T1, IMA Link)

```

user@host> show interfaces t1-1/0/0
IMA Link alarms   : None
IMA Link defects  : LIF, LODS
IMA Link state:
  Line           : Not synchronized
  Near end : Rx: Unusable, Tx: Usable
  Far end  : Rx: Unusable, Tx: Usable
IMA link media:      Seconds      Count  State
LIF                  0           0  OK
LODS                  0           0  OK
Err-ICP               0           0  OK
IV                    0           0  OK
Rx-FC                  0           0  OK
Tx-FC                  0           0  OK
FE-Defects             0           0
FE-Rx-FC               0           0
FE-Tx-FC               0           0
Rx-ICP                 0           0
Rx-Stuff               0           0
Tx-ICP                 0          11
Tx-Stuff               0           0
Rx-SES                  0
Rx-UAS                  0
Rx-UUS                  1
Tx-UUS                  0
FE-Rx-SES              0
FE-Rx-UAS              0
FE-Rx-UUS              0
FE-Tx-UUS              0

```

### show interfaces (T1, PPP)

```
user@host> show interfaces t1-1/1/0
Physical interface: t1-1/1/0, Enabled, Physical link is Up
  Interface index: 149, SNMP ifIndex: 45
  Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: T1,
  Loopback: None, FCS: 16, Framing: ESF
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
  Link flags     : Keepalives
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive: Input: 0 (never), Output: 0 (never)
  LCP state: Opened
  NCP state: Opened
  CHAP state: Opened
  CoS queues    : 4 supported, 4 in use
  Last flapped  : 2005-12-05 08:43:06 PST (02:13:35 ago)
  Input rate    : 0 bps (0 pps)
  Output rate   : 72 bps (0 pps)
  DS1 alarms   : None
  DS1 defects   : None

Logical interface t1-1/1/0.0 (Index 66) (SNMP ifIndex 51)
  Flags: Hardware-Down Point-To-Point SNMP-Traps Encapsulation: PPP
  Protocol inet, MTU: 1500
  Flags: Protocol-Down
  Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
    Destination: 1.1.1/24, Local: 1.1.1.1, Broadcast: 1.1.1.255
```

### show interfaces detail (T1, PPP)

```
user@host> show interfaces t1-1/1/0 detail
Physical interface: t1-1/1/0, Enabled, Physical link is Up
  Interface index: 149, SNMP ifIndex: 45, Generation: 32
  Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: T1,
  Loopback: None, FCS: 16, Framing: ESF
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
  Link flags     : Keepalives
  Hold-times     : Up 0 ms, Down 0 ms
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive statistics:
    Input : 0 (last seen: never)
    Output: 0 (last sent: never)
  LCP state: Opened
  NCP state: Opened
  CHAP state: Opened
  CoS queues    : 4 supported, 4 in use
  Last flapped  : 2005-12-05 08:43:06 PST (02:13:52 ago)
  Statistics last cleared: Never
  Traffic statistics:
    Input bytes :          0          0 bps
    Output bytes :        798          0 bps
    Input packets:          0          0 pps
    Output packets:        42          0 pps
  Queue counters:      Queued packets  Transmitted packets  Dropped packets

    0 best-effort          0          0          0

    1 expedited-fo        0          0          0
```

```

2 assured-forw          0          0          0
3 network-cont          40         40          0

DS1  alarms   : None
DS1  defects  : None
DS1  BERT configuration:
      BERT time period: 10 seconds, Elapsed: 0 seconds
      Induced Error rate: 10e-0, Algorithm: 2^15 - 1
Logical interface t1-1/1/0.0 (Index 66) (SNMP ifIndex 51) (Generation 5)
Flags: Hardware-Down Point-To-Point SNMP-Traps Encapsulation: PPP
Protocol inet, MTU: 1500, Generation: 14, Route table: 0
Flags: Protocol-Down
Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
      Destination: 1.1.1/24, Local: 1.1.1.1, Broadcast: 1.1.1.255,
      Generation: 18

```

### show interfaces extensive (T1 CRC Errors)

```

user@host> show interfaces t1-3/2/0:1:1 extensive
Physical interface: t1-3/2/0:1:1, Enabled, Physical link is Down
Interface index: 179, SNMP ifIndex: 79, Generation: 180
:
:
DS1  alarms   : AIS, LOF, CRC Major, CRC Minor
DS1  defects  : AIS, LOF, CRC Major, CRC Minor
T1  media:      Seconds      Count  State
SEF              1           1  OK
BEE              1           1  OK
AIS             1128          1  Defect Active
LOF             1128          1  Defect Active
LOS              0           0  OK
YELLOW           0           0  OK
CRC Major        154          1  Defect Active
CRC Minor        154          1  Defect Active
BPV              0           0
EXZ              0           0
LCV              0           0
PCV              0           0
CS               0           0
CRC             154         15400
...

```

### show interfaces extensive (T1, PPP)

```

user@host> show interfaces t1-1/1/0 extensive
Physical interface: t1-1/1/0, Enabled, Physical link is Up
Interface index: 149, SNMP ifIndex: 45, Generation: 32
Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: T1,
Loopback: None, FCS: 16, Framing: ESF
Device flags   : Present Running
Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
Link flags     : Keepalives
Hold-times     : Up 0 ms, Down 0 ms
Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
Keepalive statistics:
  Input : 0 (last seen: never)
  Output: 0 (last sent: never)
LCP state: Down
NCP state: inet: Not-configured, inet6: Not-configured, iso: Not-configured,
mpls: Not-configured

```

```

CHAP state: Closed
CoS queues      : 4 supported, 4 in use
Last flapped    : 2005-12-05 08:43:06 PST (02:13:54 ago)
Statistics last cleared: Never
Traffic statistics:
  Input bytes   :                0                0 bps
  Output bytes  :               817               72 bps
  Input packets :                0                0 pps
  Output packets:               43               0 pps
Input errors:
  Errors: 0, Drops: 0, Framing errors: 0, Policed discards: 0,
  L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
  HS link CRC errors: 0, SRAM errors: 0, Resource errors: 0
Output errors:
  Carrier transitions: 1, Errors: 0, Drops: 0, Aged packets: 0, MTU errors: 0,

  Resource errors: 0
Queue counters:      Queued packets  Transmitted packets      Dropped packets

  0 best-effort      0                0                0
  1 expedited-fo     0                0                0
  2 assured-forw     0                0                0
  3 network-cont     42               42               0

DS1  alarms   : None
DS1  defects  : None
T1  media:
      Seconds      Count  State
SEF          1          1  OK
BEE          0          0  OK
AIS          0          0  OK
LOF          1          1  OK
LOS          0          0  OK
YELLOW       1          1  OK
BPV          1          1
EXZ          1          1
LCV          1       65535
PCV          1       1023
CS           0          0
LES          1
ES           1
SES          1
SEFS         1
BES          0
UAS          0

HDLC configuration:
  Policing bucket: Disabled
  Shaping bucket : Disabled
  Giant threshold: 1514, Runt threshold: 3
  Timeslots      : All active
  Line encoding: B8ZS
  Buildout       : 0 to 132 feet
  Byte encoding: Nx64K, Data inversion: Disabled, Idle cycle flag: flags,
  Start end flag: shared
DS1 BERT configuration:
  BERT time period: 10 seconds, Elapsed: 0 seconds
  Induced Error rate: 10e-0, Algorithm: 2^15 - 1
Packet Forwarding Engine configuration:
  Destination slot: 1, PLP byte: 1 (0x00)

```

```

CoS information:
  CoS transmit queue      Bandwidth      Buffer  Priority  Limit
                           %      bps      %      usec
0 best-effort             95      1459200  95        0      low  none
3 network-control         5       76800   5         0      low  none

Logical interface t1-1/1/0.0 (Index 66) (SNMP ifIndex 51) (Generation 5)
Flags: Hardware-Down Point-To-Point SNMP-Traps Encapsulation: PPP
Protocol inet, MTU: 1500, Generation: 14, Route table: 0
Flags: Protocol-Down
Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
Destination: 1.1.1/24, Local: 1.1.1.1, Broadcast: 1.1.1.255,
Generation: 18

```

### show interfaces (E1, Frame Relay)

```

user@host> show interfaces e1-3/0/0
Physical interface: e1-3/0/0, Enabled, Physical link is Up
  Interface index: 146, SNMP ifIndex: 37
  Link-level type: Frame-Relay, MTU: 1504, Clocking: Internal, Speed: E1,
  Loopback: None, FCS: 16, Framing: G704
  Device flags   : Present Running
  Interface flags: Link-Layer-Down Point-To-Point SNMP-Traps 16384
  Link flags     : Keepalives DTE
  ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
  LMI: Input: 0 (never), Output: 11 (00:00:05 ago)
  DTE statistics:
    Enquiries sent           : 10
    Full enquiries sent      : 1
    Enquiry responses received : 0
    Full enquiry responses received : 0
  DCE statistics:
    Enquiries received       : 0
    Full enquiries received  : 0
    Enquiry responses sent   : 0
    Full enquiry responses sent : 0
  Common statistics:
    Unknown messages received : 0
    Asynchronous updates received : 0
    Out-of-sequence packets received : 0
    Keepalive responses timedout : 1
  CoS queues   : 8 supported
  Last flapped : 2005-11-30 14:50:34 PST (4d 20:33 ago)
  Input rate   : 0 bps (0 pps)
  Output rate  : 0 bps (0 pps)
  DS1 alarms   : None
  DS1 defects  : None
  Logical interface e1-3/0/0.0 (Index 72) (SNMP ifIndex 32)
  Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: FR-NLPID
  Input packets : 0
  Output packets: 0
  Protocol inet, MTU: 1500
  Flags: None
  Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
  Destination: 10.1.3/24, Local: 10.1.3.1, Broadcast: 10.1.3.255
  DLCI 100
  Flags: Down, DCE-Unconfigured
  Total down time: 00:01:13 sec, Last down: 00:01:13 ago
  Input packets : 0
  Output packets: 0

```

```

DLCI statistics:
  Active DLCI :0  Inactive DLCI :1

```

### show interfaces detail (E1, Frame Relay)

```

user@host> show interfaces e1-3/0/0 detail
Physical interface: e1-3/0/0, Enabled, Physical link is Up
  Interface index: 146, SNMP ifIndex: 37, Generation: 69
  Link-level type: Frame-Relay, MTU: 1504, Clocking: Internal, Speed: E1,
  Loopback: None, FCS: 16, Framing: G704
  Device flags   : Present Running
  Interface flags: Link-Layer-Down Point-To-Point SNMP-Traps 16384
  Link flags     : Keepalives DTE
  Hold-times    : Up 0 ms, Down 0 ms
  ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
  LMI statistics:
    Input : 0 (last seen: never)
    Output: 12 (last sent 00:00:02 ago)
  DTE statistics:
    Enquiries sent           : 10
    Full enquiries sent      : 2
    Enquiry responses received : 0
    Full enquiry responses received : 0
  DCE statistics:
    Enquiries received       : 0
    Full enquiries received  : 0
    Enquiry responses sent   : 0
    Full enquiry responses sent : 0
  Common statistics:
    Unknown messages received : 0
    Asynchronous updates received : 0
    Out-of-sequence packets received : 0
    Keepalive responses timedout : 1
  CoS queues : 8 supported
  Last flapped : 2005-11-30 14:50:34 PST (4d 20:33 ago)
  Statistics last cleared: Never
  Traffic statistics:
    Input bytes : 0 0 bps
    Output bytes : 225 56 bps
    Input packets: 0 0 pps
    Output packets: 15 0 pps
  Queue counters:

```

|                | Queued packets | Transmitted packets | Dropped packets |
|----------------|----------------|---------------------|-----------------|
| 0 limited      | 0              | 0                   | 0               |
| 1 expedited-fo | 0              | 0                   | 0               |
| 2 real-plus    | 0              | 0                   | 0               |
| 3 network-cont | 15             | 15                  | 0               |

```

  DS1 alarms : None
  DS1 defects : None
  DS1 BERT configuration:
    BERT time period: 10 seconds, Elapsed: 0 seconds
    Induced Error rate: 10e-0, Algorithm: 2^15 - 1, 0.151, Pseudorandom (9)
  Logical interface e1-3/0/0.0 (Index 72) (SNMP ifIndex 32) (Generation 26)
  Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: FR-NLPID
  Traffic statistics:
    Input bytes : 0
    Output bytes : 0

```



```

Input packets:          0
Output packets:         0
Local statistics:
Input bytes :           0
Output bytes :          0
Input packets:          0
Output packets:         0
Transit statistics:
Input bytes :           0          0 bps
Output bytes :          0          0 bps
Input packets:          0          0 pps
Output packets:         0          0 pps
Protocol inet, MTU: 1500, Generation: 32, Route table: 0
Flags: None
Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
Destination: 10.1.3/24, Local: 10.1.3.1, Broadcast: 10.1.3.255,
Generation: 42
DLCI 100
Flags: Down, DCE-Unconfigured
Total down time: 00:01:18 sec, Last down: 00:01:18 ago
Traffic statistics:
Input bytes :           0
Output bytes :          0
Input packets:          0
Output packets:         0
DLCI statistics:
Active DLCI :0 Inactive DLCI :1

```

#### show interfaces extensive (E1, Frame Relay)

```

user@host> show interfaces e1-3/0/0 extensive
Physical interface: e1-3/0/0, Enabled, Physical link is Up
Interface index: 146, SNMP ifIndex: 37, Generation: 69
Link-level type: Frame-Relay, MTU: 1504, Clocking: Internal, Speed: E1,
Loopback: None, FCS: 16, Framing: G704
Device flags : Present Running
Interface flags: Link-Layer-Down Point-To-Point SNMP-Traps 16384
Link flags : Keepalives DTE
Hold-times : Up 0 ms, Down 0 ms
ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
LMI statistics:
Input : 0 (last seen: never)
Output: 12 (last sent 00:00:05 ago)
DTE statistics:
Enquiries sent : 10
Full enquiries sent : 2
Enquiry responses received : 0
Full enquiry responses received : 0
DCE statistics:
Enquiries received : 0
Full enquiries received : 0
Enquiry responses sent : 0
Full enquiry responses sent : 0
Common statistics:
Unknown messages received : 0
Asynchronous updates received : 0
Out-of-sequence packets received : 0
Keepalive responses timedout : 1
CoS queues : 8 supported
Last flapped : 2005-11-30 14:50:34 PST (4d 20:33 ago)
Statistics last cleared: Never

```

```

Traffic statistics:
Input bytes :          0          0 bps
Output bytes :        225          0 bps
Input packets:         0          0 pps
Output packets:       15          0 pps
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Policed discards: 0,
L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
HS link CRC errors: 0, SRAM errors: 0, Resource errors: 0
Output errors:
Carrier transitions: 17, Errors: 0, Drops: 0, Aged packets: 0,
MTU errors: 0, Resource errors: 0
Queue counters:      Queued packets  Transmitted packets      Dropped packets

0 limited            0              0              0

1 expedited-fo       0              0              0

2 real-plus          0              0              0

3 network-cont       15             15             0

DS1  alarms   : None
DS1  defects  : None
E1  media:    Seconds      Count  State
SEF           0           0  OK
BEE           5           5  OK
AIS           0           0  OK
LOF          245          15  OK
LOS          245           4  OK
YELLOW        0          11  OK
BPV           0           0
EXZ           9           9
LCV           0           0
PCV           0           0
CS            0           0
FEBE          0           0
LES           0
ES            0
SES           0
SEFS          0
BES           0
UAS          271

HDLC configuration:
Policing bucket: Disabled
Shaping bucket : Disabled
Giant threshold: 1506, Runt threshold: 0
Timeslots      : All active
Line encoding: HDB3, Data inversion: Disabled, Idle cycle flag: flags,
Start end flag: shared
DS1 BERT configuration:
BERT time period: 10 seconds, Elapsed: 0 seconds
Induced Error rate: 10e-0, Algorithm: 2^15 - 1, 0.151, Pseudorandom (9)
Packet Forwarding Engine configuration:
Destination slot: 3, PLP byte: 1 (0x00)
CoS information:
CoS transmit queue    Bandwidth      Buffer  Priority  Limit
                        %      bps      %      usec
0 limited             95    1945600  95        0      low  none
3 network-control     5     102400   5         0      low  none
Logical interface e1-3/0/0.0 (Index 72) (SNMP ifIndex 32) (Generation 26)

```

```

Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: FR-NLPID
Traffic statistics:
  Input bytes :          0
  Output bytes :          0
  Input packets:         0
  Output packets:        0
Local statistics:
  Input bytes :          0
  Output bytes :          0
  Input packets:         0
  Output packets:        0
Transit statistics:
  Input bytes :          0          0 bps
  Output bytes :          0          0 bps
  Input packets:         0          0 pps
  Output packets:        0          0 pps
Protocol inet, MTU: 1500, Generation: 32, Route table: 0
  Flags: None
  Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
    Destination: 10.1.3/24, Local: 10.1.3.1, Broadcast: 10.1.3.255,
    Generation: 42
  DLCI 100
    Flags: Down, DCE-Unconfigured
    Total down time: 00:01:21 sec, Last down: 00:01:21 ago
    Traffic statistics:
      Input bytes :          0
      Output bytes :          0
      Input packets:         0
      Output packets:        0
  DLCI statistics:
    Active DLCI :0 Inactive DLCI :1

```

### show interfaces (E1, IMA Link)

```

user@host> show interfaces e1-1/0/0
IMA Link alarms : None
IMA Link defects : LIF, LODS
IMA Link state:
  Line : Not synchronized
  Near end : Rx: Unusable, Tx: Usable
  Far end : Rx: Unusable, Tx: Usable
IMA link media:      Seconds      Count  State
LIF                  0          0
LODS                  0          0
Err-ICP               0          0
IV                    0          0
Rx-FC                 0          0
Tx-FC                 0          0
FE-Defects            0          0
FE-Rx-FC              0          0
FE-Tx-FC              0          0
Rx-ICP                0          0
Rx-Stuff              0          0
Tx-ICP                0          0
Tx-Stuff              0          0
Rx-SES                0          0
Rx-UAS                0          0
Rx-UUS                1          0
Tx-UUS                0          0
FE-Rx-SES             0          0
FE-Rx-UAS             0          0

```

```

FE-Rx-UUS          0
FE-Tx-UUS          0

```

### show interfaces extensive (T1, TDM-CCC-SATOP)

```

user@host>show interfaces t1-1/0/0:1:1 extensive
Physical interface: t1-1/0/0:1:1, Enabled, Physical link is Down
  Interface index: 153, SNMP ifIndex: 579, Generation: 817
  Link-level type: TDM-CCC-SATOP, MTU: 1504, Clocking: Internal, Speed: T1,
Loopback: None, FCS: 16, Framing: ESF,
  Parent: coc1-1/0/0:1 Interface index 152
  Device flags   : Present Running Down
  Interface flags: Hardware-Down Point-To-Point SNMP-Traps Internal: 0x0
  Link flags     : None
  Hold-times     : Up 0 ms, Down 0 ms
  CoS queues     : 8 supported, 8 maximum usable queues
  Last flapped   : 2012-10-28 02:12:40 PDT (22:32:13 ago)
  Statistics last cleared: 2012-10-29 00:44:52 PDT (00:00:01 ago)
  Egress queues: 8 supported, 4 in use
  Queue counters:

```

|                | Queued packets | Transmitted packets | Dropped packets |
|----------------|----------------|---------------------|-----------------|
| 0 best-effort  | 0              | 0                   | 0               |
| 1 expedited-fo | 0              | 0                   | 0               |
| 2 assured-forw | 0              | 0                   | 0               |
| 3 network-cont | 0              | 0                   | 0               |

```

  Queue number:      Mapped forwarding classes
    0                best-effort
    1                expedited-forwarding
    2                assured-forwarding
    3                network-control
DS1  alarms         : None
DS1  defects        : None
T1  media:
      Seconds      Count  State
SEF                0      0 OK
BEE                0      0 OK
AIS                0      0 OK
LOF                0      0 OK
LOS                0      0 OK
YELLOW            0      0 OK
CRC Major          0      0 OK
CRC Minor          0      0 OK
BPV                0      0
EXZ                0      0
LCV                0      0
PCV                0      0
CS                 0      0
CRC                0      0
LES                0
ES                 0
SES                0
SEFS               0
BES                0
UAS                0
SAToP configuration:
  Payload size: 192
  Idle pattern: 0xFF
  Octet aligned: Disabled

```

```

    Jitter buffer: packets: 8, latency: 7 ms, auto adjust: Disabled
    Excessive packet loss rate: sample period: 10000 ms, threshold: 30%
DS1 BERT configuration:
    BERT time period: 10 seconds, Elapsed: 0 seconds
    Induced Error rate: 0, Algorithm: 2^15 - 1, 0.151, Pseudorandom (9)
SONET alarms : None
SONET defects : AIS-V, RDI-V
SONET vt:
    BIP-BIP2          0          0
    REI-V             0          0
    LOP-V             0          0 OK
    AIS-V             2          0 Defect Active
    RDI-V             2          0 Defect Active
    UNEQ-V            0          0 OK
    PLM-V             0          0 OK
    ES-V              0
    SES-V             0
    UAS-V             2
    ES-VFE            0
    SES-VFE           0
    UAS-VFE           0
Received SONET overhead:
V5 : 0x07
V5(cmp) : 0x02
Transmitted SONET overhead:
V5 : 0x02
Packet Forwarding Engine configuration:
    Destination slot: 1
CoS information:
    Direction : Output
    CoS transmit queue          Bandwidth          Buffer Priority
Limit
    0 best-effort          95          1459200          95          0          low
none
    3 network-control      5          76800          5          0          low
none

Logical interface t1-1/0/0:1:1.0 (Index 69) (SNMP ifIndex 580) (Generation 525)

    Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: TDM-CCC-SATOP
CE info          Packets          Bytes Count
CE Tx            1005          192960
CE Rx            1004          192768
CE Rx Forwarded          0
CE Strayed        0
CE Lost           0
CE Malformed      0
CE Misinserted    0
CE AIS dropped     0
CE Dropped        1005          192960
CE Overrun Events          0
CE Underrun Events        0
    Protocol ccc, MTU: 1504, Generation: 814, Route table: 0
    Flags: Is-Primary

```

#### show interfaces extensive (DS, TDM-CCC-CESoPSN)

```

user@host>show interfaces ds-1/0/0:1:1 extensive
Physical interface: ds-1/0/0:1:1:1, Enabled, Physical link is Down
Interface index: 154, SNMP ifIndex: 597, Generation: 819

```

```

Link-level type: TDM-CCC-CESoPSN, MTU: 1504, Speed: 1536kbps, Loopback: None,
FCS: 16, Parent: ct1-1/0/0:1:1 Interface index 153
Device flags   : Present Running Down
Interface flags: Hardware-Down Point-To-Point SNMP-Traps Internal: 0x0
Link flags     : None
Hold-times     : Up 0 ms, Down 0 ms
CoS queues     : 8 supported, 8 maximum usable queues
Last flapped   : 2012-10-29 00:49:03 PDT (00:00:35 ago)
Statistics last cleared: Never
Egress queues: 8 supported, 4 in use
Queue counters:
    Queued packets    Transmitted packets    Dropped packets

    0 best-effort      0              0              0
    1 expedited-fo     0              0              0
    2 assured-forw     0              0              0
    3 network-cont     0              0              0

Queue number:      Mapped forwarding classes
0                  best-effort
1                  expedited-forwarding
2                  assured-forwarding
3                  network-control

CESoPSN configuration:
  Packetization latency: 1000 us
  Idle pattern: 0xFF
  Jitter buffer: packets: 8, latency: 8 ms, auto adjust: Disabled
  Excessive packet loss rate: sample period: 10000 ms, threshold: 30%
DSO BERT configuration:
  BERT time period: 10 seconds, Elapsed: 0 seconds
  Induced Error rate: 0, Algorithm: 2^15 - 1, 0.151, Pseudorandom (9)
Packet Forwarding Engine configuration:
  Destination slot: 1
CoS information:
  Direction : Output
  CoS transmit queue      Bandwidth      Buffer Priority
Limit
    %      bps      %      usec
    0 best-effort      95      1459200      95      0      low
none
    3 network-control  5       76800      5       0      low
none

Logical interface ds-1/0/0:1:1:1.0 (Index 69) (SNMP ifIndex 598) (Generation
549)
Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: TDM-CCC-CESoPSN
CE info      Packets      Bytes      Count
CE Tx        0            0
CE Rx        35712        6856704
CE Rx Forwarded      0
CE Strayed      0
CE Lost      0
CE Malformed    0
CE Misinserted  0
CE AIS dropped  0
CE Dropped      0      0
CE Overrun Events      0
CE Underrun Events    1

```

```
Protocol ccc, MTU: 1504, Generation: 857, Route table: 0  
Flags: Is-Primary
```

## show interfaces statistics

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>show interfaces statistics <i>interface-name</i> &lt;detail&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 12.1x48 for PTX Series Packet Transport Routers.<br>Command introduced in Junos OS Release 12.2 for ACX Series Routers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Description</b>              | Display static interface statistics, such as errors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Options</b>                  | <i>interface-name</i> —Name of an interface.<br><br><i>detail</i> —(Optional) Display detailed output.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">clear interfaces statistics</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>List of Sample Output</b>    | <a href="#">show interfaces statistics (Fast Ethernet) on page 688</a><br><a href="#">show interfaces statistics (Gigabit Ethernet PIC—Egress) on page 689</a><br><a href="#">show interfaces statistics detail (Aggregated Ethernet) on page 691</a><br><a href="#">show interfaces statistics detail (Aggregated Ethernet—Ingress) on page 692</a><br><a href="#">show interfaces statistics detail (Aggregated Ethernet—Egress) on page 693</a><br><a href="#">show interfaces statistics (SONET/SDH) on page 695</a><br><a href="#">show interfaces statistics (Aggregated SONET/SDH—Ingress) on page 696</a><br><a href="#">show interfaces statistics (Aggregated SONET/SDH—Egress) on page 697</a><br><a href="#">show interfaces statistics (PTX Series Packet Transport Routers) on page 698</a><br><a href="#">show interfaces statistics (ACX Series routers) on page 698</a> |
| <b>Output Fields</b>            | Output from both the <code>show interfaces <i>interface-name</i> detail</code> and the <code>show interfaces <i>interface-name</i> extensive</code> commands include all the information displayed in the output from the <code>show interfaces statistics</code> command. For more information, see the particular interface type in which you are interested. For information about destination class and source class statistics, see the “Destination Class Field” section and the “Source Class Field” section under <i>Common Output Fields Description</i> . For information about the input errors and output errors, see <i>Fast Ethernet and Gigabit Ethernet Counters</i> .                                                                                                                                                                                                   |

## Sample Output

### show interfaces statistics (Fast Ethernet)

```
user@host> show interfaces fe-1/3/1 statistics
Physical interface: fe-1/3/1, Enabled, Physical link is Up
Interface index: 144, SNMP ifIndex: 1042
Description: ford fe-1/3/1
Link-level type: Ethernet, MTU: 1514, Speed: 100mbps, Loopback: Disabled,
Source filtering: Disabled, Flow control: Enabled
Device flags   : Present Running
```



```

Interface flags: SNMP-Traps Internal: 0x4000
CoS queues      : 4 supported, 4 maximum usable queues
Current address: 00:90:69:93:04:dc, Hardware address: 00:90:69:93:04:dc
Last flapped    : 2006-04-18 03:08:59 PDT (00:01:24 ago)
Statistics last cleared: Never
Input rate      : 0 bps (0 pps)
Output rate     : 0 bps (0 pps)
Input errors: 0, Output errors: 0
Active alarms   : None
Active defects  : None
Logical interface fe-1/3/1.0 (Index 69) (SNMP ifIndex 50)
  Flags: SNMP-Traps Encapsulation: ENET2
  Protocol inet, MTU: 1500
    Flags: Is-Primary, DCU, SCU-in

      Destination class      Packets      Bytes
                             (packet-per-second) (bits-per-second)
      silver1                0              0
      (                      0) (              0)
      silver2                0              0
      (                      0) (              0)
      silver3                0              0
      (                      0) (              0)
  Addresses, Flags: Is-Default Is-Preferred Is-Primary
  Destination: 10.27.245/24, Local: 10.27.245.2,
  Broadcast: 10.27.245.255
  Protocol iso, MTU: 1497
  Flags: Is-Primary

```

#### show interfaces statistics (Gigabit Ethernet PIC—Egress)

```

user@host> show interfaces ge-5/2/0 statistics detail
Physical interface: ge-5/2/0, Enabled, Physical link is Up
  Interface index: 146, SNMP ifIndex: 519, Generation: 149
  Link-level type: Ethernet, MTU: 1514, Speed: 1000mbps, BPDU Error: None,
  MAC-REWRITE Error: None, Loopback: Disabled,
  Source filtering: Disabled, Flow control: Enabled, Auto-negotiation: Enabled,
  Remote fault: Online
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  Link flags     : None
  CoS queues     : 8 supported, 8 maximum usable queues
  Hold-times     : Up 0 ms, Down 0 ms
  Current address: 00:1d:b5:61:d9:74, Hardware address: 00:1d:b5:61:d9:74
  Last flapped   : 2009-11-11 11:24:00 PST (09:23:08 ago)
  Statistics last cleared: 2009-11-11 17:50:58 PST (02:56:10 ago)
  Traffic statistics:
    Input bytes :      271524      0 bps
    Output bytes :    37769598    352 bps
    Input packets:       3664      0 pps
    Output packets:    885790      0 pps
  IPv6 transit statistics:
    Input bytes :           0
    Output bytes :    16681118
    Input packets:           0
    Output packets:    362633
  Multicast statistics:
    IPv4 multicast statistics:
      Input bytes :      112048      0 bps
      Output bytes :    20779920      0 bps
      Input packets:       1801      0 pps
      Output packets:    519498      0 pps

```

```

IPV6 multicast statistics:
  Input bytes :          156500          0 bps
  Output bytes :         16681118        0 bps
  Input packets:           1818          0 pps
  Output packets:        362633          0 pps
Input errors:
  Errors: 0, Drops: 0, Framing errors: 0, Runt: 0, Policed discards: 0, L3
incompletes: 0, L2 channel errors: 0,
  L2 mismatch timeouts: 0, FIFO errors: 0, Resource errors: 0
Output errors:
  Carrier transitions: 0, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0,
FIFO errors: 0, HS link CRC errors: 0, MTU errors: 0,
  Resource errors: 0
Egress queues: 8 supported, 4 in use
Queue counters:      Queued packets  Transmitted packets      Dropped packets

  0 best-effort          882558          882558          0
  1 expedited-fo           0              0              0
  2 assured-forw          0              0              0
  3 network-cont         3232          3232          0

Active alarms : None
Active defects : None

Logical interface ge-5/2/0.0 (Index 71) (SNMP ifIndex 573) (Generation 135)
Flags: SNMP-Traps 0x4000 Encapsulation: ENET2
Egress accounting overhead: 100
Ingress accounting overhead: 90
Traffic statistics:
  Input bytes :          271524
  Output bytes :         37769598
  Input packets:           3664
  Output packets:        885790
IPv6 transit statistics:
  Input bytes :           0
  Output bytes :         16681118
  Input packets:           0
  Output packets:        362633
Local statistics:
  Input bytes :          271524
  Output bytes :         308560
  Input packets:           3664
  Output packets:         3659
Transit statistics:
  Input bytes :           0          0 bps
  Output bytes :        37461038        0 bps
  Input packets:           0          0 pps
  Output packets:        882131          0 pps
IPv6 transit statistics:
  Input bytes :           0
  Output bytes :         16681118
  Input packets:           0
  Output packets:        362633
Multicast statistics:
IPV4 multicast statistics:
  Input bytes :          112048          0 bps
  Output bytes :        20779920          0 bps
  Input packets:           1801          0 pps

```

```

Output packets:          519498          0 pps
IPV6 multicast statistics:
Input bytes :            156500          0 bps
Output bytes :           16681118        0 bps
Input packets:           1818           0 pps
Output packets:          362633          0 pps
Protocol inet, MTU: 1500, Generation: 151, Route table: 0
Addresses, Flags: Is-Preferred Is-Primary
Destination: 40.40.40.0/30, Local: 40.40.40.2, Broadcast: 40.40.40.3,
Generation: 167
Protocol inet6, MTU: 1500, Generation: 152, Route table: 0
Addresses, Flags: Is-Preferred Is-Primary
Destination: ::40.40.40.0/126, Local: ::40.40.40.2
Generation: 169
Addresses, Flags: Is-Preferred
Destination: fe80::/64, Local: fe80::21d:b5ff:fe61:d974
Protocol multiservice, MTU: Unlimited, Generation: 171
Generation: 153, Route table: 0
Policer: Input: __default_arp_policer__

```

### show interfaces statistics detail (Aggregated Ethernet)

```

user@host> show interfaces ae0 detail
Physical interface: ae0, Enabled, Physical link is Up
Interface index: 186, SNMP ifIndex: 111, Generation: 187
Link-level type: Ethernet, MTU: 1514, Speed: 2000mbps, Loopback: Disabled,
Source filtering: Disabled, Flow control: Disabled, Minimum links needed: 1,
Minimum bandwidth needed: 0
Device flags : Present Running
Interface flags: SNMP-Traps Internal: 0x4000
Current address: 00:90:69:0b:2f:f0, Hardware address: 00:90:69:0b:2f:f0
Last flapped : Never
Statistics last cleared: 2006-12-23 03:04:16 PST (01:16:24 ago)
Traffic statistics:
Input bytes :            28544          0 bps
Output bytes :            39770          0 bps
Input packets:             508          0 pps
Output packets:            509          0 pps
Input bytes :            IPv6 28544
Output bytes :            IPv6 0
Input packets:            IPv6 508
Output packets:            IPv6 0
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0,
Policed discards: 0, Resource errors: 0
Output errors:
Carrier transitions: 0, Errors: 0, Drops: 0, MTU errors: 0,
Resource errors: 0

Logical interface ae0.0 (Index 67) (SNMP ifIndex 139) (Generation 145)
Flags: SNMP-Traps Encapsulation: ENET2
Statistics          Packets          pps          Bytes          bps
Bundle:
Input :             508              0          28544           0
Output:             509              0          35698           0
Link:
ge-3/3/8.0
Input :             508              0          28544           0
Output:              0              0              0           0
ge-3/3/9.0

```

```

      Input :          0          0          0          0
      Output:          0          0          0          0
      Marker Statistics:  Marker Rx      Resp Tx      Unknown Rx      Illegal Rx
      ge-3/3/8.0         0            0            0            0
      ge-3/3/9.0         0            0            0            0
      Egress queues: 8 supported, 8 in use
      Queue counters:      Queued packets  Transmitted packets      Dropped packets

      0 best-effort         0            0            0
      1 expedited-fo       0            0            0
      2 assured-forw       0            0            0
      3 network-cont       0            0            0

      Protocol inet, MTU: 1500, Generation: 166, Route table: 0
      Flags: None
      Addresses, Flags: Is-Preferred Is-Primary
      Destination: 10.1.1/24, Local: 10.1.1.1, Broadcast: 10.1.1.255,
      Generation: 159
      Protocol inet6, MTU: 1500, Generation: 163, Route table: 0
      Flags: Is-Primary
      Addresses, Flags: Is-Preferred
      Destination: fe80::/64, Local: fe80::206:5bff:fe05:c321,
      Broadcast: Unspecified, Generation: 161

```

#### show interfaces statistics detail (Aggregated Ethernet—Ingress)

```

user@host> show interfaces statistics detail ae0 | no-more
Physical interface: ae0, Enabled, Physical link is Up
  Interface index: 128, SNMP ifIndex: 504, Generation: 278
  Link-level type: Ethernet, MTU: 1514, Speed: 1Gbps, BPDU Error: None, MAC-REWRITE
  Error: None, Loopback: Disabled,
  Source filtering: Disabled, Flow control: Disabled, Minimum links needed: 1,
  Minimum bandwidth needed: 0
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  Current address: 00:1d:b5:61:db:f0, Hardware address: 00:1d:b5:61:db:f0
  Last flapped   : 2009-11-09 03:30:23 PST (00:01:28 ago)
  Statistics last cleared: 2009-11-09 03:26:18 PST (00:05:33 ago)
  Traffic statistics:
    Input bytes :          544009602          54761856 bps
    Output bytes :           3396          0 bps
    Input packets:          11826292          148809 pps
    Output packets:           42          0 pps
  IPv6 transit statistics:
    Input bytes :          350818604
    Output bytes :           0
    Input packets:          7626488
    Output packets:           0
  Input errors:
    Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0, Policed discards:
    0, Resource errors: 0
  Output errors:
    Carrier transitions: 0, Errors: 0, Drops: 0, MTU errors: 0, Resource errors:
    0
  Ingress queues: 8 supported, 4 in use
  Queue counters:      Queued packets  Transmitted packets      Dropped packets

      0 best-effort         0            0            0

```

```

1 expedited-fo          0          0          0
2 assured-forw          0          0          0
3 network-cont          0          0          0

Egress queues: 8 supported, 4 in use
Queue counters:         Queued packets  Transmitted packets    Dropped packets

0 best-effort           21          21          0
1 expedited-fo          0          0          0
2 assured-forw          0          0          0
3 network-cont          451        451          0

Logical interface ae0.0 (Index 70) (SNMP ifIndex 574) (Generation 177)
Flags: SNMP-Traps 0x4000 Encapsulation: ENET2
Statistics              Packets      pps          Bytes          bps
Bundle:
  Input :      11826292    148809    544009602    54761856
  Output:         42         0         3396         0
Link:
  ge-5/2/0.0
  Input :      11826292    148809    544009602    54761856
  Output:         42         0         3396         0
Marker Statistics:   Marker Rx      Resp Tx      Unknown Rx      Illegal Rx
ge-5/2/0.0              0          0          0          0
Protocol inet, MTU: 1500, Generation: 236, Route table: 0
Addresses, Flags: Is-Preferred Is-Primary
Destination: 30.30.30.0/30, Local: 30.30.30.2, Broadcast: 30.30.30.3,
Generation: 310
Protocol inet6, MTU: 1500, Generation: 237, Route table: 0
Addresses, Flags: Is-Preferred Is-Primary
Destination: ::30.30.30.0/126, Local: ::30.30.30.2
Generation: 312
Addresses, Flags: Is-Preferred
Destination: fe80::/64, Local: fe80::21d:b5ff:fe61:dbf0
Protocol multiservice, MTU: Unlimited, Generation: 314
Generation: 238, Route table: 0
Policer: Input: __default_arp_policer__

```

### show interfaces statistics detail (Aggregated Ethernet—Egress)

```

user@host> show interfaces statistics detail ae0 | no-more
Physical interface: ae0, Enabled, Physical link is Up
Interface index: 128, SNMP ifIndex: 501, Generation: 319
Link-level type: Ethernet, MTU: 1514, Speed: 1Gbps, BPDU Error: None, MAC-REWRITE
Error: None, Loopback: Disabled,
Source filtering: Disabled, Flow control: Disabled, Minimum links needed: 1,
Minimum bandwidth needed: 0
Device flags : Present Running
Interface flags: SNMP-Traps Internal: 0x4000
Current address: 00:1f:12:c2:37:f0, Hardware address: 00:1f:12:c2:37:f0
Last flapped : 2009-11-09 03:30:24 PST (00:02:42 ago)
Statistics last cleared: 2009-11-09 03:26:42 PST (00:06:24 ago)
Traffic statistics:
Input bytes :          440          0 bps

```

```

Output bytes :          1047338120          54635848 bps
Input packets:           7          0 pps
Output packets:        22768200        148466 pps
IPv6 transit statistics:
  Input bytes :          288
  Output bytes :        723202616
  Input packets:         4
  Output packets:       15721796
Input errors:
  Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0, Policed discards:
0, Resource errors: 0
Output errors:
  Carrier transitions: 0, Errors: 0, Drops: 0, MTU errors: 0, Resource errors:
0
Ingress queues: 8 supported, 4 in use
Queue counters:      Queued packets  Transmitted packets      Dropped packets

  0 best-effort          0              0              0
  1 expedited-fo        0              0              0
  2 assured-forw        0              0              0
  3 network-cont        0              0              0

Egress queues: 8 supported, 4 in use
Queue counters:      Queued packets  Transmitted packets      Dropped packets

  0 best-effort       201985796          201985796          0
  1 expedited-fo        0              0              0
  2 assured-forw        0              0              0
  3 network-cont        65              65              0

Logical interface ae0.0 (Index 72) (SNMP ifIndex 505) (Generation 204)
Flags: SNMP-Traps 0x4000 Encapsulation: ENET2
Statistics      Packets      pps      Bytes      bps
Bundle:
  Input :          7          0          440          0
  Output:       22768200    148466    1047338120    54635848
Link:
  ge-2/1/6.0
    Input :          7          0          440          0
    Output:       22768200    148466    1047338120    54635848
Marker Statistics:  Marker Rx      Resp Tx  Unknown Rx  Illegal Rx
ge-2/1/6.0          0              0          0          0
Protocol inet, MTU: 1500, Generation: 291, Route table: 0
  Addresses, Flags: Is-Preferred Is-Primary
    Destination: 30.30.30.0/30, Local: 30.30.30.1, Broadcast: 30.30.30.3,
Generation: 420
  Protocol inet6, MTU: 1500, Generation: 292, Route table: 0
    Addresses, Flags: Is-Preferred Is-Primary
      Destination: ::/26, Local: ::30.30.30.1
Generation: 422
    Addresses, Flags: Is-Preferred
      Destination: fe80::/64, Local: fe80::21f:12ff:fec2:37f0
Protocol multiservice, MTU: Unlimited, Generation: 424

```

Generation: 293, Route table: 0  
 Policer: Input: \_\_default\_arp\_policer\_\_

#### show interfaces statistics (SONET/SDH)

```

user@host> show interfaces statistics detail so-3/0/0 | no-more
Physical interface: so-3/0/0, Enabled, Physical link is Up
Interface index: 133, SNMP ifIndex: 538, Generation: 283
Link-level type: PPP, MTU: 4474, Clocking: Internal, SONET mode, Speed: OC192,
Loopback: None, FCS: 16, Payload scrambler: Enabled
Device flags   : Present Running
Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
Link flags     : Keepalives
Hold-times     : Up 0 ms, Down 0 ms
Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
Keepalive statistics:
  Input : 13 (last seen 00:00:04 ago)
  Output: 14 (last sent 00:00:02 ago)
LCP state: Opened
NCP state: inet: Opened, inet6: Opened, iso: Not-configured, mpls: Not-configured

CHAP state: Closed
PAP state: Closed
CoS queues   : 8 supported, 8 maximum usable queues
Last flapped : 2009-11-09 02:52:34 PST (01:12:39 ago)
Statistics last cleared: 2009-11-09 03:58:54 PST (00:06:19 ago)
Traffic statistics:
  Input bytes   :          2559160294          54761720 bps
  Output bytes  :           10640          48 bps
  Input packets:          55633975          148809 pps
  Output packets:           216           0 pps
IPv6 transit statistics:
  Input bytes   :          647922328
  Output bytes  :           0
  Input packets:          14085269
  Output packets:           0
Input errors:
  Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0, Bucket drops:
0, Policed discards: 0, L3 incompletes: 0,
  L2 channel errors: 0, L2 mismatch timeouts: 0, HS link CRC errors: 0, HS link
FIFO overflows: 0
Output errors:
  Carrier transitions: 0, Errors: 0, Drops: 0, Aged packets: 0, HS link FIFO
underflows: 0, MTU errors: 0
Egress queues: 8 supported, 4 in use
Queue counters:
  Queued packets  Transmitted packets  Dropped packets

  0 best-effort          4              4              0
  1 expedited-fo         0              0              0
  2 assured-forw         0              0              0
  3 network-cont        213            213              0

SONET alarms   : None
SONET defects  : None

Logical interface so-3/0/0.0 (Index 72) (SNMP ifIndex 578) (Generation 182)
Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPP
Protocol inet, MTU: 4470, Generation: 244, Route table: 0

```

```

    Addresses, Flags: Is-Preferred Is-Primary
    Destination: 30.30.30.0/30, Local: 30.30.30.2, Broadcast: 30.30.30.3,
Generation: 322
    Protocol inet6, MTU: 4470, Generation: 245, Route table: 0
    Addresses, Flags: Is-Preferred Is-Primary
    Destination: ::30.30.30.0/126, Local: ::30.30.30.2
Generation: 324
    Addresses, Flags: Is-Preferred
    Destination: fe80::/64, Local: fe80::2a0:a5ff:fe61:9264
Generation: 326

```

### show interfaces statistics (Aggregated SONET/SDH—Ingress)

```

user@host> show interfaces statistics detail as0 | no-more
Physical interface: as0, Enabled, Physical link is Up
  Interface index: 132, SNMP ifIndex: 534, Generation: 282
  Link-level type: PPP, MTU: 4474, Speed: OC192, Minimum links needed: 1, Minimum
bandwidth needed: 0
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  Link flags     : Keepalives
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Last flapped   : 2009-11-09 03:45:53 PST (00:09:38 ago)
  Statistics last cleared: 2009-11-09 03:48:17 PST (00:07:14 ago)
  Traffic statistics:
    Input bytes :          2969786332          54761688 bps
    Output bytes :             11601             0 bps
    Input packets:          64560636          148808 pps
    Output packets:             225             0 pps
  IPv6 transit statistics:
    Input bytes :      2086013152
    Output bytes :             0
    Input packets:      45348114
    Output packets:             0
  Input errors:
    Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0, Policed discards:
0, Resource errors: 0
  Output errors:
    Carrier transitions: 0, Errors: 0, Drops: 0, MTU errors: 0, Resource errors:
0
  Egress queues: 8 supported, 4 in use
  Queue counters:

```

|                | Queued packets | Transmitted packets | Dropped packets |
|----------------|----------------|---------------------|-----------------|
| 0 best-effort  | 3              | 3                   | 0               |
| 1 expedited-fo | 0              | 0                   | 0               |
| 2 assured-forw | 0              | 0                   | 0               |
| 3 network-cont | 222            | 222                 | 0               |

```

  Logical interface as0.0 (Index 71) (SNMP ifIndex 576) (Generation 179)
  Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPP
  Statistics

```

|            | Packets  | pps    | Bytes      | bps      |
|------------|----------|--------|------------|----------|
| Bundle:    |          |        |            |          |
| Input :    | 64560550 | 148808 | 2969785300 | 54761688 |
| Output:    | 139      | 0      | 10344      | 0        |
| Link:      |          |        |            |          |
| so-3/0/0.0 |          |        |            |          |
| Input :    | 64560550 | 148808 | 2969785300 | 54761688 |



```

Output:          139          0          10344          0
Protocol inet, MTU: 4470, Generation: 240, Route table: 0
Addresses, Flags: Is-Preferred Is-Primary
Destination: 30.30.30.0/30, Local: 30.30.30.2, Broadcast: 30.30.30.3,
Generation: 316
Protocol inet6, MTU: 4470, Generation: 241, Route table: 0
Addresses, Flags: Is-Preferred Is-Primary
Destination: ::30.30.30.0/126, Local: ::30.30.30.2
Generation: 318
Addresses, Flags: Is-Preferred
Destination: fe80::/64, Local: fe80::2a0:a5ff:fe61:9264
Generation: 320

```

### show interfaces statistics (Aggregated SONET/SDH—Egress)

```

user@host> show interfaces statistics detail as0 | no-more
Physical interface: as0, Enabled, Physical link is Up
Interface index: 132, SNMP ifIndex: 565, Generation: 323
Link-level type: PPP, MTU: 4474, Speed: OC192, Minimum links needed: 1, Minimum
bandwidth needed: 0
Device flags   : Present Running
Interface flags: SNMP-Traps Internal: 0x4000
Link flags     : Keepalives
Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
Last flapped   : 2009-11-09 03:43:37 PST (00:12:48 ago)
Statistics last cleared: 2009-11-09 03:48:54 PST (00:07:31 ago)
Traffic statistics:
Input bytes   :          11198          392 bps
Output bytes  :      3101452132      54783448 bps
Input packets :          234          0 pps
Output packets:      67422937      148868 pps
IPv6 transit statistics:
Input bytes   :          5780
Output bytes  :      2171015678
Input packets :          72
Output packets:      47195993
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0, Policed discards:
0, Resource errors: 0
Output errors:
Carrier transitions: 0, Errors: 0, Drops: 0, MTU errors: 0, Resource errors:
0
Egress queues: 8 supported, 4 in use
Queue counters:      Queued packets  Transmitted packets      Dropped packets

0 best-effort          67422830          67422830          0

1 expedited-fo          0          0          0

2 assured-forw          0          0          0

3 network-cont          90          90          0

Logical interface as0.0 (Index 71) (SNMP ifIndex 548) (Generation 206)
Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPP
Statistics      Packets      pps      Bytes      bps
Bundle:
Input :          144          0          10118          392
Output:      67422847      148868      3101450962      54783448
Link:

```

```

so-0/1/0.0
  Input :          144          0          10118          392
  Output:        67422847      148868      3101450962      54783448
Protocol inet, MTU: 4470, Generation: 295, Route table: 0
Addresses, Flags: Is-Preferred Is-Primary
  Destination: 30.30.30.0/30, Local: 30.30.30.1, Broadcast: 30.30.30.3,
Generation: 426
Protocol inet6, MTU: 4470, Generation: 296, Route table: 0
Addresses, Flags: Is-Preferred Is-Primary
  Destination: ::/26, Local: ::30.30.30.1
Generation: 428
Addresses, Flags: Is-Preferred
  Destination: fe80::/64, Local: fe80::2a0:a5ff:fe63:1d0a
Generation: 429

```

### show interfaces statistics (PTX Series Packet Transport Routers)

```

user@host> show interfaces statistics em0
Physical interface: em0, Enabled, Physical link is Up
  Interface index: 8, SNMP ifIndex: 0
  Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Speed: 1000mbps
  Device flags   : Present Running
  Interface flags: SNMP-Traps
  Link type      : Full-Duplex
  Current address: 00:80:f9:25:00:1b, Hardware address: 00:80:f9:25:00:1b
  Last flapped   : Never
  Statistics last cleared: Never
Input packets : 212620
Output packets: 71
  Input errors: 0, Output errors: 0

  Logical interface em0.0 (Index 3) (SNMP ifIndex 0)
  Flags: SNMP-Traps Encapsulation: ENET2
  Input packets : 212590
  Output packets: 71
  Protocol inet, MTU: 1500
  Flags: Is-Primary
  Addresses, Flags: Is-Default Is-Preferred Is-Primary
    Destination: 192.168.3/24, Local: 192.168.3.30,
    Broadcast: 192.168.3.255

```

### show interfaces statistics (ACX Series routers)

```

user@host> show interfaces statistics ge-0/1/7
Physical interface: ge-0/1/7, Enabled, Physical link is Down
  Interface index: 151, SNMP ifIndex: 524
  Link-level type: Ethernet, Media type: Copper, MTU: 1514, Link-mode: Full-duplex,
  Speed: 1000mbps, BPDU Error: None, MAC-REWRITE Error: None, Loopback: Disabled,

  Source filtering: Disabled, Flow control: Enabled, Auto-negotiation: Enabled,
  Remote fault: Online
  Device flags   : Present Running Down
  Interface flags: Hardware-Down SNMP-Traps Internal: 0x0
  Link flags     : None
  CoS queues     : 8 supported, 8 maximum usable queues
  Current address: 84:18:88:c1:49:a3, Hardware address: 84:18:88:c1:49:a3
  Last flapped   : 2012-05-11 04:25:28 PDT (2d 20:23 ago)
  Statistics last cleared: 2012-05-13 23:07:23 PDT (01:41:25 ago)
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)
  Input errors: 0, Output errors: 0

```

```
Active alarms : LINK
Active defects : LINK
Interface transmit statistics: Disabled
```

## show isis database

---

|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                     | <code>show isis database</code><br><code>&lt;system-id&gt;</code><br><code>&lt;brief   detail   extensive&gt;</code><br><code>&lt;instance <i>instance-name</i>&gt;</code><br><code>&lt;level (1   2)&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Syntax (EX Series Switches and QFX Series)</b> | <code>show isis database</code><br><code>&lt;system-id&gt;</code><br><code>&lt;brief   detail   extensive&gt;</code><br><code>&lt;level (1   2)&gt;</code><br><code>&lt;instance <i>instance-name</i>&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>                        | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>                                | Display the entries in the IS-IS link-state database, which contains data about PDU packets.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                                    | <p><b>none</b>—Display standard information about IS-IS link-state database entries for all routing instances.</p> <p><b><i>system id</i></b>—(Optional) Display IS-IS link-state database entries for the specified intermediate system.</p> <p><b>brief   detail   extensive</b>—(Optional) Display the specified level of output.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display IS-IS link-state database entries for the specified routing instance.</p> <p><b>level (1   2)</b>—(Optional) Display IS-IS link-state database entries for the specified IS-IS level.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Display standard information about IS-IS link-state database entries for all logical systems or for a particular logical system.</p> |
| <b>Required Privilege Level</b>                   | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Related Documentation</b>                      | <ul style="list-style-type: none"><li>• <a href="#">clear isis database</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>List of Sample Output</b>                      | <a href="#">show isis database on page 702</a><br><a href="#">show isis database brief on page 703</a><br><a href="#">show isis database detail on page 703</a><br><a href="#">show isis database extensive on page 703</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

**Output Fields** Table 47 on page 701 describes the output fields for the **show isis database** command. Output fields are listed in the approximate order in which they appear. Fields that contain internal IS-IS information useful only in troubleshooting obscure problems are not described in the table. For more details about these fields, contact your customer support representative.

**Table 47: show isis database Output Fields**

| Field Name             | Field Description                                                                                                                                                                                                                                                                                                                                                                            | Level of Output         |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Interface name</b>  | Name of the interface on which the link-state PDU has been received; always <b>IS-IS</b> for this command.                                                                                                                                                                                                                                                                                   | All levels              |
| <b>level</b>           | Level of intermediate system: <ul style="list-style-type: none"> <li>• <b>1</b>—Intermediate system routes within an area; when the destination is outside an area, it routes toward a Level 2 system.</li> <li>• <b>2</b>—Intermediate system routes between areas and toward other ASs.</li> </ul>                                                                                         | All levels              |
| <b>LSP ID</b>          | Link-state PDU identifier.                                                                                                                                                                                                                                                                                                                                                                   | All levels              |
| <b>Sequence</b>        | Sequence number of the link-state PDU.                                                                                                                                                                                                                                                                                                                                                       | All levels              |
| <b>Checksum</b>        | Checksum value of the link-state PDU.                                                                                                                                                                                                                                                                                                                                                        | All levels              |
| <b>Lifetime (secs)</b> | Remaining lifetime of the link-state PDU, in seconds.                                                                                                                                                                                                                                                                                                                                        | All levels              |
| <b>Attributes</b>      | Attributes of the specified database: <b>L1</b> , <b>L2</b> , <b>Overload</b> , or <b>Attached</b> (L1 only).                                                                                                                                                                                                                                                                                | none <b>brief</b>       |
| <b># LSPs</b>          | Total number of link-state PDUs in the specified link-state database.                                                                                                                                                                                                                                                                                                                        | none <b>brief</b>       |
| <b>IP prefix</b>       | Prefix advertised by this link-state PDU.                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive</b> |
| <b>IS neighbor</b>     | IS-IS neighbor of the advertising system.                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive</b> |
| <b>ES neighbor</b>     | (J Series routers only) An ES-IS neighbor of the advertising system.                                                                                                                                                                                                                                                                                                                         | <b>detail extensive</b> |
| <b>IP prefix</b>       | IPv4 prefix advertised by this link-state PDU.                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive</b> |
| <b>V6 prefix</b>       | IPv6 prefix advertised by this link-state PDU.                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive</b> |
| <b>Metric</b>          | Metric of the prefix or neighbor.                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive</b> |
| <b>Header</b>          | <ul style="list-style-type: none"> <li>• <b>LSP ID</b>—Link state PDU identifier of the header.</li> <li>• <b>Length</b>—Header length.</li> <li>• <b>Allocated Length</b>—Amount of length available for the header.</li> <li>• <b>Router ID</b>—Address of the local routing device.</li> <li>• <b>Remaining Lifetime</b>—Remaining lifetime of the link-state PDU, in seconds.</li> </ul> | <b>extensive</b>        |

Table 47: show isis database Output Fields (*continued*)

| Field Name    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Level of Output  |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Packet</b> | <ul style="list-style-type: none"> <li>• <b>LSP ID</b>—The identifier for the link-state PDU.</li> <li>• <b>Length</b>—Packet length.</li> <li>• <b>Lifetime</b>—Remaining lifetime, in seconds.</li> <li>• <b>Checksum</b>—The checksum of the link-state PDU.</li> <li>• <b>Sequence</b>—The sequence number of the link-state PDU. Every time the link-state PDU is updated, this number increments.</li> <li>• <b>Attributes</b>—Packet attributes.</li> <li>• <b>NLPID</b>—Network layer protocol identifier.</li> <li>• <b>Fixed length</b>—Specifies the set length for the packet.</li> </ul>                                                                                                                                                                                                                                                          | <b>extensive</b> |
| <b>TLVs</b>   | <ul style="list-style-type: none"> <li>• <b>Area Address</b>—Area addresses that the routing device can reach.</li> <li>• <b>Speaks</b>—Supported routing protocols.</li> <li>• <b>IP router id</b>—ID of the routing device (usually the IP address).</li> <li>• <b>IP address</b>—IPv4 address.</li> <li>• <b>Hostname</b>—Assigned name of the routing device.</li> <li>• <b>IP prefix</b>—IP prefix of the routing device.</li> <li>• <b>Metric</b>—IS-IS metric that measures the cost of the adjacency between the originating routing device and the advertised routing device.</li> <li>• <b>IP extended prefix</b>—Extended IP prefix of the routing device.</li> <li>• <b>IS neighbor</b>—Directly attached neighbor's name and metric.</li> <li>• <b>IS extended neighbor</b>—Directly attached neighbor's name, metric, and IP address.</li> </ul> | <b>extensive</b> |

## Sample Output

### show isis database

```

user@host> show isis database
IS-IS level 1 link-state database:
LSP ID                Sequence Checksum Lifetime Attributes
kobuk.00-00            0x3    0x3167    1057 L1 L2
camaro.00-00           0x5    0x770e    1091 L1 L2
ranier.00-00           0x4    0xaa95    1091 L1 L2
glacier.00-00          0x4    0x206f    1089 L1 L2
glacier.02-00          0x1    0xd141    1089 L1 L2
badlands.00-00        0x3    0x87a2    1093 L1 L2
  6 LSPs

IS-IS level 2 link-state database:
LSP ID                Sequence Checksum Lifetime Attributes
kobuk.00-00            0x6    0x8d6b    1096 L1 L2
camaro.00-00           0x9    0x877b    1101 L1 L2
ranier.00-00           0x8    0x855d    1103 L1 L2
glacier.00-00          0x7    0xf892    1098 L1 L2
glacier.02-00          0x1    0xd141    1089 L1 L2
badlands.00-00        0x6    0x562     1105 L1 L2
  6 LSPs

```

### show isis database brief

The output for the **show isis database brief** command is identical to that for the **show isis database** command. For sample output, see [show isis database on page 702](#).

### show isis database detail

```
user@host> show isis database logical-system CE3 sisira.00-00 detail
```

IS-IS level 1 link-state database:

```
sisira.00-00 Sequence: 0x11, Checksum: 0x10fc, Lifetime: 975 secs
  IS neighbor: hemantha-CE3.02           Metric:      10
  ES neighbor: 0015.0015.0015           Metric:      10 Down
  ES neighbor: 0025.0025.0025           Metric:      10 Down
  ES neighbor: 0030.0030.0030           Metric:      10 Down
  ES neighbor: 0040.0040.0040           Metric:      10 Down
  ES neighbor: sisira                     Metric:       0
  IP prefix: 1.0.0.0/24                  Metric:      10 External Down
  IP prefix: 3.0.0.0/24                  Metric:      10 External Down
  IP prefix: 4.0.0.0/24                  Metric:      10 External Down
  IP prefix: 5.0.0.0/24                  Metric:      10 Internal Up
  IP prefix: 15.15.15.15/32              Metric:      10 External Down
  IP prefix: 25.25.25.25/32              Metric:      10 External Down
  IP prefix: 30.30.30.30/32              Metric:      10 External Down
  IP prefix: 40.40.40.40/32              Metric:      10 External Down
  IP prefix: 60.60.60.60/32              Metric:       0 Internal Up
```

IS-IS level 2 link-state database:

```
sisira.00-00 Sequence: 0x13, Checksum: 0x69ac, Lifetime: 993 secs
  IS neighbor: hemantha-CE3.02           Metric:      10
  IP prefix: 1.0.0.0/24                  Metric:      10 External Down
  IP prefix: 3.0.0.0/24                  Metric:      10 External Down
  IP prefix: 4.0.0.0/24                  Metric:      10 External Down
  IP prefix: 5.0.0.0/24                  Metric:      10 Internal Up
  IP prefix: 15.15.15.15/32              Metric:      10 External Down
  IP prefix: 25.25.25.25/32              Metric:      10 External Down
  IP prefix: 30.30.30.30/32              Metric:      10 External Down
  IP prefix: 40.40.40.40/32              Metric:      10 External Down
  IP prefix: 50.50.50.50/32              Metric:      10 Internal Up
  IP prefix: 60.60.60.60/32              Metric:       0 Internal Up
  ISO prefix: 60.0006.80ff.f800.0000.0108.0001.0015.0015.0015/152
  Metric:      10 External Down
  ISO prefix: 60.0006.80ff.f800.0000.0108.0001.0025.0025.0025/152
  Metric:      10 External Down
  ISO prefix: 60.0006.80ff.f800.0000.0108.0001.0030.0030.0030/152
  Metric:      10 External Down
  ISO prefix: 60.0006.80ff.f800.0000.0108.0001.0040.0040.0040/152
  Metric:      10 External Down
  ISO prefix: 60.0006.80ff.f800.0000.0108.0001.0060.0060.0060/152
  Metric:       0 Internal Up
```

### show isis database extensive

```
user@host> show isis database logical-system CE3 sisira.00-00 extensive
```

IS-IS level 1 link-state database:

```
sisira.00-00 Sequence: 0x11, Checksum: 0x10fc, Lifetime: 970 secs
```

```

IS neighbor: hemantha-CE3.02          Metric:      10
Two-way fragment: hemantha-CE3.02-00, Two-way first fragment:
hemantha-CE3.02-00
ES neighbor: 0015.0015.0015          Metric:      10 Down
ES neighbor: 0025.0025.0025          Metric:      10 Down
ES neighbor: 0030.0030.0030          Metric:      10 Down
ES neighbor: 0040.0040.0040          Metric:      10 Down
ES neighbor: sisira                  Metric:      0
IP prefix: 1.0.0.0/24                Metric:      10 External Down
IP prefix: 3.0.0.0/24                Metric:      10 External Down
IP prefix: 4.0.0.0/24                Metric:      10 External Down
IP prefix: 5.0.0.0/24                Metric:      10 Internal Up
IP prefix: 15.15.15.15/32            Metric:      10 External Down
IP prefix: 25.25.25.25/32            Metric:      10 External Down
IP prefix: 30.30.30.30/32            Metric:      10 External Down
IP prefix: 40.40.40.40/32            Metric:      10 External Down
IP prefix: 60.60.60.60/32            Metric:      0 Internal Up

```

```

Header: LSP ID: sisira.00-00, Length: 336 bytes
Allocated length: 336 bytes, Router ID: 0.0.0.0
Remaining lifetime: 970 secs, Level: 1, Interface: 333
Estimated free bytes: 144, Actual free bytes: 0
Aging timer expires in: 970 secs
Protocols: IP, IPv6, CLNS

```

```

Packet: LSP ID: sisira.00-00, Length: 336 bytes, Lifetime : 1198 secs
Checksum: 0x10fc, Sequence: 0x11, Attributes: 0xb L1 L2 Attached
NLPID: 0x83, Fixed length: 27 bytes, Version: 1, Sysid length: 0 bytes
Packet type: 18, Packet version: 1, Max area: 0

```

#### TLVs:

```

Area address: 60.0006.80ff.f800.0000.0108.0001 (13)
Speaks: IP
Speaks: IPV6
Speaks: CLNP
Hostname: sisira
ES neighbor TLV: Internal, Metric: default 0, Up
  ES: sisira
IS neighbor: hemantha-CE3.02, Internal, Metric: default 10
IS extended neighbor: hemantha-CE3.02, Metric: default 10
ES neighbor TLV: External, Metric: default 10, Down
  ES: 0040.0040.0040
ES neighbor TLV: External, Metric: default 10, Down
  ES: 0025.0025.0025
ES neighbor TLV: External, Metric: default 10, Down
  ES: 0015.0015.0015
ES neighbor TLV: External, Metric: default 10, Down
  ES: 0030.0030.0030
IP external prefix: 3.0.0.0/24, Internal, Metric: default 10, Down
IP external prefix: 40.40.40.40/32, Internal, Metric: default 10, Down
IP external prefix: 4.0.0.0/24, Internal, Metric: default 10, Down
IP external prefix: 25.25.25.25/32, Internal, Metric: default 10, Down
IP external prefix: 15.15.15.15/32, Internal, Metric: default 10, Down
IP external prefix: 1.0.0.0/24, Internal, Metric: default 10, Down
IP external prefix: 30.30.30.30/32, Internal, Metric: default 10, Down
IP extended prefix: 3.0.0.0/24 metric 10 down
IP extended prefix: 40.40.40.40/32 metric 10 down
IP extended prefix: 4.0.0.0/24 metric 10 down
IP extended prefix: 25.25.25.25/32 metric 10 down
IP extended prefix: 15.15.15.15/32 metric 10 down
IP extended prefix: 1.0.0.0/24 metric 10 down

```



```

IP extended prefix: 30.30.30.30/32 metric 10 down
IP prefix: 60.60.60.60/32, Internal, Metric: default 0, Up
IP prefix: 5.0.0.0/24, Internal, Metric: default 10, Up
IP extended prefix: 60.60.60.60/32 metric 0 up
IP extended prefix: 5.0.0.0/24 metric 10 up
No queued transmissions

```

#### IS-IS level 2 link-state database:

```

sisira.00-00 Sequence: 0x13, Checksum: 0x69ac, Lifetime: 988 secs
IS neighbor: hemantha-CE3.02 Metric: 10
Two-way fragment: hemantha-CE3.02-00, Two-way first fragment:
hemantha-CE3.02-00
IP prefix: 1.0.0.0/24 Metric: 10 External Down
IP prefix: 3.0.0.0/24 Metric: 10 External Down
IP prefix: 4.0.0.0/24 Metric: 10 External Down
IP prefix: 5.0.0.0/24 Metric: 10 Internal Up
IP prefix: 15.15.15.15/32 Metric: 10 External Down
IP prefix: 25.25.25.25/32 Metric: 10 External Down
IP prefix: 30.30.30.30/32 Metric: 10 External Down
IP prefix: 40.40.40.40/32 Metric: 10 External Down
IP prefix: 50.50.50.50/32 Metric: 10 Internal Up
IP prefix: 60.60.60.60/32 Metric: 0 Internal Up
ISO prefix: 60.0006.80ff.f800.0000.0108.0001.0015.0015.0015/152
Metric: 10 External Down
ISO prefix: 60.0006.80ff.f800.0000.0108.0001.0025.0025.0025/152
Metric: 10 External Down
ISO prefix: 60.0006.80ff.f800.0000.0108.0001.0030.0030.0030/152
Metric: 10 External Down
ISO prefix: 60.0006.80ff.f800.0000.0108.0001.0040.0040.0040/152
Metric: 10 External Down
ISO prefix: 60.0006.80ff.f800.0000.0108.0001.0060.0060.0060/152
Metric: 0 Internal Up

```

```

Header: LSP ID: sisira.00-00, Length: 427 bytes
Allocated length: 427 bytes, Router ID: 0.0.0.0
Remaining lifetime: 988 secs, Level: 2, Interface: 333
Estimated free bytes: 130, Actual free bytes: 0
Aging timer expires in: 988 secs
Protocols: IP, IPv6, CLNS

```

```

Packet: LSP ID: sisira.00-00, Length: 427 bytes, Lifetime : 1198 secs
Checksum: 0x69ac, Sequence: 0x13, Attributes: 0x3 L1 L2
NLPID: 0x83, Fixed length: 27 bytes, Version: 1, Sysid length: 0 bytes
Packet type: 20, Packet version: 1, Max area: 0

```

#### TLVs:

```

Area address: 60.0006.80ff.f800.0000.0108.0001 (13)
Speaks: IP
Speaks: IPV6
Speaks: CLNP
Hostname: sisira
IS neighbor: hemantha-CE3.02, Internal, Metric: default 10
IS extended neighbor: hemantha-CE3.02, Metric: default 10
IP external prefix: 3.0.0.0/24, Internal, Metric: default 10, Down
IP external prefix: 40.40.40.40/32, Internal, Metric: default 10, Down
IP external prefix: 4.0.0.0/24, Internal, Metric: default 10, Down
IP external prefix: 25.25.25.25/32, Internal, Metric: default 10, Down
IP external prefix: 15.15.15.15/32, Internal, Metric: default 10, Down
IP external prefix: 1.0.0.0/24, Internal, Metric: default 10, Down
IP external prefix: 30.30.30.30/32, Internal, Metric: default 10, Down

```

```
IP extended prefix: 3.0.0.0/24 metric 10 down
IP extended prefix: 40.40.40.40/32 metric 10 down
IP extended prefix: 4.0.0.0/24 metric 10 down
IP extended prefix: 25.25.25.25/32 metric 10 down
IP extended prefix: 15.15.15.15/32 metric 10 down
IP extended prefix: 1.0.0.0/24 metric 10 down
IP extended prefix: 30.30.30.30/32 metric 10 down
ISO prefix-neighbor TLV: Internal, Metric: default 0, Up
  Prefix : 60.0006.80ff.f800.0000.0108.0001.0060.0060.0060/152
ISO prefix-neighbor TLV: External, Metric: default 10, Down
  Prefix : 60.0006.80ff.f800.0000.0108.0001.0040.0040.0040/152
ISO prefix-neighbor TLV: External, Metric: default 10, Down
  Prefix : 60.0006.80ff.f800.0000.0108.0001.0025.0025.0025/152
ISO prefix-neighbor TLV: External, Metric: default 10, Down
  Prefix : 60.0006.80ff.f800.0000.0108.0001.0015.0015.0015/152
ISO prefix-neighbor TLV: External, Metric: default 10, Down
  Prefix : 60.0006.80ff.f800.0000.0108.0001.0030.0030.0030/152
IP prefix: 60.60.60.60/32, Internal, Metric: default 0, Up
IP prefix: 5.0.0.0/24, Internal, Metric: default 10, Up
IP prefix: 50.50.50.50/32, Internal, Metric: default 10, Up
IP extended prefix: 60.60.60.60/32 metric 0 up
IP extended prefix: 5.0.0.0/24 metric 10 up
IP extended prefix: 50.50.50.50/32 metric 10 up
No queued transmissions
```

## show isis hostname

|                                                   |                                                                                                                                                                                                                        |
|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                     | show isis hostname<br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                             |
| <b>Syntax (EX Series Switches and QFX Series)</b> | show isis hostname                                                                                                                                                                                                     |
| <b>Release Information</b>                        | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.                               |
| <b>Description</b>                                | Display IS-IS hostname database information.                                                                                                                                                                           |
| <b>Options</b>                                    | <b>none</b> —Display IS-IS hostname database information.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>                   | view                                                                                                                                                                                                                   |
| <b>List of Sample Output</b>                      | <a href="#">show isis hostname on page 707</a>                                                                                                                                                                         |
| <b>Output Fields</b>                              | <a href="#">Table 48 on page 707</a> describes the output fields for the <b>show isis hostname</b> command. Output fields are listed in the approximate order in which they appear.                                    |

**Table 48: show isis hostname Output Fields**

| Field Name       | Field Description                                                                                                                                                                                                                                                                                |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>System Id</b> | System identifier mapped to the hostname.                                                                                                                                                                                                                                                        |
| <b>Hostname</b>  | Hostname mapped to the system identifier.                                                                                                                                                                                                                                                        |
| <b>Type</b>      | Type of mapping between system identifier and hostname. <ul style="list-style-type: none"> <li><b>Dynamic</b>—Hostname mapping determined as described in RFC 2763, <i>Dynamic Hostname Exchange Mechanism for IS-IS</i>.</li> <li><b>Static</b>—Hostname mapping configured by user.</li> </ul> |

## Sample Output

### show isis hostname

```

user@host> show isis hostname
IS-IS hostname database:
System Id      Hostname
1921.6800.4201 isis1
1921.6800.4202 isis2
1921.6800.4203 isis3
Type
Dynamic
Static
Dynamic

```

## show isis interface

---


|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                     | <code>show isis interface</code><br><code>&lt;brief   detail   extensive&gt;</code><br><code>&lt;interface-name&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Syntax (EX Series Switches and QFX Series)</b> | <code>show isis interface</code><br><code>&lt;brief   detail   extensive&gt;</code><br><code>&lt;interface-name&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>                        | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Description</b>                                | Display status information about IS-IS-enabled interfaces.<br><br><div> <b>NOTE:</b> If the configured metric for an IS-IS level is above 63, and the <code>wide-metrics-only</code> statement is not configured, the <code>show isis interface detail</code> command and the <code>show isis interface extensive</code> command display 63 as the metric value for that level. Configure the <code>wide-metrics-only</code> statement to generate metric values greater than 63 on a per IS-IS level basis.<br/><br/>The <code>show isis interface</code> command displays the configured metric value for an IS-IS level irrespective of whether is configured or not.</div> |
| <b>Options</b>                                    | <b>none</b> —Display standard information about all IS-IS-enabled interfaces.<br><br><b>brief   detail   extensive</b> —(Optional) Display the specified level of output.<br><br><b>interface-name</b> —(Optional) Display information about the specified interface only.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.                                                                                                                                                                                                                                                                                                                         |
| <b>Required Privilege Level</b>                   | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>                      | <ul style="list-style-type: none"><li>• <i>Example: Enabling Wide IS-IS Metrics for Traffic Engineering</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>List of Sample Output</b>                      | <a href="#">show isis interface on page 710</a><br><a href="#">show isis interface brief on page 710</a><br><a href="#">show isis interface detail on page 711</a><br><a href="#">show isis interface extensive on page 711</a><br><a href="#">show isis interface extensive (With LDP) on page 711</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Output Fields</b>                              | <a href="#">Table 49 on page 709</a> describes the output fields for the <code>show isis interface</code> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

Table 49: show isis interface Output Fields

| Field Name                                | Field Description                                                                                                                                              | Level of Output   |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| <i>interface-name</i>                     | Name of the interface.                                                                                                                                         | detail            |
| <b>Designated router</b>                  | Routing device selected by other routers that is responsible for sending link-state advertisements that describe the network. Used only on broadcast networks. | detail            |
| <b>Index</b>                              | Interface index assigned by the Junos OS kernel.                                                                                                               | detail            |
| <b>State</b>                              | Internal implementation information.                                                                                                                           | detail            |
| <b>Circuit id</b>                         | Circuit identifier.                                                                                                                                            | detail            |
| <b>Circuit type</b>                       | Circuit type: <ul style="list-style-type: none"> <li>• 1—Level 1 only</li> <li>• 2—Level 2 only</li> <li>• 3—Level 1 and Level 2</li> </ul>                    | detail            |
| <b>LSP interval</b>                       | Interval between link-state PDUs sent from the interface.                                                                                                      | detail            |
| <b>CSNP interval</b>                      | Interval between complete sequence number PDUs sent from the interface.                                                                                        | detail extensive  |
| <b>Sysid</b>                              | System identifier.                                                                                                                                             | detail            |
| <b>Interface</b>                          | Interface through which the adjacency is made.                                                                                                                 | none <b>brief</b> |
| <b>L or Level</b>                         | Level: <ul style="list-style-type: none"> <li>• 1—Level 1 only</li> <li>• 2—Level 2 only</li> <li>• 3—Level 1 and Level 2</li> </ul>                           | All levels        |
| <b>CirID</b>                              | Circuit identifier.                                                                                                                                            | none <b>brief</b> |
| <b>Level 1 DR</b>                         | Level 1 designated intermediate system.                                                                                                                        | none <b>brief</b> |
| <b>Level 2 DR</b>                         | Level 2 designated intermediate system.                                                                                                                        | none <b>brief</b> |
| <b>L1/L2 Metric</b>                       | Interface's metric for Level 1 and Level 2. If there is no information, the metric is 0.                                                                       | none <b>brief</b> |
| <b>Adjacency advertisement: Advertise</b> | This routing device has signaled to advertise this interface to its neighbors in their label-switched paths (LSPs).                                            | detail extensive  |
| <b>Adjacency advertisement: Suppress</b>  | This neighbor has signaled not to advertise this interface in the routing device's outbound LSPs.                                                              | detail extensive  |
| <b>Adjacencies</b>                        | Number of adjacencies established on this interface.                                                                                                           | detail            |

Table 49: show isis interface Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Level of Output  |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Priority                  | Priority value for this interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | detail           |
| Metric                    | Metric value for this interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | detail           |
| Hello(s) / Hello Interval | Interface's hello interval.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | detail extensive |
| Hold(s) / Hold Time       | Interface's hold time.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | detail extensive |
| Designated Router         | Router responsible for sending network link-state advertisements, which describe all the routing devices attached to the network.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | detail           |
| Hello padding             | Type of hello padding: <ul style="list-style-type: none"> <li>• <b>Adaptive</b>—On point-to-point connections, the hello packets are padded from the initial detection of a new neighbor until the neighbor verifies the adjacency as Up in the adjacency state TLV. If the neighbor does not support the adjacency state TLV, then padding continues. On LAN connections, padding starts from the initial detection of a new neighbor until there is at least one active adjacency on the interface.</li> <li>• <b>Loose</b>—(Default) The hello packet is padded from the initial detection of a new neighbor until the adjacency transitions to the Up state.</li> <li>• <b>Strict</b>—Padding is performed on all interface types and for all adjacency states, and is continuous.</li> </ul> | extensive        |
| LDP sync state            | Current LDP synchronization state: <b>in sync</b> , <b>in holddown</b> , or <b>not supported</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | extensive        |
| reason                    | Reason for being in the LDP sync state.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | extensive        |
| config holdtime           | Configured value of the hold timer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | extensive        |
| remaining                 | If the state is not in sync and the hold time is not infinity, then this field displays the remaining hold time in seconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | extensive        |

## Sample Output

### show isis interface

```

user@host> show isis interface
IS-IS interface database:
Interface          L CirID Level 1 DR      Level 2 DR      L1/L2 Metric
at-2/3/0.0         3   0x1 Point to Point    Point to Point    10/10
1o0.0              0   0x1 Passive          Passive           0/0

```

### show isis interface brief

The output for the **show isis interface brief** command is identical to that for the **show isis interface** command. For sample output, see [show isis interface on page 710](#).

### show isis interface detail

```

user@host> show isis interface detail
IS-IS interface database:
at-2/3/0.0
  Index: 66, State: 0x6, Circuit id: 0x1, Circuit type: 3
  LSP interval: 100 ms, CSNP interval: 5 s
  Level Adjacencies Priority Metric Hello (s) Hold (s) Designated Router
    1           1           64      10      9.000      27
    2           1           64      10      9.000      27
lo0.0
  Index: 64, State: 0x6, Circuit id: 0x1, Circuit type: 0
  LSP interval: 100 ms, CSNP interval: disabled
  Level Adjacencies Priority Metric Hello (s) Hold (s) Designated Router
    1           0           64       0      0 Passive
    2           0           64       0      0 Passive

```

### show isis interface extensive

```

user@host> show isis interface extensive
IS-IS interface database:
at-2/3/0.0
  Index: 66, State: 0x6, Circuit id: 0x1, Circuit type: 3
  LSP interval: 100 ms, CSNP interval: 5 s, Loose Hello padding
  Level 1
    Adjacencies: 1, Priority: 64, Metric: 10
    Hello Interval: 9.000 s, Hold Time: 27 s
  Level 2
    Adjacencies: 1, Priority: 64, Metric: 10
    Hello Interval: 9.000 s, Hold Time: 27 s
lo0.0
  Index: 64, State: 0x6, Circuit id: 0x1, Circuit type: 0
  LSP interval: 100 ms, CSNP interval: disabled, Loose Hello padding
  Level 1
    Adjacencies: 0, Priority: 64, Metric: 0
    Passive
  Level 2
    Adjacencies: 0, Priority: 64, Metric: 0
    Passive

```

### show isis interface extensive (With LDP)

```

user@host> show isis interface extensive
IS-IS interface database:
so-1/1/2.0
  Index: 114, State: 0x6, Circuit id: 0x1, Circuit type: 2
  LSP interval: 100 ms, CSNP interval: 20 s, Loose Hello padding
  Adjacency advertisement: Advertise
  LDP sync state: in sync, for: 00:01:28, reason: LDP up during config
  config holdtime: 20 seconds
  Level 2
    Adjacencies: 1, Priority: 64, Metric: 11
    Hello Interval: 9.000 s, Hold Time: 27 s
    IPV4 MulticastMetric: 10
    IPV6 UnicastMetric: 10

```

## show isis overview

|                                                   |                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                     | <b>show isis overview</b><br><instance <i>instance-name</i> ><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                           |
| <b>Syntax (EX Series Switches and QFX Series)</b> | <b>show isis overview</b><br><instance <i>instance-name</i> >                                                                                                                                                                                                                                                                                                                   |
| <b>Release Information</b>                        | Command introduced in Junos OS Release 8.5.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.                                                                                                                                                                                            |
| <b>Description</b>                                | Display IS-IS overview information.                                                                                                                                                                                                                                                                                                                                             |
| <b>Options</b>                                    | <b>none</b> —Display standard overview information about IS-IS for all routing instances.<br><br><b>instance <i>instance-name</i></b> —(Optional) Display overview information for the specified routing instance.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>                   | view                                                                                                                                                                                                                                                                                                                                                                            |
| <b>List of Sample Output</b>                      | <a href="#">show isis overview on page 714</a>                                                                                                                                                                                                                                                                                                                                  |
| <b>Output Fields</b>                              | <a href="#">Table 50 on page 712</a> lists the output fields for the <b>show isis overview</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                 |

**Table 50: show isis overview Output Fields**

| Field Name              | Field Description                                                                                                        |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Instance                | IS-IS routing instance.                                                                                                  |
| Router ID               | Router ID of the routing device.                                                                                         |
| Adjacency holddown      | Adjacency holddown capability: <b>enabled</b> or <b>disabled</b> .                                                       |
| Maximum Areas           | Maximum number of IS-IS areas advertised by the routing device.                                                          |
| LSP life time           | Lifetime of the link-state PDU, in seconds.                                                                              |
| Attached bit evaluation | Attached bit capability: <b>enabled</b> or <b>disabled</b> .                                                             |
| SPF delay               | Delay before performing consecutive shortest-path-first (SPF) calculations.                                              |
| SPF holddown            | Delay before performing additional SPF calculations after the maximum number of consecutive SPF calculations is reached. |



Table 50: show isis overview Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                       |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| SPF rapid runs                 | Maximum number of SPF calculations that can be performed in succession before the holddown timer begins.                |
| Overload bit at startup is set | Overload bit capability is enabled.                                                                                     |
| Overload high metrics          | Overload high metrics capability: <b>enabled</b> or <b>disabled</b> .                                                   |
| Overload timeout               | Time period after which overload is reset and the time that remains before the timer is set to expire.                  |
| Traffic engineering            | Traffic engineering capability: <b>enabled</b> or <b>disabled</b> .                                                     |
| Restart                        | Graceful restart capability: <b>enabled</b> or <b>disabled</b> .                                                        |
| Restart duration               | Time period for complete reacquisition of IS-IS neighbors.                                                              |
| Helper mode                    | Graceful restart helper capability: <b>enabled</b> or <b>disabled</b> .                                                 |
| Level                          | IS-IS level: <ul style="list-style-type: none"> <li>• 1—Level 1 information</li> <li>• 2—Level 2 information</li> </ul> |
| IPv4 is enabled                | IP Protocol version 4 capability is enabled.                                                                            |
| IPv6 is enabled                | IP Protocol version 6 capability is enabled.                                                                            |
| CLNS is enabled                | (J Series routers only) OSI CLNP capability is enabled.                                                                 |
| Internal route preference      | Preference value of internal routes.                                                                                    |
| External route preference      | Preference value of external routes.                                                                                    |
| Prefix export limit            | Number of prefixes allowed to be exported, as configured by the <b>prefix-export-limit</b> statement.                   |
| Prefix export count            | Number of prefixes exported.                                                                                            |
| Wide area metrics are enabled  | Wide area metrics capability is enabled.                                                                                |
| Narrow metrics are enabled     | Narrow metrics capability is enabled.                                                                                   |

## Sample Output

### show isis overview

```
user@host> show isis overview
Instance: master
  Router ID: 10.255.107.183
  Adjacency holddown: disabled
  Maximum Areas: 3
  LSP life time: 1200
  Attached bit evaluation: enabled
  SPF delay: 200 msec, SPF holddown: 5000 msec, SPF rapid runs: 3
  IPv4 is enabled, IPv6 is enabled
  Traffic engineering: enabled
  Restart: Disabled
    Helper mode: Enabled
Level 1
  Internal route preference: 15
  External route preference: 160
  Wide metrics are enabled, Narrow metrics are enabled
Level 2
  Internal route preference: 18
  External route preference: 165
  Prefix export limit: 5, Prefix export count: 5
  Wide metrics are enabled
```

## show isis route

|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                     | <pre>show isis route &lt;destination&gt; &lt;inet   inet6&gt; &lt;instance instance-name&gt; &lt;logical-system (all   logical-system-name)&gt; &lt;topology (ipv4-multicast   ipv6-multicast   ipv6-unicast   unicast)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Syntax (EX Series Switches and QFX Series)</b> | <pre>show isis route &lt;destination&gt; &lt;inet   inet6&gt; &lt;instance instance-name&gt; &lt;topology (ipv4-multicast   ipv6-multicast   ipv6-unicast   unicast)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Release Information</b>                        | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 12.1 for the QFX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b>                                | Display the routes in the IS-IS routing table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Options</b>                                    | <p><b>none</b>—Display all routes in the IS-IS routing table for all supported address families for all routing instances.</p> <p><b>destination</b>—(Optional) Destination address for the route.</p> <p><b>inet   inet6</b>—(Optional) Display inet (IPv4) or inet6 (IPv6) routes, respectively.</p> <p><b>instance instance-name</b>—(Optional) Display routes for the specified routing instance only.</p> <p><b>logical-system (all   logical-system-name)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>topology (ipv4-multicast   ipv6-multicast   ipv6-unicast   unicast)</b>—(Optional) Display routes for the specified topology only, or use unicast to display information, if available, for both IPv4 and IPv6 unicast topologies.</p> |
| <b>Required Privilege Level</b>                   | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>List of Sample Output</b>                      | <p><a href="#">show isis route logical-system on page 716</a></p> <p><a href="#">show isis route (CLNS) on page 716</a></p> <p><a href="#">show isis route on page 717</a></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Output Fields</b>                              | <p><a href="#">Table 51 on page 715</a> describes the output fields for the <b>show isis route</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

**Table 51: show isis route Output Fields**

| Field Name      | Field Description                                         |
|-----------------|-----------------------------------------------------------|
| Current version | Number of the current version of the IS-IS routing table. |

Table 51: show isis route Output Fields (*continued*)

| Field Name        | Field Description                                                                                                                          |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>L1</b>         | Version of Level 1 SPF that was run.                                                                                                       |
| <b>L2</b>         | Version of Level 2 SPF that was run.                                                                                                       |
| <b>Prefix</b>     | Destination of the route.                                                                                                                  |
| <b>L</b>          | IS-IS level: <ul style="list-style-type: none"> <li>• 1—Level 1 only</li> <li>• 2—Level 2 only</li> <li>• 3—Level 1 and Level 2</li> </ul> |
| <b>Version</b>    | Version of SPF that generated the route.                                                                                                   |
| <b>Metric</b>     | Metric value associated with the route.                                                                                                    |
| <b>Type</b>       | Metric type: <b>int</b> (internal) or <b>ext</b> (external).                                                                               |
| <b>Interface</b>  | Interface to the next hop.                                                                                                                 |
| <b>Via</b>        | System identifier of the next hop, displayed as a name if possible.                                                                        |
| <b>ISO Routes</b> | ISO routing table entries.                                                                                                                 |
| <b>snpa</b>       | MAC address.                                                                                                                               |

## Sample Output

### show isis route logical-system

```

user@host> show isis route logical-system ls1
IS-IS routing table           Current version: L1: 8 L2: 11
Prefix      L Version Metric Type Interface  Via
10.9.7.0/30  2      11    20 int  gr-0/2/0.0  h
10.9.201.1/32 2      11    60 int  gr-0/2/0.0  h
IPv6 Unicast IS-IS routing table   Current version: L1: 9 L2: 11
Prefix      L Version Metric Type Interface  Via
8009:3::a09:3200/126 2      11    20 int  gr-0/2/0.0  h

```

### show isis route (CLNS)

```

user@host> show isis route
IS-IS routing table           Current version: L1: 10 L2: 8
IPv4/IPv6 Routes
Prefix      L Version Metric Type Interface  Via
0.0.0.0/0    1      10    10 int  fe-0/0/1.0  ISIS.0
ISO Routes
Prefix L   Version Metric Type Interface  Via  snpa
0/0    1      10    10 int  fe-0/0/1.0  isis.0 0:12:0:34:0:56
47.0005.80ff.f800.0000.0108.0001/104

```

```

1          10          0 int
47.0005.80ff.f800.0000.0108.0001.1921.6800.4001/152
1          10          10 int fe-0/0/1.0 isis.0 0:12:0:34:0:56
47.0005.80ff.f800.0000.0108.0001.1921.6800.4002/152
1          10          20 int fe-0/0/1.0 isis.0 0:12:0:34:0:56
47.0005.80ff.f800.0000.0108.0002/104
1          10          0 int
47.0005.80ff.f800.0000.0108.0002.1921.6800.4001/152
1          10          10 int fe-0/0/1.0 isis.0 0:12:0:34:0:56

```

## show isis route

```
user@host> show isis route
```

```

IS-IS routing table          Current version: L1: 4 L2: 13
IPv4/IPv6 Routes
-----
Prefix                      L   Version  Metric Type Interface      NH   Via
10.255.71.52/32             2    13        10   int  ae0.0                 IPV4 camaro
10.255.71.238/32           2    13        20   int  so-6/0/0.0           IPV4 olympic
                             as0.0                 IPV4 glacier
10.255.71.239/32           2    13        20   int  so-6/0/0.0           IPV4 olympic
                             ae0.0                 IPV4 camaro
10.255.71.242/32           2    13        10   int  as0.0                 IPV4 glacier
10.255.71.243/32           2    13        10   int  so-6/0/0.0           IPV4 olympic
12.13.0.0/30                2    13        20   int  so-6/0/0.0           IPV4 olympic
12.15.0.0/30                2    13        20   int  so-6/0/0.0           IPV4 olympic
13.15.0.0/30                2    13        30   int  ae0.0                 IPV4 camaro
                             so-6/0/0.0           IPV4 olympic
                             as0.0                 IPV4 glacier
13.16.0.0/30                2    13        25   int  as0.0                 IPV4 glacier
14.15.0.0/30                2    13        20   int  ae0.0                 IPV4 camaro
192.2.1.0/30                2    13        30   int  so-6/0/0.0           IPV4 olympic
                             as0.0                 IPV4 glacier
1eee::/64                   2    13        30   int  so-6/0/0.0           IPV6 olympic
                             as0.0                 IPV6 glacier
abcd::10:255:71:52/128     2    13        10   int  ae0.0                 IPV6 camaro
abcd::10:255:71:238/128    2    13        20   int  so-6/0/0.0           IPV6 olympic
                             as0.0                 IPV6 glacier
abcd::10:255:71:239/128    2    13        20   int  so-6/0/0.0           IPV6 olympic

```

|                         |   |    |    |     |            |       |              |
|-------------------------|---|----|----|-----|------------|-------|--------------|
|                         |   |    |    |     |            | ae0.0 | IPV6 camaro  |
| abcd::10:255:71:242/128 | 2 | 13 | 10 | int | as0.0      |       | IPV6 glacier |
| abcd::10:255:71:243/128 | 2 | 13 | 10 | int | so-6/0/0.0 |       | IPV6 olympic |

## show isis spf

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                      | show isis spf (brief   log   results)<br><instance <i>instance-name</i> ><br><level (1   2)><br><logical-system (all   <i>logical-system-name</i> )><br><topology (ipv4-multicast   ipv6-multicast   ipv6-unicast   unicast)>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Syntax (EX Series Switches)</b> | show isis spf (brief   log   results)<br><instance <i>instance-name</i> ><br><level (1   2)><br><topology (ipv4-multicast   ipv6-multicast   ipv6-unicast   unicast)>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Description</b>                 | Display information about IS-IS shortest-path-first (SPF) calculations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                     | <p><b>brief</b>—Display an overview of SPF calculations.</p> <p><b>instance <i>instance instance-name</i></b>—(Optional) Display SPF calculations for the specified routing instance.</p> <p><b>level (1   2)</b>—(Optional) Display SPF calculations for the specified IS-IS level.</p> <p><b>log</b>—Display the log of SPF calculations.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>results</b>—Display the results of SPF calculations.</p> <p><b>topology (ipv4-multicast   ipv6-multicast   ipv6-unicast   unicast)</b>—(Optional) Display SPF calculations for the specified topology only.</p> |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>List of Sample Output</b>       | <a href="#">show isis spf log on page 720</a><br><a href="#">show isis spf results logical-system on page 721</a><br><a href="#">show isis spf results (CLNS) on page 722</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Output Fields</b>               | <a href="#">Table 52 on page 719</a> describes the output fields for the <b>show isis spf</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

**Table 52: show isis spf Output Fields**

| Field Name | Field Description    |
|------------|----------------------|
| Node       | System ID of a node. |
| Metric     | Metric to the node.  |

Table 52: show isis spf Output Fields (*continued*)

| Field Name     | Field Description                                                                       |
|----------------|-----------------------------------------------------------------------------------------|
| Interface      | Interface of the next hop.                                                              |
| Via            | System ID of the next hop.                                                              |
| SNPA           | Subnetwork point of attachment (MAC address of the next hop).                           |
| Start time     | (log option only) Time that the SPF computation started.                                |
| Elapsed (secs) | (log option only) Length of time, in seconds, required to complete the SPF computation. |
| Count          | (log option only) Number of times the SPF was triggered.                                |
| Reason         | (log option only) Reason that the SPF computation was completed.                        |

## Sample Output

### show isis spf log

```

user@host> show isis spf log logical-system lsl
IS-IS level 1 SPF log:
Start time           Elapsed (secs) Count Reason
Fri Oct 31 12:41:18   0.000069    1 Reconfig
Fri Oct 31 12:41:18   0.000107    3 Updated LSP fix.00-00
Fri Oct 31 12:41:18   0.000050    3 Address change on so-1/2/2.0
Fri Oct 31 12:41:23   0.000033    1 Updated LSP fix.00-00
Fri Oct 31 12:41:28   0.000178    5 New adjacency scat on ge-1/1/0.0
Fri Oct 31 12:41:59   0.000060    1 Updated LSP fix.00-00
Fri Oct 31 12:42:30   0.000161    2 Multi area attachment change
Fri Oct 31 12:56:58   0.000198    1 Periodic SPF
Fri Oct 31 13:10:29   0.000209    1 Periodic SPF
IS-IS level 2 SPF log:
Start time           Elapsed (secs) Count Reason
Fri Oct 31 12:41:18   0.000035    1 Reconfig
Fri Oct 31 12:41:18   0.000047    2 Updated LSP fix.00-00
Fri Oct 31 12:41:18   0.000043    5 Address change on gr-0/2/0.0
Fri Oct 31 12:41:23   0.000022    1 Updated LSP fix.00-00
Fri Oct 31 12:41:59   0.000144    3 New adjacency h on gr-0/2/0.0
Fri Oct 31 12:42:30   0.000257    3 New LSP skag.00-00
Fri Oct 31 12:54:37   0.000195    1 Periodic SPF
Fri Oct 31 12:55:50   0.000178    1 Updated LSP fix.00-00
Fri Oct 31 12:55:55   0.000174    1 Updated LSP h.00-00
Fri Oct 31 12:55:58   0.000176    1 Updated LSP skag.00-00
Fri Oct 31 13:08:14   0.000198    1 Periodic SPF
IPv6 Unicast IS-IS level 1 SPF log:
Start time           Elapsed (secs) Count Reason
Fri Oct 31 12:41:18   0.000028    1 Reconfig
Fri Oct 31 12:41:18   0.000043    3 Updated LSP fix.00-00
Fri Oct 31 12:41:18   0.000112    4 Updated LSP fix.00-00
Fri Oct 31 12:41:23   0.000059    1 Updated LSP fix.00-00
Fri Oct 31 12:41:25   0.000041    1 Updated LSP fix.00-00

```



```

Fri Oct 31 12:41:28      0.000103    5 New adjacency scat on ge-1/1/0.0
Fri Oct 31 12:41:59      0.000040    1 Updated LSP fix.00-00
Fri Oct 31 12:42:30      0.000118    2 Multi area attachment change
Fri Oct 31 12:56:08      0.000289    1 Periodic SPF
Fri Oct 31 13:11:07      0.000214    1 Periodic SPF
IPv6 Unicast IS-IS level 2 SPF log:

```

```

Start time      Elapsed (secs) Count Reason
Fri Oct 31 12:41:18 0.000027    1 Reconfig
Fri Oct 31 12:41:18 0.000039    2 Updated LSP fix.00-00
Fri Oct 31 12:41:18 0.000049    6 Updated LSP fix.00-00
Fri Oct 31 12:41:23 0.000025    1 Updated LSP fix.00-00
Fri Oct 31 12:41:25 0.000023    1 Updated LSP fix.00-00
Fri Oct 31 12:41:59 0.000087    3 New adjacency h on gr-0/2/0.0
Fri Oct 31 12:42:30 0.000123    3 New LSP skag.00-00
Fri Oct 31 12:55:50 0.000121    1 Updated LSP fix.00-00
Fri Oct 31 12:55:55 0.000121    1 Updated LSP h.00-00
Fri Oct 31 12:55:58 0.000121    1 Updated LSP skag.00-00
Fri Oct 31 13:09:46 0.000201    1 Periodic SPF
...

```

### show isis spf results logical-system

```
user@host> show isis spf results logical-system ls1
```

```
IS-IS level 1 SPF results:
```

| Node    | Metric | Interface     | Via  | SNPA             |
|---------|--------|---------------|------|------------------|
| scat.00 | 10     | ge-1/1/0.0    | scat | 0:90:69:a6:48:9d |
|         | 20     | 10.9.1.0/30   |      |                  |
| fix.02  | 10     |               |      |                  |
| fix.00  | 0      |               |      |                  |
|         | 10     | 10.9.1.0/30   |      |                  |
|         | 10     | 10.9.5.0/30   |      |                  |
|         | 10     | 10.9.6.0/30   |      |                  |
|         | 20     | 10.9.7.0/30   |      |                  |
|         | 60     | 10.9.201.1/32 |      |                  |

```
3 nodes
```

```
IS-IS level 2 SPF results:
```

| Node    | Metric | Interface     | Via | SNPA |
|---------|--------|---------------|-----|------|
| skag.00 | 20     | gr-0/2/0.0    | h   |      |
|         | 30     | 10.9.7.0/30   |     |      |
| skag.02 | 20     | gr-0/2/0.0    | h   |      |
| h.00    | 10     | gr-0/2/0.0    | h   |      |
|         | 20     | 10.9.6.0/30   |     |      |
|         | 20     | 10.9.7.0/30   |     |      |
|         | 60     | 10.9.201.1/32 |     |      |
| fix.00  | 0      |               |     |      |
|         | 10     | 10.9.1.0/30   |     |      |
|         | 10     | 10.9.5.0/30   |     |      |
|         | 10     | 10.9.6.0/30   |     |      |

```
4 nodes
```

```
IPv6 Unicast IS-IS level 1 SPF results:
```

| Node    | Metric | Interface            | Via  | SNPA             |
|---------|--------|----------------------|------|------------------|
| scat.00 | 10     | ge-1/1/0.0           | scat | 0:90:69:a6:48:9d |
|         |        | ge-1/1/0.0           | scat | 0:90:69:a6:48:9d |
|         | 20     | 8009:1::a09:1400/126 |      |                  |
| fix.02  | 10     |                      |      |                  |
| fix.00  | 0      |                      |      |                  |
|         | 10     | 8009:1::a09:1400/126 |      |                  |
|         | 10     | 8009:2::a09:1e00/126 |      |                  |

```

                20      8009:3::a09:3200/126
                10      8009:4::a09:2800/126
    3 nodes

IPv6 Unicast IS-IS level 2 SPF results:
Node      Metric      Interface      Via      SNPA
skag.00    20      gr-0/2/0.0    h
           30      8009:3::a09:3200/126
skag.02    20      gr-0/2/0.0    h
           20      gr-0/2/0.0    h
h.00       10      gr-0/2/0.0    h
           20      8009:3::a09:3200/126
           20      8009:4::a09:2800/126
fix.00     0
           10      8009:1::a09:1400/126
           10      8009:2::a09:1e00/126
           10      8009:4::a09:2800/126
    4 nodes

Multicast IS-IS level 1 SPF results:
Node      Metric      Interface      Via      SNPA
scat.00    10      ge-1/1/0.0    scat    0:90:69:a6:48:9d
fix.02     10
fix.00     0
    3 nodes

Multicast IS-IS level 2 SPF results:
Node      Metric      Interface      Via      SNPA
skag.00    20      gr-0/2/0.0    h
skag.02    20      gr-0/2/0.0    h
h.00       10      gr-0/2/0.0    h
fix.00     0
    4 nodes
...

```

### show isis spf results (CLNS)

```

user@host> show isis spf results
IS-IS level 1 SPF results:
Node      Metric      Interface      Via      SNPA
skag.00 10      fe-0/0/1.0    toothache 0:12:0:34:0:56
           20      fe-0/0/1.0    toothache 0:12:0:34:0:56
           20      192.168.37.64/29
           10      1921.6800.4001
           20      1921.6800.4002
pro1-a.02 10
pro1-a.00 0
           0      10.255.245.1/32
           10      192.168.37.64/29
           0      1921.6800.4211
    3 nodes

IS-IS level 2 SPF results:
Node      Metric      Interface      Via      SNPA
skag.00 10      fe-0/0/1.0    toothache 0:12:0:34:0:56
           20      fe-0/0/1.0    toothache 0:12:0:34:0:56
           20      10.255.245.1/32
           20      192.168.37.64/29
           20      47.0005.80ff.f800.0000.0109.0010/104

```

|           |    |                  |
|-----------|----|------------------|
| pro1-a.02 | 10 |                  |
| pro1-a.00 | 0  |                  |
|           | 0  | 10.255.245.1/32  |
|           | 10 | 192.168.37.64/29 |
| 3 nodes   |    |                  |

## show isis statistics

---

|                                                   |                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                     | show isis statistics<br><instance <i>instance-name</i> ><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                     |
| <b>Syntax (EX Series Switches and QFX Series)</b> | show isis statistics<br><instance <i>instance-name</i> >                                                                                                                                                                                                                                                                                             |
| <b>Release Information</b>                        | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.                                                                                                                                                             |
| <b>Description</b>                                | Display statistics about IS-IS traffic.                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                                    | <b>none</b> —Display IS-IS traffic statistics for all routing instances.<br><br><b>instance <i>instance-name</i></b> —(Optional) Display statistics for the specified routing instance.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>                   | view                                                                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>                      | <ul style="list-style-type: none"><li>• <i>clear isis statistics</i></li></ul>                                                                                                                                                                                                                                                                       |
| <b>List of Sample Output</b>                      | <a href="#">show isis statistics on page 726</a>                                                                                                                                                                                                                                                                                                     |
| <b>Output Fields</b>                              | <a href="#">Table 53 on page 725</a> describes the output fields for the <b>show isis statistics</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                |

Table 53: show isis statistics Output Fields

| Field Name                  | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PDU type                    | <p>PDU type:</p> <ul style="list-style-type: none"> <li>• <b>CSNP</b>—Complete sequence number PDUs contain a complete list of all link-state PDUs in the IS-IS database. CSNPs are sent periodically on all links, and the receiving systems use the information in the CSNP to update and synchronize their link-state PDU databases. The designated router multicasts CSNPs on broadcast links in place of sending explicit acknowledgments for each link-state PDU.</li> <li>• <b>IIH</b>—IS-IS hello packets are broadcast to discover the identity of neighboring IS-IS systems and to determine whether the neighbors are Level 1 or Level 2 intermediate systems.</li> <li>• <b>LSP</b>—Link-state PDUs contain information about the state of adjacencies to neighboring IS-IS systems. Link-state PDUs are flooded periodically throughout an area.</li> <li>• <b>PSNP</b>—Partial sequence number PDUs are sent multicast by a receiver when it detects that it is missing a link-state PDU (when its link-state PDU database is out of date). The receiver sends a PSNP to the system that transmitted the CSNP, effectively requesting that the missing link-state PDU be transmitted. That routing device, in turn, forwards the missing link-state PDU to the requesting routing device.</li> <li>• <b>Unknown</b>—The PDU type is unknown.</li> </ul> |
| Received                    | Number of PDUs received since IS-IS started or since the statistics were set to zero.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Processed                   | Number of PDUs received less the number dropped.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Drops                       | Number of PDUs dropped.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Sent                        | Number of PDUs transmitted since IS-IS started or since the statistics were set to zero.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Rexmit                      | Number of PDUs retransmitted since IS-IS started or since the statistics were set to zero.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Total packets received/sent | Total number of PDUs received and transmitted since IS-IS started or since the statistics were set to zero.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| SNP queue length            | Number of CSPN and PSNP packets currently waiting in the queue for processing. This value is almost always 0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| LSP queue length            | Number of link-state PDUs waiting in the queue for processing. This value is almost always 0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| SPF runs                    | Number of shortest-path-first (SPF) calculations that have been performed. If this number is incrementing rapidly, it indicates that the network is unstable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Fragments rebuilt           | Number of link-state PDU fragments that the local system has computed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| LSP regenerations           | Number of link-state PDUs that have been regenerated. A link-state PDU is regenerated when it is nearing the end of its lifetime and it has not changed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Purges initiated            | Number of purges that the system initiated. A purge is initiated if the software decides that a link-state PDU must be removed from the network.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

## Sample Output

### show isis statistics

```
user@host> show isis statistics
```

```
IS-IS statistics for merino:
```

| PDU type | Received | Processed | Drops | Sent   | Rexmit |
|----------|----------|-----------|-------|--------|--------|
| LSP      | 12227    | 12227     | 0     | 8184   | 683    |
| IIH      | 113808   | 113808    | 0     | 115817 | 0      |
| CSNP     | 198868   | 198868    | 0     | 198934 | 0      |
| PSNP     | 6985     | 6979      | 6     | 8274   | 0      |
| Unknown  | 0        | 0         | 0     | 0      | 0      |
| Totals   | 331888   | 331882    | 6     | 331209 | 683    |

```
Total packets received: 331888 Sent: 331892
```

```
SNP queue length:      0 Drops:      0  
LSP queue length:      0 Drops:      0
```

```
SPF runs:              1014  
Fragments rebuilt:     1038  
LSP regenerations:     425  
Purges initiated:      0
```

## show ospf database

|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                     | <pre>show ospf database &lt;brief   detail   extensive   summary&gt; &lt;advertising-router (address   self)&gt; &lt;area area-id&gt; &lt;asbrsummary&gt; &lt;external&gt; &lt;instance instance-name&gt; &lt;link-local&gt; &lt;logical-system (all   logical-system-name)&gt; &lt;lsa-id lsa-id&gt; &lt;netsummary&gt; &lt;network&gt; &lt;nssa&gt; &lt;opaque-area&gt; &lt;router&gt;</pre>                                                                         |
| <b>Syntax (EX Series Switches and QFX Series)</b> | <pre>show ospf database &lt;brief   detail   extensive   summary&gt; &lt;advertising-router (address   self)&gt; &lt;area area-id&gt; &lt;asbrsummary&gt; &lt;external&gt; &lt;instance instance-name&gt; &lt;link-local&gt; &lt;lsa-id lsa-id&gt; &lt;netsummary&gt; &lt;network&gt; &lt;nssa&gt; &lt;opaque-area&gt; &lt;router&gt;</pre>                                                                                                                            |
| <b>Release Information</b>                        | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>advertising-router self (address   self)</b> option introduced in Junos OS Release 9.5.</p> <p><b>advertising-router self (address   self)</b> option introduced in Junos OS Release 9.5 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>                                     |
| <b>Description</b>                                | Display the entries in the OSPF version 2 (OSPFv2) link-state database, which contains data about link-state advertisement (LSA) packets.                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                                    | <p><b>none</b>—Display standard information about entries in the OSPFv2 link-state database for all routing instances.</p> <p><b>brief   detail   extensive   summary</b>—(Optional) Display the specified level of output.</p> <p><b>advertising-router (address   self)</b>—(Optional) Display the LSAs advertised either by a particular routing device or by this routing device.</p> <p><b>area area-id</b>—(Optional) Display the LSAs in a particular area.</p> |

**asbrsummary**—(Optional) Display summary AS boundary router LSA entries.

**external**—(Optional) Display external LSAs.

**instance *instance-name***—(Optional) Display all OSPF database information under the named routing instance.

**link-local**—(Optional) Display information about link-local LSAs.

**logical-system (all | *logical-system-name*)**—(Optional) Perform this operation on all logical systems or on a particular logical system.

**lsa-id *lsa-id***—(Optional) Display the LSA with the specified LSA identifier.

**netsummary**—(Optional) Display summary network LSAs.

**network**—(Optional) Display information about network LSAs.

**nssa**—(Optional) Display information about not-so-stubby area (NSSA) LSAs.

**opaque-area**—(Optional) Display opaque area-scope LSAs.

**router**—(Optional) Display information about router LSAs.

**Required Privilege Level**

view

**Related Documentation**

- *clear (ospf | ospf3) database*

**List of Sample Output**

[show ospf database on page 730](#)  
[show ospf database brief on page 730](#)  
[show ospf database detail on page 730](#)  
[show ospf database extensive on page 732](#)  
[show ospf database summary on page 734](#)

**Output Fields**

[Table 54 on page 728](#) describes the output fields for the **show ospf database** command. Output fields are listed in the approximate order in which they appear.

**Table 54: show ospf database Output Fields**

| Field Name     | Field Description                                                                                                                                        | Level of Output |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>area</b>    | Area number. Area 0.0.0.0 is the backbone area.                                                                                                          | All levels      |
| <b>Type</b>    | Type of link advertisement: <b>ASBRSum</b> , <b>Extern</b> , <b>Network</b> , <b>NSSA</b> , <b>OpaqArea</b> , <b>Router</b> , or <b>Summary</b> .        | All levels      |
| <b>ID</b>      | LSA identifier included in the advertisement. An asterisk preceding the identifier marks database entries that originated from the local routing device. | All levels      |
| <b>Adv Rtr</b> | Address of the routing device that sent the advertisement.                                                                                               | All levels      |
| <b>Seq</b>     | Link sequence number of the advertisement.                                                                                                               | All levels      |



Table 54: show ospf database Output Fields (*continued*)

| Field Name                              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Level of Output         |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Age</b>                              | Time elapsed since the LSA was originated, in seconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | All levels              |
| <b>Opt</b>                              | Optional OSPF capabilities associated with the LSA.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | All levels              |
| <b>Cksum</b>                            | Checksum value of the LSA.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | All levels              |
| <b>Len</b>                              | Length of the advertisement, in bytes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | All levels              |
| <b>Router</b>                           | Router link-state advertisement information: <ul style="list-style-type: none"> <li>• <b>bits</b>—Flags describing the routing device that generated the LSP.</li> <li>• <b>link count</b>—Number of links in the advertisement.</li> <li>• <b>id</b>—ID of a routing device or subnet on the link.</li> <li>• <b>data</b>—For stub networks, the subnet mask. Otherwise, the IP address of the routing device that generated the LSP.</li> <li>• <b>type</b>—Type of link. It can be <b>PointToPoint</b>, <b>Transit</b>, <b>Stub</b>, or <b>Virtual</b>.</li> <li>• <b>TOS count</b>—Number of type-of-service (ToS) entries in the advertisement.</li> <li>• <b>TOS 0 metric</b>—Metric for ToS 0.</li> <li>• <b>TOS</b>—Type-of-service (ToS) value.</li> <li>• <b>metric</b>—Metric for the ToS.</li> </ul> | <b>detail extensive</b> |
| <b>Network</b>                          | Network link-state advertisement information: <ul style="list-style-type: none"> <li>• <b>mask</b>—Network mask.</li> <li>• <b>attached router</b>—ID of the attached neighbor.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive</b> |
| <b>Summary</b>                          | Summary link-state advertisement information: <ul style="list-style-type: none"> <li>• <b>mask</b>—Network mask.</li> <li>• <b>TOS</b>—Type-of-service (ToS) value.</li> <li>• <b>metric</b>—Metric for the ToS.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive</b> |
| <b>Gen timer</b>                        | How long until the LSA is regenerated.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>extensive</b>        |
| <b>Aging timer</b>                      | How long until the LSA expires.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>extensive</b>        |
| <b>Installed <i>hh:mm:ss</i> ago</b>    | How long ago the route was installed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>extensive</b>        |
| <b>expires in <i>hh:mm:ss</i></b>       | How long until the route expires.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>extensive</b>        |
| <b>sent <i>hh:mm:ss</i> ago</b>         | How long ago the LSA was sent.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>extensive</b>        |
| <b>Last changed <i>hh:mm:ss</i> ago</b> | How long ago the route was changed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>extensive</b>        |
| <b>Change count</b>                     | Number of times the route has changed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>extensive</b>        |

Table 54: show ospf database Output Fields (*continued*)

| Field Name          | Field Description                                                                  | Level of Output  |
|---------------------|------------------------------------------------------------------------------------|------------------|
| <b>Ours</b>         | Indicates that this is a local advertisement.                                      | <b>extensive</b> |
| <b>Router LSAs</b>  | Number of router link-state advertisements in the link-state database.             | <b>summary</b>   |
| <b>Network LSAs</b> | Number of network link-state advertisements in the link-state database.            | <b>summary</b>   |
| <b>Summary LSAs</b> | Number of summary link-state advertisements in the link-state database.            | <b>summary</b>   |
| <b>NSSA LSAs</b>    | Number of not-so-stubby area link-state advertisements in the link-state database. | <b>summary</b>   |

## Sample Output

### show ospf database

```

user@host> show ospf database
OSPF link state database, Area 0.0.0.1
  Type      ID            Adv Rtr      Seq          Age    Opt  Cksum  Len
Router     10.255.70.103   10.255.70.103 0x80000002   215    0x20 0x4112  48
Router     *10.255.71.242  10.255.71.242 0x80000002   214    0x20 0x11b1  48
Summary    *23.1.1.0       10.255.71.242 0x80000002   172    0x20 0x6d72  28
Summary    *24.1.1.0       10.255.71.242 0x80000002   177    0x20 0x607e  28
NSSA       *33.1.1.1       10.255.71.242 0x80000002   217    0x28 0x73bd  36

      OSPF link state database, Area 0.0.0.2
  Type      ID            Adv Rtr      Seq          Age    Opt  Cksum  Len
Router     10.255.71.52   10.255.71.52  0x80000004   174    0x20 0xd021  36
Router     *10.255.71.242  10.255.71.242 0x80000003   173    0x20 0xe191  36
Network    *23.1.1.1       10.255.71.242 0x80000002   173    0x20 0x9c76  32
Summary    *12.1.1.0       10.255.71.242 0x80000001   217    0x20 0xfeec  28
Summary    *24.1.1.0       10.255.71.242 0x80000002   177    0x20 0x607e  28
NSSA       *33.1.1.1       10.255.71.242 0x80000001   222    0x28 0xe047  36

      OSPF link state database, Area 0.0.0.3
  Type      ID            Adv Rtr      Seq          Age    Opt  Cksum  Len
Router     10.255.71.238   10.255.71.238 0x80000003   179    0x20 0x3942  36
Router     *10.255.71.242  10.255.71.242 0x80000003   177    0x20 0xf37d  36
Network    *24.1.1.1       10.255.71.242 0x80000002   177    0x20 0xc591  32
Summary    *12.1.1.0       10.255.71.242 0x80000001   217    0x20 0xfeec  28
Summary    *23.1.1.0       10.255.71.242 0x80000002   172    0x20 0x6d72  28
NSSA       *33.1.1.1       10.255.71.242 0x80000001   222    0x28 0xeb3b  36

```

### show ospf database brief

The output for the **show ospf database brief** command is identical to that for the **show ospf database** command. For sample output, see [show ospf database on page 730](#).

### show ospf database detail

```

user@host> show ospf database detail
OSPF link state database, Area 0.0.0.1
  Type      ID            Adv Rtr      Seq          Age    Opt  Cksum  Len
Router     10.255.70.103   10.255.70.103 0x80000002   261    0x20 0x4112  48

```

```

bits 0x0, link count 2
id 10.255.71.242, data 12.1.1.1, Type PointToPoint (1)
TOS count 0, TOS 0 metric 1
id 12.1.1.0, data 255.255.255.0, Type Stub (3)
TOS count 0, TOS 0 metric 1
Router *10.255.71.242 10.255.71.242 0x80000002 260 0x20 0x11b1 48
bits 0x3, link count 2
id 10.255.70.103, data 12.1.1.2, Type PointToPoint (1)
TOS count 0, TOS 0 metric 1
id 12.1.1.0, data 255.255.255.0, Type Stub (3)
TOS count 0, TOS 0 metric 1
Summary *23.1.1.0 10.255.71.242 0x80000002 218 0x20 0x6d72 28
mask 255.255.255.0
TOS 0x0, metric 1
Summary *24.1.1.0 10.255.71.242 0x80000002 223 0x20 0x607e 28
mask 255.255.255.0
TOS 0x0, metric 1
NSSA *33.1.1.1 10.255.71.242 0x80000002 263 0x28 0x73bd 36
mask 255.255.255.255
Type 2, TOS 0x0, metric 0, fwd addr 12.1.1.2, tag 0.0.0.0

```

#### OSPF link state database, Area 0.0.0.2

| Type                                                      | ID             | Adv Rtr       | Seq        | Age | Opt  | Cksum  | Len |
|-----------------------------------------------------------|----------------|---------------|------------|-----|------|--------|-----|
| Router                                                    | 10.255.71.52   | 10.255.71.52  | 0x80000004 | 220 | 0x20 | 0xd021 | 36  |
| bits 0x0, link count 1                                    |                |               |            |     |      |        |     |
| id 23.1.1.1, data 23.1.1.2, Type Transit (2)              |                |               |            |     |      |        |     |
| TOS count 0, TOS 0 metric 1                               |                |               |            |     |      |        |     |
| Router                                                    | *10.255.71.242 | 10.255.71.242 | 0x80000003 | 219 | 0x20 | 0xe191 | 36  |
| bits 0x3, link count 1                                    |                |               |            |     |      |        |     |
| id 23.1.1.1, data 23.1.1.1, Type Transit (2)              |                |               |            |     |      |        |     |
| TOS count 0, TOS 0 metric 1                               |                |               |            |     |      |        |     |
| Network                                                   | *23.1.1.1      | 10.255.71.242 | 0x80000002 | 219 | 0x20 | 0x9c76 | 32  |
| mask 255.255.255.0                                        |                |               |            |     |      |        |     |
| attached router 10.255.71.242                             |                |               |            |     |      |        |     |
| attached router 10.255.71.52                              |                |               |            |     |      |        |     |
| Summary                                                   | *12.1.1.0      | 10.255.71.242 | 0x80000001 | 263 | 0x20 | 0xfeec | 28  |
| mask 255.255.255.0                                        |                |               |            |     |      |        |     |
| TOS 0x0, metric 1                                         |                |               |            |     |      |        |     |
| Summary                                                   | *24.1.1.0      | 10.255.71.242 | 0x80000002 | 223 | 0x20 | 0x607e | 28  |
| mask 255.255.255.0                                        |                |               |            |     |      |        |     |
| TOS 0x0, metric 1                                         |                |               |            |     |      |        |     |
| NSSA                                                      | *33.1.1.1      | 10.255.71.242 | 0x80000001 | 268 | 0x28 | 0xe047 | 36  |
| mask 255.255.255.255                                      |                |               |            |     |      |        |     |
| Type 2, TOS 0x0, metric 0, fwd addr 23.1.1.1, tag 0.0.0.0 |                |               |            |     |      |        |     |

#### OSPF link state database, Area 0.0.0.3

| Type                                         | ID             | Adv Rtr       | Seq        | Age | Opt  | Cksum  | Len |
|----------------------------------------------|----------------|---------------|------------|-----|------|--------|-----|
| Router                                       | 10.255.71.238  | 10.255.71.238 | 0x80000003 | 225 | 0x20 | 0x3942 | 36  |
| bits 0x0, link count 1                       |                |               |            |     |      |        |     |
| id 24.1.1.1, data 24.1.1.2, Type Transit (2) |                |               |            |     |      |        |     |
| TOS count 0, TOS 0 metric 1                  |                |               |            |     |      |        |     |
| Router                                       | *10.255.71.242 | 10.255.71.242 | 0x80000003 | 223 | 0x20 | 0xf37d | 36  |
| bits 0x3, link count 1                       |                |               |            |     |      |        |     |
| id 24.1.1.1, data 24.1.1.1, Type Transit (2) |                |               |            |     |      |        |     |
| TOS count 0, TOS 0 metric 1                  |                |               |            |     |      |        |     |
| Network                                      | *24.1.1.1      | 10.255.71.242 | 0x80000002 | 223 | 0x20 | 0xc591 | 32  |
| mask 255.255.255.0                           |                |               |            |     |      |        |     |
| attached router 10.255.71.242                |                |               |            |     |      |        |     |
| attached router 10.255.71.238                |                |               |            |     |      |        |     |
| Summary                                      | *12.1.1.0      | 10.255.71.242 | 0x80000001 | 263 | 0x20 | 0xfeec | 28  |
| mask 255.255.255.0                           |                |               |            |     |      |        |     |

```

TOS 0x0, metric 1
Summary *23.1.1.0      10.255.71.242    0x80000002    218  0x20 0x6d72  28
mask 255.255.255.0
TOS 0x0, metric 1
NSSA  *33.1.1.1      10.255.71.242    0x80000001    268  0x28 0xeb3b  36
mask 255.255.255.255
Type 2, TOS 0x0, metric 0, fwd addr 24.1.1.1, tag 0.0.0.0

```

### show ospf database extensive

```

user@host> show ospf database extensive
  OSPF link state database, Area 0.0.0.1
  Type      ID          Adv Rtr      Seq      Age  Opt  Cksum  Len
Router  10.255.70.103    10.255.70.103  0x80000002  286  0x20 0x4112  48
  bits 0x0, link count 2
  id 10.255.71.242, data 12.1.1.1, Type PointToPoint (1)
  TOS count 0, TOS 0 metric 1
  id 12.1.1.0, data 255.255.255.0, Type Stub (3)
  TOS count 0, TOS 0 metric 1
  Aging timer 00:55:14
  Installed 00:04:43 ago, expires in 00:55:14
  Last changed 00:04:43 ago, Change count: 2
Router *10.255.71.242  10.255.71.242  0x80000002  285  0x20 0x11b1  48
  bits 0x3, link count 2
  id 10.255.70.103, data 12.1.1.2, Type PointToPoint (1)
  TOS count 0, TOS 0 metric 1
  id 12.1.1.0, data 255.255.255.0, Type Stub (3)
  TOS count 0, TOS 0 metric 1
  Gen timer 00:45:15
  Aging timer 00:55:15
  Installed 00:04:45 ago, expires in 00:55:15, sent 00:04:43 ago
  Last changed 00:04:45 ago, Change count: 2, Ours
Summary *23.1.1.0      10.255.71.242    0x80000002    243  0x20 0x6d72  28
mask 255.255.255.0
TOS 0x0, metric 1
Gen timer 00:45:57
Aging timer 00:55:57
Installed 00:04:03 ago, expires in 00:55:57, sent 00:04:01 ago
Last changed 00:04:48 ago, Change count: 1, Ours
Summary *24.1.1.0      10.255.71.242    0x80000002    248  0x20 0x607e  28
mask 255.255.255.0
TOS 0x0, metric 1
Gen timer 00:45:52
Aging timer 00:55:52
Installed 00:04:08 ago, expires in 00:55:52, sent 00:04:06 ago
Last changed 00:04:48 ago, Change count: 1, Ours
NSSA  *33.1.1.1      10.255.71.242    0x80000002    288  0x28 0x73bd  36
mask 255.255.255.255
Type 2, TOS 0x0, metric 0, fwd addr 12.1.1.2, tag 0.0.0.0
Gen timer 00:45:12
Aging timer 00:55:12
Installed 00:04:48 ago, expires in 00:55:12, sent 00:04:48 ago
Last changed 00:04:48 ago, Change count: 2, Ours

  OSPF link state database, Area 0.0.0.2
  Type      ID          Adv Rtr      Seq      Age  Opt  Cksum  Len
Router  10.255.71.52    10.255.71.52    0x80000004    245  0x20 0xd021  36
  bits 0x0, link count 1
  id 23.1.1.1, data 23.1.1.2, Type Transit (2)
  TOS count 0, TOS 0 metric 1
  Aging timer 00:55:55

```

```

    Installed 00:04:02 ago, expires in 00:55:55
    Last changed 00:04:02 ago, Change count: 2
Router *10.255.71.242    10.255.71.242    0x80000003    244    0x20    0xe191    36
    bits 0x3, link count 1
    id 23.1.1.1, data 23.1.1.1, Type Transit (2)
    TOS count 0, TOS 0 metric 1
    Gen timer 00:45:56
    Aging timer 00:55:56
    Installed 00:04:04 ago, expires in 00:55:56, sent 00:04:02 ago
    Last changed 00:04:04 ago, Change count: 2, Ours
Network *23.1.1.1      10.255.71.242    0x80000002    244    0x20    0x9c76    32
    mask 255.255.255.0
    attached router 10.255.71.242
    attached router 10.255.71.52
    Gen timer 00:45:56
    Aging timer 00:55:56
    Installed 00:04:04 ago, expires in 00:55:56, sent 00:04:02 ago
    Last changed 00:04:04 ago, Change count: 1, Ours
Summary *12.1.1.0      10.255.71.242    0x80000001    288    0x20    0xfeec    28
    mask 255.255.255.0
    TOS 0x0, metric 1
    Gen timer 00:45:12
    Aging timer 00:55:12
    Installed 00:04:48 ago, expires in 00:55:12, sent 00:04:04 ago
    Last changed 00:04:48 ago, Change count: 1, Ours
Summary *24.1.1.0      10.255.71.242    0x80000002    248    0x20    0x607e    28
    mask 255.255.255.0
    TOS 0x0, metric 1
    Gen timer 00:45:52
    Aging timer 00:55:52
    Installed 00:04:08 ago, expires in 00:55:52, sent 00:04:04 ago
    Last changed 00:04:48 ago, Change count: 1, Ours
NSSA  *33.1.1.1        10.255.71.242    0x80000001    293    0x28    0xe047    36
    mask 255.255.255.255
    Type 2, TOS 0x0, metric 0, fwd addr 23.1.1.1, tag 0.0.0.0
    Gen timer 00:45:07
    Aging timer 00:55:07
    Installed 00:04:53 ago, expires in 00:55:07, sent 00:04:04 ago
    Last changed 00:04:53 ago, Change count: 1, Ours

    OSPF link state database, Area 0.0.0.3
    Type      ID      Adv Rtr      Seq      Age  Opt  Cksum  Len
Router  10.255.71.238    10.255.71.238    0x80000003    250  0x20  0x3942  36
    bits 0x0, link count 1
    id 24.1.1.1, data 24.1.1.2, Type Transit (2)
    TOS count 0, TOS 0 metric 1
    Aging timer 00:55:50
    Installed 00:04:07 ago, expires in 00:55:50
    Last changed 00:04:07 ago, Change count: 2
Router *10.255.71.242    10.255.71.242    0x80000003    248  0x20  0xf37d  36
    bits 0x3, link count 1
    id 24.1.1.1, data 24.1.1.1, Type Transit (2)
    TOS count 0, TOS 0 metric 1
    Gen timer 00:45:52
    Aging timer 00:55:52
    Installed 00:04:08 ago, expires in 00:55:52, sent 00:04:06 ago
    Last changed 00:04:08 ago, Change count: 2, Ours
Network *24.1.1.1      10.255.71.242    0x80000002    248  0x20  0xc591  32
    mask 255.255.255.0
    attached router 10.255.71.242
    attached router 10.255.71.238

```

```
Gen timer 00:45:52
Aging timer 00:55:52
Installed 00:04:08 ago, expires in 00:55:52, sent 00:04:06 ago
Last changed 00:04:08 ago, Change count: 1, Ours
Summary *12.1.1.0      10.255.71.242    0x80000001    288  0x20 0xfeec  28
mask 255.255.255.0
TOS 0x0, metric 1
Gen timer 00:45:12
Aging timer 00:55:12
Installed 00:04:48 ago, expires in 00:55:12, sent 00:04:13 ago
Last changed 00:04:48 ago, Change count: 1, Ours
Summary *23.1.1.0      10.255.71.242    0x80000002    243  0x20 0x6d72  28
mask 255.255.255.0
TOS 0x0, metric 1
Gen timer 00:45:57
Aging timer 00:55:57
Installed 00:04:03 ago, expires in 00:55:57, sent 00:04:01 ago
Last changed 00:04:48 ago, Change count: 1, Ours
NSSA  *33.1.1.1        10.255.71.242    0x80000001    293  0x28 0xeb3b  36
mask 255.255.255.255
Type 2, TOS 0x0, metric 0, fwd addr 24.1.1.1, tag 0.0.0.0
Gen timer 00:45:07
Aging timer 00:55:07
Installed 00:04:53 ago, expires in 00:55:07, sent 00:04:13 ago
Last changed 00:04:53 ago, Change count: 1, Ours
```

#### show ospf database summary

```
user@host> show ospf database summary
Area 0.0.0.1:
  2 Router LSAs
  2 Summary LSAs
  1 NSSA LSAs
Area 0.0.0.2:
  2 Router LSAs
  1 Network LSAs
  2 Summary LSAs
  1 NSSA LSAs
Area 0.0.0.3:
  2 Router LSAs
  1 Network LSAs
  2 Summary LSAs
  1 NSSA LSAs
Externals:
Interface fe-2/2/1.0:
Interface ge-0/3/2.0:
Interface so-0/1/2.0:
Interface so-0/1/2.0:
```

## show ospf3 database

|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                     | <pre>show ospf3 database &lt;brief   detail   extensive   summary&gt; &lt;advertising-router (address   self)&gt; &lt;area area-id&gt; &lt;external&gt; &lt;instance instance-name&gt; &lt;inter-area-prefix&gt; &lt;inter-area-router&gt; &lt;intra-area-prefix&gt; &lt;link&gt; &lt;link-local&gt; &lt;logical-system (all   logical-system-name)&gt; &lt;lsa-id lsa-id&gt; &lt;network&gt; &lt;nssa&gt; &lt;realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)&gt; &lt;router&gt;</pre> |
| <b>Syntax (EX Series Switches and QFX Series)</b> | <pre>show ospf3 database &lt;brief   detail   extensive   summary&gt; &lt;advertising-router (address   self)&gt; &lt;area area-id&gt; &lt;external&gt; &lt;instance instance-name&gt; &lt;inter-area-prefix&gt; &lt;inter-area-router&gt; &lt;intra-area-prefix&gt; &lt;link&gt; &lt;link-local&gt; &lt;lsa-id lsa-id&gt; &lt;network&gt; &lt;nssa&gt; &lt;router&gt;</pre>                                                                                                                   |
| <b>Release Information</b>                        | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>realm</b> option introduced in Junos OS Release 9.2.</p> <p><b>advertising-router (address   self)</b> option introduced in Junos Release 9.5.</p> <p><b>advertising-router (address   self)</b> option introduced in Junos OS Release 9.5 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>           |
| <b>Description</b>                                | Display the entries in the OSPF version 3 (OSPFv3) link-state database, which contains data about link-state advertisement (LSA) packets.                                                                                                                                                                                                                                                                                                                                                      |
| <b>Options</b>                                    | <p><b>none</b>—Display standard information about all entries in the OSPFv3 link-state database.</p> <p><b>brief   detail   extensive   summary</b>—(Optional) Display the specified level of output.</p> <p><b>advertising-router (address   self)</b>—(Optional) Display the LSAs advertised either by a particular routing device or by this routing device.</p>                                                                                                                            |

**area** *area-id*—(Optional) Display the LSAs in a particular area.

**external**—(Optional) Display external LSAs.

**instance** *instance-name*—(Optional) Display all OSPF database information under the named routing instance.

**inter-area-prefix**—(Optional) Display information about interarea-prefix LSAs.

**inter-area-router**—(Optional) Display information about interarea-router LSAs.

**intra-area-prefix**—(Optional) Display information about intra-area-prefix LSAs.

**link**—(Optional) Display information about link LSAs.

**link-local**—(Optional) Display information about link-local LSAs.

**logical-system** (**all** | *logical-system-name*)—(Optional) Perform this operation on all logical systems or on a particular logical system.

**lsa-id** *lsa-id*—(Optional) Display the LSA with the specified LSA identifier.

**network**—(Optional) Display information about network LSAs.

**nssa**—(Optional) Display information about not-so-stubby area (NSSA) LSAs.

**realm** (**ipv4-multicast** | **ipv4-unicast** | **ipv6-multicast**)—(Optional) Display information about the specified OSPFv3 realm, or address family. Use the **realm** option to specify an address family other than IPv6 unicast, which is the default.

**router**—(Optional) Display information about router LSAs.

**Required Privilege Level**

view

**Related Documentation**

- *clear (ospf | ospf3) database*

**List of Sample Output**

[show ospf3 database brief on page 741](#)  
[show ospf3 database extensive on page 741](#)  
[show ospf3 database summary on page 744](#)

**Output Fields**

Table 55 on page 736 lists the output fields for the **show ospf3 database** command. Output fields are listed in the approximate order in which they appear.

**Table 55: show ospf3 database Output Fields**

| Field Name                                        | Field Description                                 | Level of Output        |
|---------------------------------------------------|---------------------------------------------------|------------------------|
| OSPF link state database, area <i>area-number</i> | Entries in the link-state database for this area. | brief detail extensive |
| OSPF AS SCOPE link state database                 | Entries in the AS scope link-state database.      | brief detail extensive |



Table 55: show ospf3 database Output Fields (*continued*)

| Field Name                                                           | Field Description                                                                                                                                                                                                                                                                                                                                                          | Level of Output        |
|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| OSPF Link-Local link state database, interface <i>interface-name</i> | Entries in the link-local link-state database for this interface.                                                                                                                                                                                                                                                                                                          | brief detail extensive |
| area                                                                 | Area number. Area 0.0.0.0 is the backbone area.                                                                                                                                                                                                                                                                                                                            | All levels             |
| Type                                                                 | Type of link advertisement: <b>Extern</b> , <b>InterArPfx</b> , <b>InterArRtr</b> , <b>IntraArPrx</b> , <b>Link</b> , <b>Network</b> , <b>NSSA</b> , or <b>Router</b> .                                                                                                                                                                                                    | brief detail extensive |
| ID                                                                   | Link identifier included in the advertisement. An asterisk (*) preceding the identifier marks database entries that originated from the local routing device.                                                                                                                                                                                                              | brief detail extensive |
| Adv Rtr                                                              | Address of the routing device that sent the advertisement.                                                                                                                                                                                                                                                                                                                 | brief detail extensive |
| Seq                                                                  | Link sequence number of the advertisement.                                                                                                                                                                                                                                                                                                                                 | brief detail extensive |
| Age                                                                  | Time elapsed since the LSA was originated, in seconds.                                                                                                                                                                                                                                                                                                                     | brief detail extensive |
| Cksum                                                                | Checksum value of the LSA.                                                                                                                                                                                                                                                                                                                                                 | brief detail extensive |
| Len                                                                  | Length of the advertisement, in bytes.                                                                                                                                                                                                                                                                                                                                     | brief detail extensive |
| Router (Router Link-State Advertisements)                            |                                                                                                                                                                                                                                                                                                                                                                            |                        |
| bits                                                                 | Flags describing the routing device that generated the LSP.                                                                                                                                                                                                                                                                                                                | detail extensive       |
| Options                                                              | Option bits carried in the router LSA.                                                                                                                                                                                                                                                                                                                                     | detail extensive       |
| For Each Router Link                                                 |                                                                                                                                                                                                                                                                                                                                                                            |                        |
| Type                                                                 | Type of interface. The value of all other output fields describing a routing device interface depends on the interface's type: <ul style="list-style-type: none"> <li>• <b>PointToPoint (1)</b>—Point-to-point connection to another routing device.</li> <li>• <b>Transit (2)</b>—Connection to a transit network.</li> <li>• <b>Virtual (4)</b>—Virtual link.</li> </ul> | detail extensive       |
| Loc-if-id                                                            | Local interface ID assigned to the interface that uniquely identifies the interface with the routing device.                                                                                                                                                                                                                                                               | detail extensive       |
| Nbr-if-id                                                            | Interface ID of the neighbor's interface for this routing device link.                                                                                                                                                                                                                                                                                                     | detail extensive       |
| Nbr-rtr-id                                                           | Router ID of the neighbor routing device (for type 2 interfaces, the attached link's designated router).                                                                                                                                                                                                                                                                   | detail extensive       |
| Metric                                                               | Cost of the router link.                                                                                                                                                                                                                                                                                                                                                   | detail extensive       |
| Gen timer                                                            | How long until the LSA is regenerated, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                                                                                                                                                        | extensive              |

Table 55: show ospf3 database Output Fields (*continued*)

| Field Name                                                     | Field Description                                                                                                                                                                                                                                            | Level of Output  |
|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Aging timer</b>                                             | How long until the LSA expires, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                                                 | extensive        |
| <b>Installed <i>nn:nn:nn</i> ago</b>                           | How long ago the route was installed, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                                           | extensive        |
| <b>expires in <i>nn:nn:nn</i></b>                              | How long until the route expires, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                                               | extensive        |
| <b>sent <i>nn:nn:nn</i> ago</b>                                | Time elapsed since the LSA was last transmitted or flooded to an adjacency or an interface, respectively, in the format <i>hours:minutes:seconds</i> .                                                                                                       | extensive        |
| <b>Ours</b>                                                    | Indicates that this is a local advertisement.                                                                                                                                                                                                                | extensive        |
| <b>Network (Network Link-State Advertisements)</b>             |                                                                                                                                                                                                                                                              |                  |
| <b>Options</b>                                                 | Option bits carried in the network LSA.                                                                                                                                                                                                                      | detail extensive |
| <b>Attached Router</b>                                         | Router IDs of each of the routing devices attached to the link. Only routing devices that are fully adjacent to the designated router are listed. The designated router includes itself in this list.                                                        | detail extensive |
| <b>InterArPfx (Interarea-Prefix Link-State Advertisements)</b> |                                                                                                                                                                                                                                                              |                  |
| <b>Prefix</b>                                                  | IPv6 address prefix.                                                                                                                                                                                                                                         | detail extensive |
| <b>Prefix-options</b>                                          | Option bit associated with the prefix.                                                                                                                                                                                                                       | detail extensive |
| <b>Metric</b>                                                  | Cost of this route. Expressed in the same units as the interface costs in the router LSAs. When the interarea-prefix LSA is describing a route to a range of addresses, the cost is set to the maximum cost to any reachable component of the address range. | detail extensive |
| <b>Gen timer</b>                                               | How long until the LSA is regenerated, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                                          | extensive        |
| <b>Aging timer</b>                                             | How long until the LSA expires, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                                                 | extensive        |
| <b>Installed <i>nn:nn:nn</i> ago</b>                           | How long ago the route was installed, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                                           | extensive        |
| <b>expires in <i>nn:nn:nn</i></b>                              | How long until the route expires, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                                               | extensive        |
| <b>sent <i>nn:nn:nn</i> ago</b>                                | Time elapsed since the LSA was last transmitted or flooded to an adjacency or an interface, respectively, in the format <i>hours:minutes:seconds</i> .                                                                                                       | extensive        |
| <b>Ours</b>                                                    | Indicates that this is a local advertisement.                                                                                                                                                                                                                | extensive        |
| <b>InterArRtr (Interarea-Router Link-State Advertisements)</b> |                                                                                                                                                                                                                                                              |                  |
| <b>Dest-router-id</b>                                          | Router ID of the routing device described by the LSA.                                                                                                                                                                                                        | detail extensive |
| <b>options</b>                                                 | Optional capabilities supported by the routing device.                                                                                                                                                                                                       | detail extensive |

Table 55: show ospf3 database Output Fields (*continued*)

| Field Name                                         | Field Description                                                                                                                                                                                                                                            | Level of Output         |
|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Metric</b>                                      | Cost of this route. Expressed in the same units as the interface costs in the router LSAs. When the interarea-prefix LSA is describing a route to a range of addresses, the cost is set to the maximum cost to any reachable component of the address range. | <b>detail extensive</b> |
| <b>Prefix</b>                                      | IPv6 address prefix.                                                                                                                                                                                                                                         | <b>extensive</b>        |
| <b>Prefix-options</b>                              | Option bit associated with the prefix.                                                                                                                                                                                                                       | <b>extensive</b>        |
| <b>Extern (External Link-State Advertisements)</b> |                                                                                                                                                                                                                                                              |                         |
| <b>Prefix</b>                                      | IPv6 address prefix.                                                                                                                                                                                                                                         | <b>detail extensive</b> |
| <b>Prefix-options</b>                              | Option bit associated with the prefix.                                                                                                                                                                                                                       | <b>detail extensive</b> |
| <b>Metric</b>                                      | Cost of the route, which depends on the value of <b>Type</b> .                                                                                                                                                                                               | <b>detail extensive</b> |
| <b>Type <i>n</i></b>                               | Type of external metric: <b>Type 1</b> or <b>Type 2</b> .                                                                                                                                                                                                    | <b>detail extensive</b> |
| <b>Aging timer</b>                                 | How long until the LSA expires, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                                                 | <b>extensive</b>        |
| <b>Installed <i>nn:nn:nn</i> ago</b>               | How long ago the route was installed, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                                           | <b>extensive</b>        |
| <b>expires in <i>nn:nn:nn</i></b>                  | How long until the route expires, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                                               | <b>extensive</b>        |
| <b>sent <i>nn:nn:nn</i> ago</b>                    | Time elapsed since the LSA was last transmitted or flooded to an adjacency or an interface, respectively, in the format <i>hours:minutes:seconds</i> .                                                                                                       | <b>extensive</b>        |
| <b>Link (Link-State Advertisements)</b>            |                                                                                                                                                                                                                                                              |                         |
| <b>IPv6-Address</b>                                | IPv6 link-local address on the link for which this link LSA originated.                                                                                                                                                                                      | <b>detail extensive</b> |
| <b>Options</b>                                     | Option bits carried in the link LSA.                                                                                                                                                                                                                         | <b>detail extensive</b> |
| <b>priority</b>                                    | Router priority of the interface attaching the originating routing device to the link.                                                                                                                                                                       | <b>detail extensive</b> |
| <b>Prefix-count</b>                                | Number of IPv6 address prefixes contained in the LSA. The rest of the link LSA contains a list of IPv6 prefixes to be associated with the link.                                                                                                              | <b>detail extensive</b> |
| <b>Prefix</b>                                      | IPv6 address prefix.                                                                                                                                                                                                                                         | <b>detail extensive</b> |
| <b>Prefix-options</b>                              | Option bit associated with the prefix.                                                                                                                                                                                                                       | <b>detail extensive</b> |
| <b>Gen timer</b>                                   | How long until the LSA is regenerated, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                                          | <b>extensive</b>        |
| <b>Aging timer</b>                                 | How long until the LSA expires, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                                                 | <b>extensive</b>        |

Table 55: show ospf3 database Output Fields (*continued*)

| Field Name                                                      | Field Description                                                                                                                                                                                                              | Level of Output  |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Installed <i>nn:nn:nn</i> ago                                   | How long ago the route was installed, in the format <i>hours:minutes:seconds</i> .                                                                                                                                             | extensive        |
| expires in <i>nn:nn:nn</i>                                      | How long until the route expires, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                 | extensive        |
| sent <i>nn:nn:nn</i> ago                                        | Time elapsed since the LSA was last transmitted or flooded to an adjacency or an interface, respectively, in the format <i>hours:minutes:seconds</i> .                                                                         | extensive        |
| Ours                                                            | Indicates that this is a local advertisement.                                                                                                                                                                                  | extensive        |
| <b>IntraArPfx (Intra-Area-Prefix Link-State Advertisements)</b> |                                                                                                                                                                                                                                |                  |
| Ref-lsa-type                                                    | LSA type of the referenced LSA. <ul style="list-style-type: none"> <li><b>Router</b>—Address prefixes are associated with a router LSA.</li> <li><b>Network</b>—Address prefixes are associated with a network LSA.</li> </ul> | detail extensive |
| Ref-lsa-id                                                      | Link-state ID of the referenced LSA.                                                                                                                                                                                           | detail extensive |
| Ref-router-id                                                   | Advertising router ID of the referenced LSA.                                                                                                                                                                                   | detail extensive |
| Prefix-count                                                    | Number of IPv6 address prefixes contained in the LSA. The rest of the link LSA contains a list of IPv6 prefixes to be associated with the link.                                                                                | detail extensive |
| Prefix                                                          | IPv6 address prefix.                                                                                                                                                                                                           | detail extensive |
| Prefix-options                                                  | Option bit associated with the prefix.                                                                                                                                                                                         | detail extensive |
| Metric                                                          | Cost of this prefix. Expressed in the same units as the interface costs in the router LSAs.                                                                                                                                    | detail extensive |
| Gen timer                                                       | How long until the LSA is regenerated, in the format <i>hours:minutes:seconds</i> .                                                                                                                                            | extensive        |
| Aging timer                                                     | How long until the LSA expires, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                   | extensive        |
| Installed <i>hh:mm:ss</i> ago                                   | How long ago the route was installed, in the format <i>hours:minutes:seconds</i> .                                                                                                                                             | extensive        |
| expires in <i>hh:mm:ss</i>                                      | How long until the route expires, in the format <i>hours:minutes:seconds</i> .                                                                                                                                                 | extensive        |
| sent <i>hh:mm:ss</i> ago                                        | Time elapsed since the LSA was last transmitted or flooded to an adjacency or an interface, respectively, in the format <i>hours:minutes:seconds</i> .                                                                         | extensive        |
| <i>n</i> Router LSAs                                            | Number of router LSAs in the link-state database.                                                                                                                                                                              | summary          |
| <i>n</i> Network LSAs                                           | Number of network LSAs in the link-state database.                                                                                                                                                                             | summary          |
| <i>n</i> InterArPfx LSAs                                        | Number of interarea-prefix LSAs in the link-state database.                                                                                                                                                                    | summary          |

Table 55: show ospf3 database Output Fields (*continued*)

| Field Name                         | Field Description                                                        | Level of Output |
|------------------------------------|--------------------------------------------------------------------------|-----------------|
| <i>n</i> InterArRtr LSAs           | Number of interarea-router LSAs in the link-state database.              | summary         |
| <i>n</i> IntraArPfx LSAs           | Number of intra-area-prefix LSAs in the link-state database.             | summary         |
| Externals                          | Display of the external LSA database.                                    | summary         |
| <i>n</i> Extern LSAs               | Number of external LSAs in the link-state database.                      | summary         |
| Interface<br><i>interface-name</i> | Name of the interface for which link-local LSA information is displayed. | summary         |
| <i>n</i> Link LSAs                 | Number of link LSAs in the link-state database.                          | summary         |

## Sample Output

### show ospf3 database brief

```

user@host> show ospf3 database brief
      OSPF3 link state database, area 0.0.0.0
      Type      ID          Adv Rtr      Seq          Age    Cksum  Len
      Router    0.0.0.1      10.255.4.85  0x80000003   885    0xa697  40
      Router    *0.0.0.1     10.255.4.93  0x80000002   953    0xc677  40
      InterArPfx *0.0.0.2     10.255.4.93  0x80000001   910    0xb96f  44
      InterArRtr *0.0.0.1     10.255.4.93  0x80000001   910    0xe159  32
      IntraArPfx *0.0.0.1     10.255.4.93  0x80000002   432    0x788f  72

      OSPF3 link state database, area 0.0.0.1
      Type      ID          Adv Rtr      Seq          Age    Cksum  Len
      Router    *0.0.0.1     10.255.4.93  0x80000003   916    0xea40  40
      Router    0.0.0.1     10.255.4.97  0x80000006   851    0xc95b  40
      Network    0.0.0.2     10.255.4.97  0x80000002   916    0x4598  32
      InterArPfx *0.0.0.1     10.255.4.93  0x80000002   117    0xa980  44
      InterArPfx *0.0.0.2     10.255.4.93  0x80000002    62    0xd47e  44
      NSSA       0.0.0.1     10.255.4.97  0x80000002   362    0x45ee  44
      IntraArPfx 0.0.0.1     10.255.4.97  0x80000006   851    0x2f77  52

      OSPF3 AS SCOPE link state database
      Type      ID          Adv Rtr      Seq          Age    Cksum  Len
      Extern     0.0.0.1     10.255.4.85  0x80000002    63    0x9b86  44
      Extern     *0.0.0.1     10.255.4.93  0x80000001   910    0x59c9  44

      OSPF3 Link-Local link state database, interface ge-1/3/0.0
      Type      ID          Adv Rtr      Seq          Age    Cksum  Len
      Link       *0.0.0.2     10.255.4.93  0x80000003   916    0x4dab  64

```

### show ospf3 database extensive

```

user@host> show ospf3 database extensive
      OSPF3 link state database, area 0.0.0.0
      Type      ID          Adv Rtr      Seq          Age    Cksum  Len
      Router    0.0.0.1     10.255.4.85  0x80000003  1028    0xa697  40
      bits 0x2, Options 0x13
      Type PointToPoint (1), Metric 10

```

```

    Loc-If-Id 2, Nbr-If-Id 3, Nbr-Rtr-Id 10.255.4.93
    Aging timer 00:42:51
    Installed 00:17:05 ago, expires in 00:42:52, sent 02:37:54 ago
Router    *0.0.0.1          10.255.4.93      0x80000002  1096  0xc677  40
    bits 0x3, Options 0x13
    Type PointToPoint (1), Metric 10
    Loc-If-Id 3, Nbr-If-Id 2, Nbr-Rtr-Id 10.255.4.85
    Gen timer 00:00:40
    Aging timer 00:41:44
    Installed 00:18:16 ago, expires in 00:41:44, sent 00:18:14 ago
    Ours
InterArPfx *0.0.0.2          10.255.4.93      0x80000001  1053  0xb96f  44
    Prefix feee::10:10:2:0/126
    Prefix-options 0x0, Metric 10
    Gen timer 00:17:02
    Aging timer 00:42:26
    Installed 00:17:33 ago, expires in 00:42:27, sent 00:17:31 ago
    Ours
InterArPfx *0.0.0.3          10.255.4.93      0x80000001  1053  0x71d3  44
    Prefix feee::10:255:4:97/128
    Prefix-options 0x0, Metric 10
    Gen timer 00:21:07
    Aging timer 00:42:26
    Installed 00:17:33 ago, expires in 00:42:27, sent 00:17:31 ago
    Ours
InterArRtr *0.0.0.1          10.255.4.93      0x80000001  1053  0xe159  32
    Dest-router-id 10.255.4.97, Options 0x19, Metric 10
    Gen timer 00:29:18
    Aging timer 00:42:26
    Installed 00:17:33 ago, expires in 00:42:27, sent 00:17:31 ago
    Ours
IntraArPfx 0.0.0.1          10.255.4.85      0x80000002  1028  0x2403  72
    Ref-lsa-type Router, Ref-lsa-id 0.0.0.0, Ref-router-id 10.255.4.85
    Prefix-count 2
    Prefix feee::10:255:4:85/128
    Prefix-options 0x2, Metric 0
    Prefix feee::10:10:1:0/126
    Prefix-options 0x0, Metric 10
    Aging timer 00:42:51
    Installed 00:17:05 ago, expires in 00:42:52, sent 02:37:54 ago
IntraArPfx *0.0.0.1          10.255.4.93      0x80000002   575  0x788f  72
    Ref-lsa-type Router, Ref-lsa-id 0.0.0.0, Ref-router-id 10.255.4.93
    Prefix-count 2
    Prefix feee::10:255:4:93/128
    Prefix-options 0x2, Metric 0
    Prefix feee::10:10:1:0/126
    Prefix-options 0x0, Metric 10
    Gen timer 00:33:23
    Aging timer 00:50:24
    Installed 00:09:35 ago, expires in 00:50:25, sent 00:09:33 ago
    OSPF3 link state database, area 0.0.0.1
    Type      ID          Adv Rtr          Seq          Age  Cksum  Len
Router    *0.0.0.1          10.255.4.93      0x80000003  1059  0xea40  40
    bits 0x3, Options 0x19
    Type Transit (2), Metric 10
    Loc-If-Id 2, Nbr-If-Id 2, Nbr-Rtr-Id 10.255.4.97
    Gen timer 00:08:51
    Aging timer 00:42:20
    Installed 00:17:39 ago, expires in 00:42:21, sent 00:17:37 ago
Router      0.0.0.1          10.255.4.97      0x80000006   994  0xc95b  40
    bits 0x2, Options 0x19

```

```

Type Transit (2), Metric 10
  Loc-If-Id 2, Nbr-If-Id 2, Nbr-Rtr-Id 10.255.4.97
Aging timer 00:43:25
  Installed 00:16:31 ago, expires in 00:43:26, sent 02:37:54 ago
Network    0.0.0.2          10.255.4.97      0x80000002  1059  0x4598  32
Options 0x11
  Attached router 10.255.4.97
  Attached router 10.255.4.93
Aging timer 00:42:20
  Installed 00:17:36 ago, expires in 00:42:21, sent 02:37:54 ago
InterArPfx *0.0.0.1      10.255.4.93      0x80000002   260  0xa980  44
  Prefix feee::10:10:1:0/126
  Prefix-options 0x0, Metric 10
  Gen timer 00:45:39
  Aging timer 00:55:39
  Installed 00:04:20 ago, expires in 00:55:40, sent 00:04:18 ago
  Ours
InterArPfx *0.0.0.2      10.255.4.93      0x80000002   205  0xd47e  44
  Prefix feee::10:255:4:93/128
  Prefix-options 0x0, Metric 0
  Gen timer 00:46:35
  Aging timer 00:56:35
  Installed 00:03:25 ago, expires in 00:56:35, sent 00:03:23 ago
  Ours
InterArPfx *0.0.0.3      10.255.4.93      0x80000001  1089  0x9bbb  44
  Prefix feee::10:255:4:85/128
  Prefix-options 0x0, Metric 10
  Gen timer 00:04:46
  Aging timer 00:41:51
  Installed 00:18:09 ago, expires in 00:41:51, sent 00:17:43 ago
  Ours
NSSA      0.0.0.1          10.255.4.97      0x80000002   505  0x45ee  44
  Prefix feee::200:200:1:0/124
  Prefix-options 0x8, Metric 10, Type 2,
  Aging timer 00:51:35
  Installed 00:08:22 ago, expires in 00:51:35, sent 02:37:54 ago
IntraArPfx 0.0.0.1      10.255.4.97      0x80000006   994  0x2f77  52
  Ref-lsa-type Router, Ref-lsa-id 0.0.0.0, Ref-router-id 10.255.4.97
  Prefix-count 1
  Prefix feee::10:255:4:97/128
  Prefix-options 0x2, Metric 0
  Aging timer 00:43:25
  Installed 00:16:31 ago, expires in 00:43:26, sent 02:37:54 ago
IntraArPfx 0.0.0.3      10.255.4.97      0x80000002  1059  0x4446  52
  Ref-lsa-type Network, Ref-lsa-id 0.0.0.2, Ref-router-id 10.255.4.97
  Prefix-count 1
  Prefix feee::10:10:2:0/126
  Prefix-options 0x0, Metric 0
  Aging timer 00:42:20
  Installed 00:17:36 ago, expires in 00:42:21, sent 02:37:54 ago
  OSPF3 AS SCOPE link state database
Type      ID          Adv Rtr          Seq          Age  Cksum  Len
Extern    0.0.0.1          10.255.4.85      0x80000002   206  0x9b86  44
  Prefix feee::100:100:1:0/124
  Prefix-options 0x0, Metric 20, Type 2,
  Aging timer 00:56:34
  Installed 00:03:23 ago, expires in 00:56:34, sent 02:37:54 ago
Extern    *0.0.0.1          10.255.4.93      0x80000001  1053  0x59c9  44
  Prefix feee::200:200:1:0/124
  Prefix-options 0x0, Metric 10, Type 2,
  Gen timer 00:25:12

```

```

Aging timer 00:42:26
Installed 00:17:33 ago, expires in 00:42:27, sent 00:17:31 ago

    OSPF3 Link-Local link state database, interface ge-1/3/0.0
    Type      ID          Adv Rtr      Seq          Age  Cksum  Len
    Link      *0.0.0.2      10.255.4.93  0x80000003   1059 0x4dab 64
    fe80::290:69ff:fe39:1cdb
    Options 0x11, priority 128
    Prefix-count 1
    Prefix feee::10:10:2:0/126 Prefix-options 0x0
    Gen timer 00:12:56
    Aging timer 00:42:20
    Installed 00:17:39 ago, expires in 00:42:21, sent 00:17:37 ago
    Link      0.0.0.2      10.255.4.97  0x80000003   205 0xa87d 64
    fe80::290:69ff:fe38:883e
    Options 0x11, priority 128
    Prefix-count 1
    Prefix feee::10:10:2:0/126 Prefix-options 0x0
    Aging timer 00:56:35
    Installed 00:03:22 ago, expires in 00:56:35, sent 02:37:54 ago

    OSPF3 Link-Local link state database, interface so-2/2/0.0
    Type      ID          Adv Rtr      Seq          Age  Cksum  Len
    Link      0.0.0.2      10.255.4.85  0x80000002   506 0x42bb 64
    fe80::280:42ff:fe10:f169
    Options 0x13, priority 128
    Prefix-count 1
    Prefix feee::10:10:1:0/126 Prefix-options 0x0
    Aging timer 00:51:34
    Installed 00:08:23 ago, expires in 00:51:34, sent 02:37:54 ago
    Link      *0.0.0.3      10.255.4.93  0x80000002   505 0x6b7a 64
    fe80::280:42ff:fe10:f177
    Options 0x13, priority 128
    Prefix-count 1
    Prefix feee::10:10:1:0/126 Prefix-options 0x0
    Gen timer 00:37:28
    Aging timer 00:51:35
    Installed 00:08:25 ago, expires in 00:51:35, sent 00:08:23 ago
    Ours

```

### show ospf3 database summary

```

user@host> show ospf3 database summary
Area 0.0.0.0:
  2 Router LSAs
  1 InterArPfx LSAs
  1 InterArRtr LSAs
  1 IntraArPfx LSAs
Area 0.0.0.1:
  2 Router LSAs
  1 Network LSAs
  2 InterArPfx LSAs
  1 NSSA LSAs
  1 IntraArPfx LSAs
Externals:
  2 Extern LSAs
Interface ge-1/3/0.0:
  1 Link LSAs
Interface lo0.0:

```



Interface so-2/2/0.0:  
1 Link LSAs

## show (ospf | ospf3) interface

---

|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                     | <code>show (ospf   ospf3) interface</code><br><code>&lt;brief   detail   extensive&gt;</code><br><code>&lt;area <i>area-id</i>&gt;</code><br><code>&lt;interface-name&gt;</code><br><code>&lt;instance <i>instance-name</i>&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code><br><code>&lt;realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Syntax (EX Series Switches and QFX Series)</b> | <code>show (ospf   ospf3) interface</code><br><code>&lt;brief   detail   extensive&gt;</code><br><code>&lt;area <i>area-id</i>&gt;</code><br><code>&lt;interface-name&gt;</code><br><code>&lt;instance <i>instance-name</i>&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>                        | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br><b>area</b> option introduced in Junos OS Release 9.2.<br><b>area</b> option introduced in Junos OS Release 9.2 for EX Series switches.<br><b>realm</b> option introduced in Junos OS Release 9.2.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Description</b>                                | Display the status of OSPF interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                                    | <b>none</b> —Display standard information about the status of all OSPF interfaces for all routing instances<br><br><b>brief   detail   extensive</b> —(Optional) Display the specified level of output.<br><br><b>area <i>area-id</i></b> —(Optional) Display information about the interfaces that belong to the specified area.<br><br><b><i>interface-name</i></b> —(Optional) Display information for the specified interface.<br><br><b>instance <i>instance-name</i></b> —(Optional) Display all OSPF interfaces under the named routing instance.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.<br><br><b>realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)</b> —(OSPFv3 only) (Optional) Display information about the interfaces for the specified OSPFv3 realm, or address family. Use the <b>realm</b> option to specify an address family for OSPFv3 other than IPv6 unicast, which is the default. |
| <b>Required Privilege Level</b>                   | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>List of Sample Output</b>                      | <a href="#">show ospf interface brief on page 749</a><br><a href="#">show ospf interface detail on page 749</a><br><a href="#">show ospf3 interface detail on page 749</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

[show ospf interface detail \(When Multiarea Adjacency Is Configured\) on page 749](#)  
[show ospf interface area area-id on page 750](#)  
[show ospf interface extensive \(When Flooding Reduction Is Enabled\) on page 751](#)  
[show ospf interface extensive \(When LDP Synchronization Is Configured\) on page 751](#)

**Output Fields** Table 56 on page 747 lists the output fields for the **show (ospf | ospf3) interface** command. Output fields are listed in the approximate order in which they appear.

**Table 56: show (ospf | ospf3) interface Output Fields**

| Field Name              | Field Description                                                                                                                                                                                                                 | Level of Output         |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Interface</b>        | Name of the interface running OSPF version 2 or OSPF version 3.                                                                                                                                                                   | All levels              |
| <b>State</b>            | State of the interface: <b>BDR</b> , <b>Down</b> , <b>DR</b> , <b>DRother</b> , <b>Loop</b> , <b>PtToPt</b> , or <b>Waiting</b> .                                                                                                 | All levels              |
| <b>Area</b>             | Number of the area that the interface is in.                                                                                                                                                                                      | All levels              |
| <b>DR ID</b>            | Address of the area's designated router.                                                                                                                                                                                          | All levels              |
| <b>BDR ID</b>           | Backup designated router for a particular subnet.                                                                                                                                                                                 | All levels              |
| <b>Nbrs</b>             | Number of neighbors on this interface.                                                                                                                                                                                            | All levels              |
| <b>Type</b>             | Type of interface: <b>LAN</b> , <b>NBMA</b> , <b>P2MP</b> , <b>P2P</b> , or <b>Virtual</b> .                                                                                                                                      | <b>detail extensive</b> |
| <b>Address</b>          | IP address of the neighbor.                                                                                                                                                                                                       | <b>detail extensive</b> |
| <b>Mask</b>             | Netmask of the neighbor.                                                                                                                                                                                                          | <b>detail extensive</b> |
| <b>Prefix-length</b>    | (OSPFv3) IPv6 prefix length, in bits.                                                                                                                                                                                             | <b>detail extensive</b> |
| <b>OSPF3-Intf-Index</b> | (OSPFv3) OSPF version 3 interface index.                                                                                                                                                                                          | <b>detail extensive</b> |
| <b>MTU</b>              | Interface maximum transmission unit (MTU).                                                                                                                                                                                        | <b>detail extensive</b> |
| <b>Cost</b>             | Interface cost (metric).                                                                                                                                                                                                          | <b>detail extensive</b> |
| <b>DR addr</b>          | Address of the designated router.                                                                                                                                                                                                 | <b>detail extensive</b> |
| <b>BDR addr</b>         | Address of the backup designated router.                                                                                                                                                                                          | <b>detail extensive</b> |
| <b>Adj count</b>        | Number of adjacent neighbors.                                                                                                                                                                                                     | <b>detail extensive</b> |
| <b>Secondary</b>        | Indicates that this interface is configured as a secondary interface for this area. This interface can belong to more than one area, but can be designated as a primary interface for only one area.                              | <b>detail extensive</b> |
| <b>Flood Reduction</b>  | Indicates that this interface is configured with flooding reduction. All self-originated LSAs from this interface are initially sent with the <b>DoNotAge</b> bit set. As a result, LSAs are refreshed only when a change occurs. | <b>extensive</b>        |

Table 56: show (ospf | ospf3) interface Output Fields (*continued*)

| Field Name                   | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Level of Output  |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Priority                     | Router priority used in designated router (DR) election on this interface.                                                                                                                                                                                                                                                                                                                                                                                          | detail extensive |
| Flood list                   | List of link-state advertisements (LSAs) that might be about to flood this interface.                                                                                                                                                                                                                                                                                                                                                                               | extensive        |
| Ack list                     | Acknowledgment list. List of pending acknowledgments on this interface.                                                                                                                                                                                                                                                                                                                                                                                             | extensive        |
| Descriptor list              | List of packet descriptors.                                                                                                                                                                                                                                                                                                                                                                                                                                         | extensive        |
| Hello                        | Configured value for the hello timer.                                                                                                                                                                                                                                                                                                                                                                                                                               | detail extensive |
| Dead                         | Configured value for the dead timer.                                                                                                                                                                                                                                                                                                                                                                                                                                | detail extensive |
| Auth type                    | (OSPFv2) Authentication mechanism for sending and receiving OSPF protocol packets: <ul style="list-style-type: none"> <li>• <b>MD5</b>—The MD5 mechanism is configured in accordance with RFC 2328.</li> <li>• <b>None</b>—No authentication method is configured.</li> <li>• <b>Password</b>—A simple password (RFC 2328) is configured.</li> </ul>                                                                                                                | detail extensive |
| Topology                     | (Multiarea adjacency) Name of topology: <b>default</b> or <i>name</i> .                                                                                                                                                                                                                                                                                                                                                                                             |                  |
| LDP sync state               | (OSPFv2 and LDP synchronization) Current state of LDP synchronization: <b>in sync</b> , <b>in holddown</b> , and <b>not supported</b> .                                                                                                                                                                                                                                                                                                                             | extensive        |
| reason                       | (OSPFv2 and LDP synchronization) Reason for the current state of LDP synchronization. The LDP session might be up or down, or adjacency might be up or down.                                                                                                                                                                                                                                                                                                        | extensive        |
| config holdtime              | (OSPFv2 and LDP synchronization) Configured value of the hold timer.<br><br>If the state is not synchronized, and the hold time is not infinity, the <b>remaining</b> field displays the number of seconds that remain until the configured hold timer expires.                                                                                                                                                                                                     | extensive        |
| IPSec SA name                | (OSPFv2) Name of the IPSec security association name.                                                                                                                                                                                                                                                                                                                                                                                                               | detail extensive |
| Active key ID                | (OSPFv2 and MD5) Number from <b>0</b> to <b>255</b> that uniquely identifies an MD5 key.                                                                                                                                                                                                                                                                                                                                                                            | detail extensive |
| Start time                   | (OSPFv2 and MD5) Time at which the routing device starts using an MD5 key to authenticate OSPF packets transmitted on the interface on which this key is configured. To authenticate received OSPF protocol packets, the key becomes effective immediately after the configuration is committed. If the start time option is not configured, the key is effective immediately for send and receive and is displayed as <b>Start time 1970 Jan 01 00:00:00 PST</b> . | detail extensive |
| ReXmit                       | Configured value for the Retransmit timer.                                                                                                                                                                                                                                                                                                                                                                                                                          | detail extensive |
| Stub, Not Stub, or Stub NSSA | Type of area.                                                                                                                                                                                                                                                                                                                                                                                                                                                       | detail extensive |

## Sample Output

### show ospf interface brief

```
user@host> show ospf interface brief
```

| Intf       | State  | Area    | DR ID        | BDR ID       | Nbrs |
|------------|--------|---------|--------------|--------------|------|
| at-5/1/0.0 | PtToPt | 0.0.0.0 | 0.0.0.0      | 0.0.0.0      | 1    |
| ge-2/3/0.0 | DR     | 0.0.0.0 | 192.168.4.16 | 192.168.4.15 | 1    |
| lo0.0      | DR     | 0.0.0.0 | 192.168.4.16 | 0.0.0.0      | 0    |
| so-0/0/0.0 | Down   | 0.0.0.0 | 0.0.0.0      | 0.0.0.0      | 0    |
| so-6/0/1.0 | PtToPt | 0.0.0.0 | 0.0.0.0      | 0.0.0.0      | 1    |
| so-6/0/2.0 | Down   | 0.0.0.0 | 0.0.0.0      | 0.0.0.0      | 0    |
| so-6/0/3.0 | PtToPt | 0.0.0.0 | 0.0.0.0      | 0.0.0.0      | 1    |

### show ospf interface detail

```
user@host> show ospf interface detail
```

| Interface  | State | Area    | DR ID         | BDR ID         | Nbrs |
|------------|-------|---------|---------------|----------------|------|
| fe-0/0/1.0 | BDR   | 0.0.0.0 | 192.168.37.12 | 10.255.245.215 | 1    |

Type LAN, address 192.168.37.11, Mask 255.255.255.248, MTU 4460, Cost 40  
 DR addr 192.168.37.12, BDR addr 192.168.37.11, Adj count 1, Priority 128  
 Hello 10, Dead 40, ReXmit 5, Not Stub

| Interface  | State  | Area    | DR ID   | BDR ID  | Nbrs |
|------------|--------|---------|---------|---------|------|
| tl-0/2/1.0 | PtToPt | 0.0.0.0 | 0.0.0.0 | 0.0.0.0 | 0    |

Type P2P, Address 0.0.0.0, Mask 0.0.0.0, MTU 1500, Cost 2604  
 Adj count 0  
 Hello 10, Dead 40, ReXmit 5, Not Stub  
 Auth type: MD5, Active key ID 3, Start time 2002 Nov 19 10:00:00 PST  
 IPsec SA Name: sa

### show ospf3 interface detail

```
user@host> show ospf3 interface so-0/0/3.0 detail
```

| Interface  | State  | Area    | DR-ID   | BDR-ID  | Nbrs |
|------------|--------|---------|---------|---------|------|
| so-0/0/3.0 | PtToPt | 0.0.0.0 | 0.0.0.0 | 0.0.0.0 | 1    |

Address fe80::2a0:a5ff:fe28:1dfc, Prefix-length 64  
 OSPF3-Intf-index 1, Type P2P, MTU 4470, Cost 12, Adj-count 1  
 Hello 10, Dead 40, ReXmit 5, Not Stub

### show ospf interface detail (When Multiarea Adjacency Is Configured)

```
user@host> show ospf interface detail
```

```
regress@router> show ospf interface detail
```

| Interface | State | Area    | DR ID        | BDR ID  | Nbrs |
|-----------|-------|---------|--------------|---------|------|
| lo0.0     | DR    | 0.0.0.0 | 10.255.245.2 | 0.0.0.0 | 0    |

Type: LAN, Address: 127.0.0.1, Mask: 255.255.255.255, MTU: 65535, Cost: 0  
 DR addr: 127.0.0.1, Adj count: 0, Priority: 128  
 Hello: 10, Dead: 40, ReXmit: 5, Not Stub  
 Auth type: None  
 Topology default (ID 0) -> Cost: 0

| Interface | State | Area    | DR ID        | BDR ID  | Nbrs |
|-----------|-------|---------|--------------|---------|------|
| lo0.0     | DR    | 0.0.0.0 | 10.255.245.2 | 0.0.0.0 | 0    |

Type: LAN, Address: 10.255.245.2, Mask: 255.255.255.255, MTU: 65535, Cost: 0  
 DR addr: 10.255.245.2, Adj count: 0, Priority: 128  
 Hello: 10, Dead: 40, ReXmit: 5, Not Stub  
 Auth type: None  
 Topology default (ID 0) -> Cost: 0

| Interface  | State  | Area    | DR ID   | BDR ID  | Nbrs |
|------------|--------|---------|---------|---------|------|
| so-0/0/0.0 | PtToPt | 0.0.0.0 | 0.0.0.0 | 0.0.0.0 | 1    |

Type: P2P, Address: 0.0.0.0, Mask: 0.0.0.0, MTU: 4470, Cost: 1

```

Adj count: 1
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
Topology default (ID 0) -> Cost: 1
so-0/0/0.0      PtToPt  0.0.0.0      0.0.0.0      0.0.0.0      0

Type: P2P, Address: 192.168.37.46, Mask: 255.255.255.254, MTU: 4470, Cost: 1
Adj count: 0, , Passive
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
Topology default (ID 0) -> Passive, Cost: 1
so-1/0/0.0      PtToPt  0.0.0.0      0.0.0.0      0.0.0.0      1

Type: P2P, Address: 0.0.0.0, Mask: 0.0.0.0, MTU: 4470, Cost: 1
Adj count: 1
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
Topology default (ID 0) -> Cost: 1
so-1/0/0.0      PtToPt  0.0.0.0      0.0.0.0      0.0.0.0      0

Type: P2P, Address: 192.168.37.54, Mask: 255.255.255.254, MTU: 4470, Cost: 1
Adj count: 0, , Passive
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
Topology default (ID 0) -> Passive, Cost: 1
so-0/0/0.0      PtToPt  1.1.1.1      0.0.0.0      0.0.0.0      1

Type: P2P, Address: 0.0.0.0, Mask: 0.0.0.0, MTU: 4470, Cost: 1
Adj count: 1, Secondary
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
Topology default (ID 0) -> Cost: 1
so-1/0/0.0      PtToPt  1.1.1.1      0.0.0.0      0.0.0.0      1

Type: P2P, Address: 0.0.0.0, Mask: 0.0.0.0, MTU: 4470, Cost: 1
Adj count: 1, Secondary
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
Topology default (ID 0) -> Cost: 1
so-0/0/0.0      PtToPt  2.2.2.2      0.0.0.0      0.0.0.0      1

Type: P2P, Address: 0.0.0.0, Mask: 0.0.0.0, MTU: 4470, Cost: 1
Adj count: 1, Secondary
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
Topology default (ID 0) -> Cost: 1
so-1/0/0.0      PtToPt  2.2.2.2      0.0.0.0      0.0.0.0      1

Type: P2P, Address: 0.0.0.0, Mask: 0.0.0.0, MTU: 4470, Cost: 1
Adj count: 1, Secondary
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
Topology default (ID 0) -> Cost: 1

```

### show ospf interface area area-id

```
user@host> show ospf interface area 1.1.1.1
```

| Interface  | State  | Area    | DR ID   | BDR ID  | Nbrs |
|------------|--------|---------|---------|---------|------|
| so-0/0/0.0 | PtToPt | 1.1.1.1 | 0.0.0.0 | 0.0.0.0 | 1    |
| so-1/0/0.0 | PtToPt | 1.1.1.1 | 0.0.0.0 | 0.0.0.0 | 1    |

#### show ospf interface extensive (When Flooding Reduction Is Enabled)

```

user@host> show ospf interface extensive
Interface      State  Area      DR ID      BDR ID      Nbrs
fe-0/0/0.0     PtToPt 0.0.0.0    0.0.0.0    0.0.0.0     0

Type: P2P, Address: 10.10.10.1, Mask: 255.255.255.0, MTU: 1500, Cost: 1
Adj count: 0
Secondary, Flood Reduction
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
Topology default (ID 0) -> Cost: 1

```

#### show ospf interface extensive (When LDP Synchronization Is Configured)

```

user@host> show ospf interface extensive
Interface      State  Area      DR ID      BDR ID
Nbrs
so-1/0/3.0     Down   0.0.0.0    0.0.0.0    0.0.0.0
0

Type: P2P, Address: 0.0.0.0, Mask: 0.0.0.0, MTU: 4470, Cost: 65535
Adj count: 0
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
LDP sync state: in holddown, for: 00:00:08, reason: LDP down during config
                  config holddtime: 10 seconds, remaining: 1

```

## show (ospf | ospf3) io-statistics

|                                                 |                                                                                                                                                                                                                          |
|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                   | show (ospf   ospf3) io-statistics<br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                |
| <b>Syntax (EX Series Switch and QFX Series)</b> | show (ospf   ospf3) io-statistics                                                                                                                                                                                        |
| <b>Release Information</b>                      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                 |
| <b>Description</b>                              | Display Open Shortest Path First (OSPF) input and output statistics.                                                                                                                                                     |
| <b>Options</b>                                  | <p><b>none</b>—Display OSPF input and output statistics.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                 | view                                                                                                                                                                                                                     |
| <b>Related Documentation</b>                    | <ul style="list-style-type: none"> <li><i>clear (ospf   ospf3) statistics</i></li> </ul>                                                                                                                                 |
| <b>List of Sample Output</b>                    | <a href="#">show ospf io-statistics on page 752</a>                                                                                                                                                                      |
| <b>Output Fields</b>                            | <a href="#">Table 57 on page 752</a> lists the output fields for the <b>show ospf io-statistics</b> command. Output fields are listed in the approximate order in which they appear.                                     |

**Table 57: show (ospf | ospf3) io-statistics Output Fields**

| Field Name             | Field Description                                                                                         |
|------------------------|-----------------------------------------------------------------------------------------------------------|
| <b>Packets read</b>    | Number of OSPF packets read since the last time the routing protocol was started.                         |
| <b>average per run</b> | Total number of packets divided by the total number of times the OSPF read operation is scheduled to run. |
| <b>max run</b>         | Maximum number of packets for a given run among all scheduled runs.                                       |
| <b>Receive errors</b>  | Number of faulty packets received with errors.                                                            |

## Sample Output

### show ospf io-statistics

```
user@host> show ospf io-statistics
```

```
Packets read: 7361, average per run: 1.00, max run: 1
```



Receive errors:  
None

## show (ospf | ospf3) log

|                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                   | <pre>show (ospf   ospf3) log &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)&gt; &lt;topology <i>topology-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Syntax (EX Series Switch and QFX Series)</b> | <pre>show (ospf   ospf3) log &lt;instance <i>instance-name</i>&gt; &lt;topology <i>topology-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>                      | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>topology</b> option introduced in Junos OS Release 9.0.</p> <p><b>topology</b> option introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>realm</b> option introduced in Junos OS Release 9.2.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                                                                                                                                                                                                             |
| <b>Description</b>                              | Display the entries in the Open Shortest Path First (OSPF) log of SPF calculations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                                  | <p><b>none</b>—Display entries in the OSPF log of SPF calculations for all routing instances.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display entries for the specified routing instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>topology <i>topology-name</i></b>—(Optional) (OSPFv2 only) Display entries for the specified topology.</p> <p><b>realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)</b>—(OSPFv3 only) (Optional) Display entries for the specified OSPFv3 realm, or address family. Use the <b>realm</b> option to specify an address family for OSPFv3 other than IPv6 unicast, which is the default.</p> |
| <b>Required Privilege Level</b>                 | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>List of Sample Output</b>                    | <p><a href="#">show ospf log on page 755</a></p> <p><a href="#">show ospf log topology voice on page 755</a></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Output Fields</b>                            | <p><a href="#">Table 58 on page 754</a> lists the output fields for the <b>show (ospf   ospf3) log</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

**Table 58: show (ospf | ospf3) log Output Fields**

| Field Name  | Field Description                                                                      |
|-------------|----------------------------------------------------------------------------------------|
| <b>When</b> | Time, in weeks ( <b>w</b> ) and days ( <b>d</b> ), since the SPF calculation was made. |

Table 58: show (ospf | ospf3) log Output Fields (*continued*)

| Field Name | Field Description                                                                                                                                                            |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type       | Type of calculation: Cleanup, External, Interarea, NSSA, Redist, SPF, Stub, Total, or VirtualLink.                                                                           |
| Elapsed    | Amount of time, in seconds, that elapsed during the operation, or the time required to complete the SPF calculation. The start time is the time displayed in the When field. |

## Sample Output

### show ospf log

```

user@host> show ospf log
When          Type          Elapsed
1w4d 17:25:58 Stub          0.000017
1w4d 17:25:58 SPF            0.000070
1w4d 17:25:58 Stub          0.000019
1w4d 17:25:58 Interarea       0.000054
1w4d 17:25:58 External        0.000005
1w4d 17:25:58 Cleanup         0.000203
1w4d 17:25:58 Total          0.000537
1w4d 17:24:48 SPF            0.000125
1w4d 17:24:48 Stub          0.000017
1w4d 17:24:48 SPF            0.000100
1w4d 17:24:48 Stub          0.000016
1w4d 17:24:48 Interarea       0.000056
1w4d 17:24:48 External        0.000005
1w4d 17:24:48 Cleanup         0.000238
1w4d 17:24:48 Total          0.000600
...

```

### show ospf log topology voice

```

user@host> show ospf log topology voice
Topology voice SPF log:

    Last instance of each event type
When          Type          Elapsed
00:06:11      SPF            0.000116
00:06:11      Stub            0.000114
00:06:11      Interarea        0.000126
00:06:11      External          0.000067
00:06:11      NSSA              0.000037
00:06:11      Cleanup           0.000186

    Maximum length of each event type
When          Type          Elapsed
00:13:43      SPF            0.000140
00:13:33      Stub            0.000116
00:13:43      Interarea        0.000128
00:13:33      External          0.000075
00:13:38      NSSA              0.000039
00:13:53      Cleanup           0.000657

    Last 100 events

```

| When     | Type      | Elapsed  |
|----------|-----------|----------|
| 00:13:53 | SPF       | 0.000090 |
| 00:13:53 | Stub      | 0.000041 |
| 00:13:53 | Interarea | 0.000123 |
| 00:13:53 | External  | 0.000040 |
| 00:13:53 | NSSA      | 0.000038 |
| 00:13:53 | Cleanup   | 0.000657 |
| 00:13:53 | Total     | 0.001252 |
| .        |           |          |
| .        |           |          |
| 00:06:11 | SPF       | 0.000116 |
| 00:06:11 | Stub      | 0.000114 |
| 00:06:11 | Interarea | 0.000126 |
| 00:06:11 | External  | 0.000067 |
| 00:06:11 | NSSA      | 0.000037 |
| 00:06:11 | Cleanup   | 0.000186 |
| 00:06:11 | Total     | 0.000818 |

## show (ospf | ospf3) neighbor

|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                     | <pre>show (ospf   ospf3) neighbor &lt;brief   detail   extensive&gt; &lt;area <i>area-id</i>&gt; &lt;instance (all   <i>instance-name</i>)&gt; &lt;interface <i>interface-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;neighbor&gt; &lt;realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Syntax (EX Series Switches and QFX Series)</b> | <pre>show (ospf   ospf3) neighbor &lt;brief   detail   extensive&gt; &lt;area <i>area-id</i>&gt; &lt;instance (all   <i>instance-name</i>)&gt; &lt;interface <i>interface-name</i>&gt; &lt;neighbor&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Release Information</b>                        | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>instance all</b> option introduced in Junos OS Release 9.1.</p> <p><b>instance all</b> option introduced in Junos OS Release 9.1 for EX Series switches.</p> <p><b>area</b>, <b>interface</b>, and <b>realm</b> options introduced in Junos OS Release 9.2.</p> <p><b>area</b> and <b>interface</b> options introduced in Junos OS Release 9.2 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                                                      |
| <b>Description</b>                                | <p>Display information about OSPF neighbors.</p> <p>CPU utilization might increase while the device learns its OSPF neighbors. We recommend that you use the <b>show (ospf   ospf3) neighbor</b> command after the device learns and establishes OSPF neighbor adjacencies. Depending on the size of your network, this might take several minutes. If you receive a “timeout communicating with routing daemon” error when using the <b>show (ospf   ospf3) neighbor</b> command, wait several minutes before attempting to use the command again. This is not a critical system error, but you might experience a delay in using the CLI.</p>                                                                                                                               |
| <b>Options</b>                                    | <p><b>none</b>—Display standard information about all OSPF neighbors for all routing instances.</p> <p><b>brief   detail   extensive</b>—(Optional) Display the specified level of output.</p> <p><b>area <i>area-id</i></b>—(Optional) Display information about the OSPF neighbors for the specified area.</p> <p><b>instance (all   <i>instance-name</i>)</b>—(Optional) Display all OSPF interfaces for all routing instances or under the named routing instance.</p> <p><b>interface <i>interface-name</i></b>—(Optional) Display information about OSPF neighbors for the specified logical interface.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |

**neighbor**—(Optional) Display information about the specified OSPF neighbor.

**realm (ipv4-multicast | ipv4-unicast | ipv6-multicast)**—(OSPFv3 only) (Optional) Display information about the OSPF neighbors for the specified OSPFv3 realm, or address family. Use the **realm** option to specify an address family for OSPFv3 other than IPv6 unicast, which is the default.

**Required Privilege Level** view

**Related Documentation**

- *clear (ospf | ospf3) neighbor*

**List of Sample Output**

[show ospf neighbor brief on page 760](#)  
[show ospf neighbor detail on page 760](#)  
[show ospf neighbor extensive on page 761](#)  
[show ospf3 neighbor detail on page 762](#)  
[show ospf neighbor area area-id on page 762](#)  
[show ospf neighbor interface interface-name on page 762](#)  
[show ospf3 neighbor instance all \(OSPFv3 Multiple Family Address Support Enabled\) on page 762](#)

**Output Fields** [Table 59 on page 758](#) lists the output fields for the **show (ospf | ospf3) neighbor** command. Output fields are listed in the approximate order in which they appear.

**Table 59: show (ospf | ospf3) neighbor Output Fields**

| Field Name       | Field Description                                  | Level of Output |
|------------------|----------------------------------------------------|-----------------|
| <b>Address</b>   | Address of the neighbor.                           | All levels      |
| <b>Interface</b> | Interface through which the neighbor is reachable. | All levels      |

Table 59: show (ospf | ospf3) neighbor Output Fields (*continued*)

| Field Name                            | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Level of Output         |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>State</b>                          | <p>State of the neighbor:</p> <ul style="list-style-type: none"> <li>• <b>Attempt</b>—Valid only for neighbors attached to nonbroadcast networks. It indicates that no recent information has been received from the neighbor, but that a more concerted effort must be made to contact the neighbor.</li> <li>• <b>Down</b>—Initial state of a neighbor conversation. It indicates that no recent information has been received from the neighbor. Hello packets might continue to be sent to neighbors in the <b>Down</b> state, although at a reduced frequency.</li> <li>• <b>Exchange</b>—Routing device is describing its entire link-state database by sending database description packets to the neighbor. Each packet has a sequence number and is explicitly acknowledged.</li> <li>• <b>ExStart</b>—First step in creating an adjacency between the two neighboring routing devices. The goal of this step is to determine which routing device is the master, and to determine the initial sequence number.</li> <li>• <b>Full</b>—Neighboring routing devices are fully adjacent. These adjacencies appear in router link and network link advertisements.</li> <li>• <b>Init</b>—A hello packet has recently been sent by the neighbor. However, bidirectional communication has not yet been established with the neighbor. This state might occur, for example, because the routing device itself did not appear in the neighbor's hello packet.</li> <li>• <b>Loading</b>—Link-state request packets are sent to the neighbor to acquire more recent advertisements that have been discovered (but not yet received) in the <b>Exchange</b> state.</li> <li>• <b>2Way</b>—Communication between the two routing devices is bidirectional. This state has been ensured by the operation of the Hello Protocol. This is the most advanced state short of beginning adjacency establishment. The (backup) designated router is selected from the set of neighbors in state <b>2Way</b> or greater.</li> </ul> | All levels              |
| <b>ID</b>                             | Router ID of the neighbor.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | All levels              |
| <b>Pri</b>                            | Priority of the neighbor to become the designated router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | All levels              |
| <b>Dead</b>                           | Number of seconds until the neighbor becomes unreachable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | All levels              |
| <b>Link state acknowledgment list</b> | Number of link-state acknowledgments received.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>extensive</b>        |
| <b>Link state retransmission list</b> | <p>Total number of link-state advertisements retransmitted. For <b>extensive</b> output only, the following information is also displayed:</p> <ul style="list-style-type: none"> <li>• <b>Type</b>—Type of link advertisement: <b>ASBR</b>, <b>Sum</b>, <b>Extern</b>, <b>Network</b>, <b>NSSA</b>, <b>OpaqArea</b>, <b>Router</b>, or <b>Summary</b>.</li> <li>• <b>LSA ID</b>—LSA identifier included in the advertisement. An asterisk preceding the identifier marks database entries that originated from the local routing device.</li> <li>• <b>Adv rtr</b>—Address of the routing device that sent the advertisement.</li> <li>• <b>Seq</b>—Link sequence number of the advertisement.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive</b> |

Table 59: show (ospf | ospf3) neighbor Output Fields (*continued*)

| Field Name              | Field Description                                                                                                                                                                                                                | Level of Output  |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Neighbor-address</b> | (OSPFv3 only) If the neighbor uses virtual links, the <b>Neighbor-address</b> is the site-local, local, or global address. If the neighbor uses a physical interface, the <b>Neighbor-address</b> is an IPv6 link-local address. | detail extensive |
| <b>area</b>             | Area that the neighbor is in.                                                                                                                                                                                                    | detail extensive |
| <b>OSPF3-Intf-Index</b> | (OSPFv3 only) Displays the OSPFv3 interface index.                                                                                                                                                                               | detail extensive |
| <b>opt</b>              | Option bits received in the hello packets from the neighbor.                                                                                                                                                                     | detail extensive |
| <b>DR or DR-ID</b>      | Address of the designated router.                                                                                                                                                                                                | detail extensive |
| <b>BDR or BDR-ID</b>    | Address of the backup designated router.                                                                                                                                                                                         | detail extensive |
| <b>Up</b>               | Length of time since the neighbor came up.                                                                                                                                                                                       | detail extensive |
| <b>adjacent</b>         | Length of time since the adjacency with the neighbor was established.                                                                                                                                                            | detail extensive |

## Sample Output

### show ospf neighbor brief

```

user@host> show ospf neighbor brief
  Address      Intf      State      ID          Pri  Dead
192.168.254.225 fxp3.0    2Way      10.250.240.32 128  36
192.168.254.230 fxp3.0    Full      10.250.240.8  128  38
192.168.254.229 fxp3.0    Full      10.250.240.35 128  33
10.1.1.129      fxp2.0    Full      10.250.240.12 128  37
10.1.1.131      fxp2.0    Full      10.250.240.11 128  38
10.1.2.1        fxp1.0    Full      10.250.240.9  128  32
10.1.2.81       fxp0.0    Full      10.250.240.10 128  33

```

### show ospf neighbor detail

```

user@host> show ospf neighbor detail
  Address      Interface      State      ID          Pri  Dead
10.5.1.2      ge-1/2/0.1    Full      10.5.1.2    128  37
area 0.0.0.1, opt 0x42, DR 10.5.1.2, BDR 10.5.1.1
Up 06:09:28, adjacent 05:17:36
Link state acknowledgment list: 3 entries

Link state retransmission list: 9 entries

10.5.10.2     ge-1/2/0.10    ExStart   10.5.1.38   128  34
area 0.0.0.1, opt 0x42, DR 10.5.10.2, BDR 10.5.10.1
Up 06:09:28
master, seq 0xac1530f8, rexmit DBD in 3 sec
rexmit LSREQ in 0 sec
10.5.11.2     ge-1/2/0.11    Full      10.5.1.42   128  38
area 0.0.0.1, opt 0x42, DR 10.5.11.2, BDR 10.5.11.1
Up 06:09:28, adjacent 05:26:46
Link state retransmission list: 1 entries

```



```

10.5.12.2      ge-1/2/0.12      ExStart  10.5.1.46      128   33
area 0.0.0.1, opt 0x42, DR 10.5.12.2, BDR 10.5.12.1
Up 06:09:28
master, seq 0xac188a68, rexmit DBD in 2 sec
rexmit LSREQ in 0 sec

```

### show ospf neighbor extensive

```

user@host> show ospf neighbor extensive
Address      Interface      State      ID            Pri  Dead
10.5.1.2     ge-1/2/0.1     Full      10.5.1.2     128  33
area 0.0.0.1, opt 0x42, DR 10.5.1.2, BDR 10.5.1.1
Up 06:09:42, adjacent 05:17:50
Link state retransmission list:

  Type      LSA ID      Adv rtr      Seq
Summary    10.8.56.0   172.25.27.82 0x8000004d
Router     10.5.1.94   10.5.1.94    0x8000005c
Network    10.5.24.2   10.5.1.94    0x80000036
Summary    10.8.57.0   172.25.27.82 0x80000024
Extern     1.10.90.0   10.8.1.2     0x80000041
Extern     1.4.109.0   10.6.1.2     0x80000041
Router     10.5.1.190  10.5.1.190   0x8000005f
Network    10.5.48.2   10.5.1.190   0x8000003d
Summary    10.8.58.0   172.25.27.82 0x8000004d
Extern     1.10.91.0   10.8.1.2     0x80000041
Extern     1.4.110.0   10.6.1.2     0x80000041
Router     10.5.1.18   10.5.1.18    0x8000005f
Network    10.5.5.2    10.5.1.18    0x80000033
Summary    10.8.59.0   172.25.27.82 0x8000003a
Summary    10.8.62.0   172.25.27.82 0x80000025

10.5.10.2    ge-1/2/0.10    ExStart  10.5.1.38      128   38
area 0.0.0.1, opt 0x42, DR 10.5.10.2, BDR 10.5.10.1
Up 06:09:42
master, seq 0xac1530f8, rexmit DBD in 2 sec
rexmit LSREQ in 0 sec
10.5.11.2    ge-1/2/0.11    Full     10.5.1.42      128   33
area 0.0.0.1, opt 0x42, DR 10.5.11.2, BDR 10.5.11.1
Up 06:09:42, adjacent 05:27:00
Link state retransmission list:

  Type      LSA ID      Adv rtr      Seq
Summary    10.8.58.0   172.25.27.82 0x8000004d

```

|         |           |              |            |
|---------|-----------|--------------|------------|
| Extern  | 1.10.91.0 | 10.8.1.2     | 0x80000041 |
| Extern  | 1.1.247.0 | 10.5.1.2     | 0x8000003f |
| Extern  | 1.4.110.0 | 10.6.1.2     | 0x80000041 |
| Router  | 10.5.1.18 | 10.5.1.18    | 0x8000005f |
| Network | 10.5.5.2  | 10.5.1.18    | 0x80000033 |
| Summary | 10.8.59.0 | 172.25.27.82 | 0x8000003a |

### show ospf3 neighbor detail

```
user@host> show ospf3 neighbor detail
ID          Interface          State    Pri    Dead
10.255.71.13 fe-0/0/2.0          Full     128    30
Neighbor-address fe80::290:69ff:fe9b:e002
area 0.0.0.0, opt 0x13, OSPF3-Intf-Index 2
DR-ID 10.255.71.13, BDR-ID 10.255.71.12
Up 02:51:43, adjacent 02:51:43
```

### show ospf neighbor area area-id

```
user@host >show ospf neighbor area 1.1.1.1
Address      Interface          State    ID          Pri    Dead
192.168.37.47 so-0/0/0.0        Full     10.255.245.4 128    33
Area 1.1.1.1
192.168.37.55 so-1/0/0.0        Full     10.255.245.5 128    37
Area 1.1.1.1
```

### show ospf neighbor interface interface-name

```
user@host >show ospf neighbor interface so-0/0/0.0
Address      Interface          State    ID          Pri    Dead
192.168.37.47 so-0/0/0.0        Full     10.255.245.4 128    37
Area 0.0.0.0
192.168.37.47 so-0/0/0.0        Full     10.255.245.4 128    33
Area 1.1.1.1
192.168.37.47 so-0/0/0.0        Full     10.255.245.4 128    32
Area 2.2.2.2
```

### show ospf3 neighbor instance all (OSPFv3 Multiple Family Address Support Enabled)

```
user @host > show ospf3 neighbor instance all
Instance: ina
Realm: ipv6-unicast
ID          Interface          State    Pri    Dead
100.1.1.1    fe-0/0/2.0          Full     128    37
Neighbor-address fe80::217:cb00:c87c:8c03
Instance: inb
Realm: ipv4-unicast
ID          Interface          State    Pri    Dead
100.1.2.1    fe-0/0/2.1          Full     128    33
Neighbor-address fe80::217:cb00:c97c:8c03
```

## show (ospf | ospf3) overview

|                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                   | show (ospf   ospf3) overview<br><brief   extensive><br><instance <i>instance-name</i> ><br><logical-system (all   <i>logical-system-name</i> )><br><realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Syntax (EX Series Switch and QFX Series)</b> | show (ospf   ospf3) overview<br><brief   extensive><br><instance <i>instance-name</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>                      | Command introduced in Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br><b>realm</b> option introduced in Junos OS Release 9.2.<br>Database protection introduced in Junos 10.2.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>                              | Display Open Shortest Path First (OSPF) overview information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Options</b>                                  | <p><b>none</b>—Display standard information about all OSPF neighbors for all routing instances.</p> <p><b>brief   extensive</b>—(Optional) Display the specified level of output.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display all OSPF interfaces under the named routing instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)</b>—(Optional) (OSPFv3 only) Display information about the specified OSPFv3 realm, or address family. Use the <b>realm</b> option to specify an address family for OSPFv3 other than IPv6 unicast, which is the default.</p> |
| <b>Required Privilege Level</b>                 | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>List of Sample Output</b>                    | <a href="#">show ospf overview on page 765</a><br><a href="#">show ospf overview (With Database Protection) on page 766</a><br><a href="#">show ospf3 overview (With Database Protection) on page 766</a><br><a href="#">show ospf overview extensive on page 766</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Output Fields</b>                            | <a href="#">Table 60 on page 763</a> lists the output fields for the <b>show ospf overview</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

Table 60: show ospf overview Output Fields

| Field name | Field Description      | Level of Output |
|------------|------------------------|-----------------|
| Instance   | OSPF routing instance. | All levels      |

Table 60: show ospf overview Output Fields (*continued*)

| Field name                       | Field Description                                                                                                                                                                        | Level of Output |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Router ID</b>                 | Router ID of the routing device.                                                                                                                                                         | All levels      |
| <b>Route table index</b>         | Route table index.                                                                                                                                                                       | All levels      |
| <b>Configured overload</b>       | Overload capability is enabled. If the overload timer is also configured, display the time that remains before it is set to expire. This field is not displayed after the timer expires. | All levels      |
| <b>Topology</b>                  | Topology identifier.                                                                                                                                                                     | All levels      |
| <b>Prefix export count</b>       | Number of prefixes exported into OSPF.                                                                                                                                                   | All levels      |
| <b>Full SPF runs</b>             | Number of complete Shortest Path First calculations.                                                                                                                                     | All levels      |
| <b>SPF delay</b>                 | Delay before performing consecutive Shortest Path First calculations.                                                                                                                    | All levels      |
| <b>SPF holddown</b>              | Delay before performing additional Shortest Path First (SPF) calculations after the maximum number of consecutive SPF calculations is reached.                                           | All levels      |
| <b>SPF rapid runs</b>            | Maximum number of Shortest Path First calculations that can be performed in succession before the hold-down timer begins.                                                                | All levels      |
| <b>LSA refresh time</b>          | Refresh period for link-state advertisement (in minutes).                                                                                                                                | All levels      |
| <b>Database protection state</b> | Current state of database protection.                                                                                                                                                    | All levels      |
| <b>Warning threshold</b>         | Threshold at which a warning message is logged (percentage of maximum LSA count).                                                                                                        | All levels      |
| <b>Non self-generated LSAs</b>   | Number of LSAs whose router ID is not equal to the local router ID: <b>Current</b> , <b>Warning</b> (threshold), and <b>Allowed</b> .                                                    | All levels      |
| <b>Ignore time</b>               | How long the database has been in the ignore state.                                                                                                                                      | All levels      |
| <b>Reset time</b>                | How long the database must stay out of the ignore or isolated state before it returns to normal operations.                                                                              | All levels      |
| <b>Ignore count</b>              | Number of times the database has been in the ignore state: <b>Current</b> and <b>Allowed</b> .                                                                                           | All levels      |
| <b>Restart</b>                   | Graceful restart capability: <b>enabled</b> or <b>disabled</b> .                                                                                                                         | All levels      |
| <b>Restart duration</b>          | Time period for complete reacquisition of OSPF neighbors.                                                                                                                                | All levels      |
| <b>Restart grace period</b>      | Time period for which the neighbors should consider the restarting routing device as part of the topology.                                                                               | All levels      |

Table 60: show ospf overview Output Fields (*continued*)

| Field name                    | Field Description                                                                                                                                                                                                                                                                                                                     | Level of Output  |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Graceful restart helper mode  | (OSPFv2) Standard graceful restart helper capability (based on RFC 3623): <b>enabled</b> or <b>disabled</b> .                                                                                                                                                                                                                         | All levels       |
| Restart-signaling helper mode | (OSPFv2) Restart signaling-based graceful restart helper capability (based on RFC 4811, RFC 4812, and RFC 4813): <b>enabled</b> or <b>disabled</b> .                                                                                                                                                                                  | All levels       |
| Helper mode                   | (OSPFv3) Graceful restart helper capability: <b>enabled</b> or <b>disabled</b> .                                                                                                                                                                                                                                                      | All levels       |
| Trace options                 | OSPF-specific trace options.                                                                                                                                                                                                                                                                                                          | <b>extensive</b> |
| Trace file                    | Name of the file to receive the output of the tracing operation.                                                                                                                                                                                                                                                                      | <b>extensive</b> |
| Area                          | Area number. Area 0.0.0.0 is the backbone area.                                                                                                                                                                                                                                                                                       | All levels       |
| Stub type                     | Stub type of area: <b>Normal Stub</b> , <b>Not Stub</b> , or <b>Not so Stubby Stub</b> .                                                                                                                                                                                                                                              | All levels       |
| Authentication Type           | Type of authentication: <b>None</b> , <b>Password</b> , or <b>MD5</b> .<br><br><b>NOTE:</b> The <b>Authentication Type</b> field refers to the authentication configured at the <b>[edit protocols ospf area area-id]</b> level. Any authentication configured for an interface in this area will not affect the value of this field. | All levels       |
| Area border routers           | Number of area border routers.                                                                                                                                                                                                                                                                                                        | All levels       |
| Neighbors                     | Number of autonomous system boundary routers.                                                                                                                                                                                                                                                                                         | All levels       |

## Sample Output

### show ospf overview

```

user@host> show ospf overview
Instance: master
  Router ID: 10.255.245.6
  Route table index: 0
  Configured overload, expires in 118 seconds
  LSA refresh time: 50 minutes
  Restart: Enabled
    Restart duration: 20 sec
    Restart grace period: 40 sec
    Helper mode: enabled
  Area: 0.0.0.0
    Stub type: Not Stub
    Authentication Type: None
    Area border routers: 0, AS boundary routers: 0
    Neighbors
      Up (in full state): 0
  Topology: default (ID 0)
  Prefix export count: 0
  Full SPF runs: 1

```

SPF delay: 0.200000 sec, SPF holddown: 5 sec, SPF rapid runs: 3

#### show ospf overview (With Database Protection)

```
user@host> show ospf overview
Instance: master
Router ID: 10.255.112.218
Route table index: 0
LSA refresh time: 50 minutes
Traffic engineering
Restart: Enabled
  Restart duration: 180 sec
  Restart grace period: 210 sec
  Graceful restart helper mode: Enabled
  Restart-signaling helper mode: Enabled
Database protection state: Normal
Warning threshold: 70 percent
Non self-generated LSAs: Current 582, Warning 700, Allowed 1000
Ignore time: 30, Reset time: 60
Ignore count: Current 0, Allowed 1
Area: 0.0.0.0
  Stub type: Not Stub
  Authentication Type: None
  Area border routers: 0, AS boundary routers: 0
  Neighbors
    Up (in full state): 160
Topology: default (ID 0)
Prefix export count: 0
Full SPF runs: 70
SPF delay: 0.200000 sec, SPF holddown: 5 sec, SPF rapid runs: 3
Backup SPF: Not Needed
```

#### show ospf3 overview (With Database Protection)

```
user@host> show ospf3 overview
Instance: master
Router ID: 10.255.112.128
Route table index: 0
LSA refresh time: 50 minutes
Database protection state: Normal
Warning threshold: 80 percent
Non self-generated LSAs: Current 3, Warning 8, Allowed 10
Ignore time: 30, Reset time: 60
Ignore count: Current 0, Allowed 2
Area: 0.0.0.0
  Stub type: Not Stub
  Area border routers: 0, AS boundary routers: 0
  Neighbors
    Up (in full state): 1
Topology: default (ID 0)
Prefix export count: 0
Full SPF runs: 7
SPF delay: 0.200000 sec, SPF holddown: 5 sec, SPF rapid runs: 3
Backup SPF: Not Needed
```

#### show ospf overview extensive

```
user@host> show ospf overview extensive
Instance: master
Router ID: 1.1.1.103
Route table index: 0
```

```
Full SPF runs: 13, SPF delay: 0.200000 sec
LSA refresh time: 50 minutes
Restart: Disabled
Trace options: lsa
Trace file: /var/log/ospf size 131072 files 10
Area: 0.0.0.0
  Stub type: Not Stub
  Authentication Type: None
  Area border routers: 0, AS boundary routers: 0
  Neighbors
    Up (in full state): 1
```

## show (ospf | ospf3) route

---

|                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                   | <pre>show (ospf   ospf3) route &lt;brief   detail   extensive&gt; &lt;abr   asbr   extern   inter   intra&gt; &lt;destination&gt; &lt;instance (default   ipv4-multicast   <i>instance-name</i>)&gt; &lt;logical-system (default   ipv4-multicast   <i>logical-system-name</i>)&gt; &lt;network&gt; &lt;no-backup-coverage&gt; &lt;realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)&gt; &lt;router&gt; &lt;topology (default   ipv4-multicast   <i>topology-name</i>)&gt; &lt;transit&gt;</pre>                                                                                                                                                                                  |
| <b>Syntax (EX Series Switch and QFX Series)</b> | <pre>show (ospf   ospf3) route &lt;brief   detail   extensive&gt; &lt;abr   asbr   extern   inter   intra&gt; &lt;destination&gt; &lt;instance <i>instance-name</i> &lt;network&gt; &lt;no-backup-coverage&gt; &lt;router&gt; &lt;topology (default   ipv4-multicast   <i>topology-name</i>)&gt; &lt;transit&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Release Information</b>                      | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>topology</b> option introduced in Junos OS Release 9.0.</p> <p><b>realm</b> option introduced in Junos OS Release 9.2.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>                              | Display the entries in the Open Shortest Path First (OSPF) routing table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                                  | <p><b>none</b>—Display standard information about all entries in the OSPF routing table for all routing instances and all topologies.</p> <p><b>destination</b>—Display routes to the specified IP address (with optional destination prefix length).</p> <p><b>brief   detail   extensive</b>—(Optional) Display the specified level of output.</p> <p><b>abr</b>—(Optional) Display routes to area border routers.</p> <p><b>asbr</b>—(Optional) Display routes to autonomous system border routers.</p> <p><b>extern</b>—(Optional) Display external routes.</p> <p><b>inter</b>—(Optional) Display interarea routes.</p> <p><b>intra</b>—(Optional) Display intra-area routes.</p> |



**instance** (**default** | **ipv4-multicast** | *instance-name*)—(Optional) Display entries for the default routing instance, the IPv4 multicast routing instance, or for the specified routing instance.

**logical-system** (**default** | **ipv4-multicast** | *logical-system-name*)—(Optional) Perform this operation on the default logical system, the IPv4 multicast logical system, or on a particular logical system.

**network**—(Optional) Display routes to networks.

**no-backup-coverage**—(Optional) Display routes with no backup coverage.

**realm** (**ipv4-multicast** | **ipv4-unicast** | **ipv6-multicast**)—(OSPFv3 only) (Optional) Display entries in the routing table for the specified OSPFv3 realm, or address family. Use the **realm** option to specify an address family for OSPFv3 other than IPv6 unicast, which is the default.

**router**—(Optional) Display routes to all routers.

**topology** (**default** | **ipv4-multicast** | *topology-name*)—(OSPFv2 only) (Optional) Display routes for the default OSPF topology, IPv4 multicast topology, or for a particular topology.

**transit**—(Optional) (OSPFv3 only) Display OSPFv3 routes to pseudonodes.

**Required Privilege Level** view

**List of Sample Output** [show ospf route on page 771](#)  
[show ospf route detail on page 771](#)  
[show ospf3 route on page 771](#)  
[show ospf3 route detail on page 772](#)  
[show ospf route topology voice on page 772](#)

**Output Fields** [Table 61 on page 769](#) list the output fields for the **show (ospf | ospf3) route** command. Output fields are listed in the approximate order in which they appear.

**Table 61: show (ospf | ospf3) route Output Fields**

| Field Name       | Field Description                                                                                                                                                                                                                              | Output Level |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| <b>Topology</b>  | Name of the topology.                                                                                                                                                                                                                          | All levels   |
| <b>Prefix</b>    | Destination of the route.                                                                                                                                                                                                                      | All levels   |
| <b>Path type</b> | How the route was learned: <ul style="list-style-type: none"> <li>• <b>Inter</b>—Interarea route</li> <li>• <b>Ext1</b>—External type 1 route</li> <li>• <b>Ext2</b>—External type 2 route</li> <li>• <b>Intra</b>—Intra-area route</li> </ul> | All levels   |

Table 61: show (ospf | ospf3) route Output Fields (*continued*)

| Field Name                 | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Output Level  |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| <b>Route type</b>          | The type of routing device from which the route was learned: <ul style="list-style-type: none"> <li>• <b>AS BR</b>—Route to AS border router.</li> <li>• <b>Area BR</b>—Route to area border router.</li> <li>• <b>Area/AS BR</b>—Route to router that is both an <b>Area BR</b> and <b>AS BR</b>.</li> <li>• <b>Network</b>—Network router.</li> <li>• <b>Router</b>—Route to a router that is neither an <b>Area BR</b> nor an <b>AS BR</b>.</li> <li>• <b>Transit</b>—(OSPFv3 only) Route to a pseudonode representing a transit network, LAN, or nonbroadcast multiaccess (NBMA) link.</li> <li>• <b>Discard</b>—Route to a summary discard.</li> </ul> | All levels    |
| <b>NH Type</b>             | Next-hop type: <b>LSP</b> or <b>IP</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | All levels    |
| <b>Metric</b>              | Route's metric value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | All levels    |
| <b>NH-interface</b>        | (OSPFv3 only) Interface through which the route's next hop is reachable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | All levels    |
| <b>NH-addr</b>             | (OSPFv3 only) IPv6 address of the next hop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels    |
| <b>NextHop Interface</b>   | (OSPFv2 only) Interface through which the route's next hop is reachable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | All levels    |
| <b>Nexthop addr/label</b>  | (OSPFv2 only) If the <b>NH Type</b> is <b>IP</b> , then it is the address of the next hop. If the <b>NH Type</b> is <b>LSP</b> , then it is the name of the label-switched path.                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | All levels    |
| <b>Area</b>                | Area ID of the route.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail</b> |
| <b>Origin</b>              | Router from which the route was learned.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail</b> |
| <b>Type 7</b>              | Route was learned through a not-so-stubby area (NSSA) link-state advertisement (LSA).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail</b> |
| <b>P-bit</b>               | Route was learned through NSSA LSA and the propagate bit was set.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail</b> |
| <b>Fwd NZ</b>              | Forwarding address is nonzero. <b>Fwd NZ</b> is only displayed if the route is learned through an NSSA LSA.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail</b> |
| <b>optional-capability</b> | Optional capabilities propagated in the router LSA. This field is in the output for intra-area router routes only (when <b>Route Type</b> is <b>Area BR</b> , <b>AS BR</b> , <b>Area/AS BR</b> , or <b>Router</b> ), not for interarea router routes or network routes. Three bits in this field are defined as follows: <ul style="list-style-type: none"> <li>• <b>0x4 (V)</b>—Routing device is at the end of a virtual active link.</li> <li>• <b>0x2 (E)</b>—Routing device is an autonomous system boundary router.</li> <li>• <b>0x1 (B)</b>—Routing device is an area border router.</li> </ul>                                                     | <b>detail</b> |

Table 61: show (ospf | ospf3) route Output Fields (*continued*)

| Field Name | Field Description                                                                                                                                                                                                                  | Output Level |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| priority   | <p>The priority assigned to the prefix:</p> <ul style="list-style-type: none"> <li>• high</li> <li>• medium</li> <li>• low</li> </ul> <p><b>NOTE:</b> The <b>priority</b> field applies only to routes of type <b>Network</b>.</p> | detail       |

## Sample Output

### show ospf route

```

user@host> show ospf route
Prefix          Path    Route    NH    Metric  NextHop    Nexthop
                Type    Type      Type                Interface  addr/label
10.255.71.12     Intra   Router    IP     1       fe-0/0/2.0 192.16.22.86
10.255.71.13/32  Intra   Network    IP     0       100.0       192.16.22.86
192.168.222.84/30 Intra   Network    LSP    1       fe-0/0/2.0 1sp-ab

```

### show ospf route detail

```

user@host> show ospf route detail
Topology default Route Table:

Prefix          Path    Route    NH    Metric  NextHop    Nexthop
                Type    Type      Type                Interface  addr/label
10.255.14.174    Inter   AS BR     IP     210     t1-3/0/1.0
area 0.0.0.2, origin 10.255.14.185
10.255.14.178    Intra   Router    IP     200     t3-3/1/3.0
area 0.0.0.2, origin 10.255.14.178, optional-capability 0x0
10.210.1.0/30    Intra   Network    IP     10      t3-3/1/2.0
area 0.0.0.2, origin 10.255.14.172, priority medium
100.1.1.1/32     Inter   Network    IP     210     t1-3/0/1.0
area 0.0.0.2, origin 10.255.14.185, priority low
112.3.1.0/24     Ext2    Network    IP     0       t1-3/0/1.0
area 0.0.0.0, origin 10.255.14.174, priority high
200.3.3.0/30     Inter   Network    IP     220     t1-3/0/1.0
area 0.0.0.2, origin 10.255.14.185, priority high

```

### show ospf3 route

```

user@host> show ospf3 route
Prefix          Path    Route    NH    Metric  NextHop    Nexthop
                Type    Type      Type                Interface  addr/label
10.255.71.13     Intra   Router    IP     1       1
NH-interface fe-0/0/2.0, NH-addr fe80::290:69ff:fe9b:e002
10.255.71.13;0.0.0.2
10.255.245.1     Intra   Router    IP     40     fxp1.1     192.168.36.17
area 0.0.0.0, origin 10.255.245.1 optional-capability 0x0,
10.255.245.3     Intra   AS BR     IP     1      fxp2.3     192.168.36.34
area 0.0.0.0, origin 10.255.245.3 optional-capability 0x0,
10.255.245.1/32  Intra   Network    IP     40     fxp1.1     192.168.36.17

```

```

    area 0.0.0.0, origin 10.255.245.1, priority high
10.255.245.2/32      Intra Network   IP      0  lo0.0
    area 0.0.0.0, origin 10.255.245.2, priority medium
10.255.245.3/32      Intra Network   IP      1  fxp2.3      192.168.36.34

    area 0.0.0.0, origin 10.255.245.3, priority low
                        Intra Transit   IP      1
    NH-interface fe-0/0/2.0
192::168:222:84/126 Intra Network   IP      1
    NH-interface fe-0/0/2.0
abcd::71:12/128      Intra Network   IP      0
    NH-interface lo0.0
abcd::71:13/128      Intra Network   LSP     1
    NH-interface fe-0/0/2.0, NH-addr lsp-cd

```

### show ospf3 route detail

```

user@host> show ospf3 route detail
Prefix                                Path   Route   NH   Metric
                                type  type   type
10.255.14.174                        Intra Area/AS BR IP    110
    NH-interface so-1/2/2.0
    Area 0.0.0.0, Origin 10.255.14.174, Optional-capability 0x3
10.255.14.178                        Intra Router   IP    200
    NH-interface t3-3/1/3.0
    Area 0.0.0.0, Origin 10.255.14.178, Optional-capability 0x0
10.255.14.185;0.0.0.2                Intra Transit  IP    200
    NH-interface t1-3/0/1.0
    NH-interface so-1/2/2.0
    Area 0.0.0.0, Origin 10.255.14.185
1000:1:1::1/128                     Inter Network  IP    110
    NH-interface so-1/2/2.0
    Area 0.0.0.0, Origin 10.255.14.174, Priority low
1001:2:1::/48                       Ext1  Network    IP    110
    NH-interface so-1/2/2.0
    Area 0.0.0.0, Origin 10.255.14.174, Fwd NZ, Priority medium
1002:1:7::/48                       Ext2  Network    IP     0
    NH-interface so-1/2/2.0
    Area 0.0.0.0, Origin 10.255.14.174, Fwd NZ, Priority low
1002:3:4::/48                       Ext2  Network    IP     0
    NH-interface so-1/2/2.0
    Area 0.0.0.0, Origin 10.255.14.174, Fwd NZ, Priority high
abcd::10:255:14:172/128             Intra Network  IP     0
    NH-interface lo0.0
    Area 0.0.0.0, Origin 10.255.14.172, Priority low

```

### show ospf route topology voice

```

user@host show ospf route topology voice
Topology voice Route Table:
Prefix      Path   Route   NH   Metric  NextHop      Nexthop
                                Type  Type   Type
10.255.8.2  Intra Router   IP    1  so-0/2/0.0
10.255.8.3  Intra Router   IP    2  so-0/2/0.0
10.255.8.1/32 Intra Network  IP    0  lo0.0
10.255.8.2/32 Intra Network  IP    1  so-0/2/0.0
10.255.8.3/32 Intra Network  IP    2  so-0/2/0.0
192.168.8.0/29 Intra Network  IP    2  so-0/2/0.0
192.168.8.44/30 Intra Network  IP    2  so-0/2/0.0
192.168.8.46/32 Intra Network  IP    1  so-0/2/0.0

```

|                 |       |         |    |   |            |
|-----------------|-------|---------|----|---|------------|
| 192.168.8.48/30 | Intra | Network | IP | 1 | so-0/2/1.0 |
| 192.168.8.52/30 | Intra | Network | IP | 2 | so-0/2/0.0 |
| 192.168.9.44/30 | Intra | Network | IP | 1 | so-0/2/0.0 |
| 192.168.9.45/32 | Intra | Network | IP | 2 | so-0/2/0.0 |

## show (ospf | ospf3) statistics

|                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                   | show (ospf   ospf3) statistics<br><instance <i>instance-name</i> ><br><logical-system (all   <i>logical-system-name</i> )><br><realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Syntax (EX Series Switch and QFX Series)</b> | show (ospf   ospf3) statistics<br><instance <i>instance-name</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Release Information</b>                      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br><b>realm</b> option introduced in Junos OS Release 9.2.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>                              | Display OSPF statistics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Options</b>                                  | <p><b>none</b>—Display OSPF statistics for all routing instances.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display all statistics for the specified routing instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)</b>—(Optional) (OSPFv3 only) Display all statistics for the specified OSPFv3 realm, or address family. Use the <b>realm</b> option to specify an address family for OSPFv3 other than IPv6 unicast, which is the default.</p> |
| <b>Required Privilege Level</b>                 | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Related Documentation</b>                    | <ul style="list-style-type: none"> <li><a href="#">clear (ospf   ospf3) statistics</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>List of Sample Output</b>                    | <a href="#">show ospf statistics on page 776</a><br><a href="#">show ospf statistics logical-system all on page 776</a><br><a href="#">show ospf3 statistics on page 777</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Output Fields</b>                            | Table 62 on page 774 lists the output fields for the <b>show (ospf   ospf3) statistics</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

**Table 62: show (ospf | ospf3) statistics Output Fields**

| Field Name                                  | Field Description                                                |
|---------------------------------------------|------------------------------------------------------------------|
| Packet type                                 | Type of OSPF packet.                                             |
| Total Sent/Total Received                   | Total number of packets sent and received.                       |
| Last 5 seconds Sent/Last 5 seconds Received | Total number of packets sent and received in the last 5 seconds. |

Table 62: show (ospf | ospf3) statistics Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DBDs retransmitted</b>      | Total number of database description packets retransmitted, and number retransmitted in the last 5 seconds.                                                                                                                                                                                                                                                                                                               |
| <b>LSAs flooded</b>            | Total number of link-state advertisements flooded, and number flooded in the last 5 seconds.                                                                                                                                                                                                                                                                                                                              |
| <b>LSAs flooded high-prio</b>  | <p>Total number of high priority link-state advertisements flooded, and number flooded in the last 5 seconds.</p> <p>A link-state advertisement is deemed a high priority if it has changed since it was last sent.</p>                                                                                                                                                                                                   |
| <b>LSAs retransmitted</b>      | Total number of link-state advertisements retransmitted, and number retransmitted in the last 5 seconds.                                                                                                                                                                                                                                                                                                                  |
| <b>LSAs transmitted to nbr</b> | Total number of link-state advertisements transmitted to a neighbor, and number transmitted in the last 5 seconds.                                                                                                                                                                                                                                                                                                        |
| <b>LSAs requested</b>          | Total number of link-state advertisements requested by neighboring devices, and number requested in the last 5 seconds.                                                                                                                                                                                                                                                                                                   |
| <b>LSAs acknowledged</b>       | Total number of link-state advertisements acknowledged, and number acknowledged in the last 5 seconds.                                                                                                                                                                                                                                                                                                                    |
| <b>Flood queue depth</b>       | Total number of entries in the extended queue.                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Total rexmit entries</b>    | Total number of retransmission entries waiting to be sent from the OSPF routing instance.                                                                                                                                                                                                                                                                                                                                 |
| <b>db summaries</b>            | Total number of database description summaries waiting to be sent from the OSPF routing instance.                                                                                                                                                                                                                                                                                                                         |
| <b>lsreq entries</b>           | Total number of link-state request entries waiting to be sent from the OSPF routing instance.                                                                                                                                                                                                                                                                                                                             |
| <b>Receive errors</b>          | <p>Number and type of receive errors. Some sample receive errors include:</p> <ul style="list-style-type: none"> <li>• <b>mtu mismatches</b></li> <li>• <b>no interface found</b></li> <li>• <b>no virtual link found</b></li> <li>• <b>nssa mismatches</b></li> <li>• <b>stub area mismatches</b></li> <li>• <b>subnet mismatches</b></li> </ul> <p>If there are no receive errors, the output displays <b>none</b>.</p> |

## Sample Output

### show ospf statistics

```

user@host> show ospf statistics
Packet type          Total
                   Sent      Received
Hello                 31         14
DbD                   9          10
LSReq                 2           2
LSUpdate              8          16
LSAck                 9           9
                   Last 5 seconds
                   Sent      Received
Hello                 2           2
DbD                   0           0
LSReq                 0           0
LSUpdate              0           0
LSAck                 0           0

DBDs retransmitted   :           3, last 5 seconds :           0
LSAs flooded         :          12, last 5 seconds :           0
LSAs flooded high-prio :           0, last 5 seconds :           0
LSAs retransmitted   :           0, last 5 seconds :           0
LSAs transmitted to nbr:           3, last 5 seconds :           0
LSAs requested       :           5, last 5 seconds :           0
LSAs acknowledged    :          19, last 5 seconds :           0

Flood queue depth    :           0
Total rexmit entries :           0
db summaries         :           0
lsreq entries        :           0

Receive errors:
  862 no interface found
 115923 no virtual link found

```

### show ospf statistics logical-system all

```

user@host> show ospf statistics logical-system all
logical-system: C
OSPF instance is not running
-----

logical-system: B
Packet type          Total
                   Sent      Received
Hello                313740        313653
DbD                   3           2
LSReq                 1           1
LSUpdate              2752        1825
LSAck                 1821        2747
                   Last 5 seconds
                   Sent      Received
Hello                  1           0
DbD                    0           0
LSReq                  0           0
LSUpdate               0           0
LSAck                  0           0

DBDs retransmitted   :           0, last 5 seconds :           0
LSAs flooded         :          2741, last 5 seconds :           0
LSAs flooded high-prio :          10, last 5 seconds :           0
LSAs retransmitted   :           0, last 5 seconds :           0
LSAs transmitted to nbr:           2, last 5 seconds :           0
LSAs requested       :           1, last 5 seconds :           0
LSAs acknowledged    :          1831, last 5 seconds :           0

Flood queue depth    :           0
Total rexmit entries :           0
db summaries         :           0
lsreq entries        :           0

Receive errors:

```



```

None
-----

logical-system: A

Packet type          Total          Last 5 seconds
                   Sent      Received      Sent      Received
    Hello           313698      313695         0         0
      DbD              2         3         0         0
    LSReq              1         1         0         0
  LSUpdate           1825      2752         0         0
    LSAck            2747      1821         0         0

DBDs retransmitted   :           0, last 5 seconds :           0
LSAs flooded         :        1825, last 5 seconds :           0
LSAs flooded high-prio :         10, last 5 seconds :           0
LSAs retransmitted   :           0, last 5 seconds :           0
LSAs transmitted to nbr:         1, last 5 seconds :           0
LSAs requested       :           2, last 5 seconds :           0
LSAs acknowledged   :        2748, last 5 seconds :           0

Flood queue depth    :           0
Total rexmit entries :           0
db summaries         :           0
lsreq entries        :           0

Receive errors:
None
-----

```

### show ospf3 statistics

```

user@host> show ospf3 statistics

Packet type          Total          Last 5 seconds
                   Sent      Received      Sent      Received
    Hello              0         0         0         0
      DbD              0         0         0         0
    LSReq              0         0         0         0
  LSUpdate            0         0         0         0
    LSAck              0         0         0         0

DBDs retransmitted   :           0, last 5 seconds :           0
LSAs flooded         :           0, last 5 seconds :           0
LSAs flooded high-prio :           0, last 5 seconds :           0
LSAs retransmitted   :           0, last 5 seconds :           0
LSAs transmitted to nbr:           0, last 5 seconds :           0
LSAs requested       :           0, last 5 seconds :           0
LSAs acknowledged   :           0, last 5 seconds :           0

Flood queue depth    :           0
Total rexmit entries :           0
db summaries         :           0
lsreq entries        :           0

Receive errors:
None

```

## show poe controller

|                                 |                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <b>show poe controller</b>                                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>      | Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 12.2 for ACX2000 routers.                                                                                                                                                                                                  |
| <b>Description</b>              | Display configuration and status of the PoE controllers.                                                                                                                                                                                                                                                                                |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>show poe interface</i></li> <li>• <i>request system firmware upgrade poe</i></li> <li>• <i>Verifying PoE Configuration and Status (CLI Procedure)</i></li> <li>• <i>Monitoring PoE Power Consumption (CLI Procedure)</i></li> <li>• <i>Upgrading the PoE Controller Software</i></li> </ul> |
| <b>List of Sample Output</b>    | <a href="#">show poe controller (EX3200 Switch) on page 779</a><br><a href="#">show poe controller (EX8200 Switch) on page 779</a><br><a href="#">show poe controller (Controller Software Upgrade in Progress) on page 779</a><br><a href="#">show poe controller (ACX2000 Router) on page 780</a>                                     |
| <b>Output Fields</b>            | Table 63 on page 778 lists the output fields for the <b>show poe controller</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                        |

**Table 63: show poe controller Output Fields**

| Field Name               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Controller index</b>  | PoE controller number: <ul style="list-style-type: none"> <li>• 0 for EX2200, EX3200, standalone EX3300, standalone EX4200 switches, standalone EX4300 switches, and ACX2000 routers.</li> <li>• Member ID for switches in an EX3300 Virtual Chassis, EX4200 Virtual Chassis, EX4300 Virtual Chassis, or a mixed EX4200 and EX4500 Virtual Chassis.</li> <li>• Slot number for line cards with a PoE controller in an EX6200 or EX8200 switch.</li> </ul> |
| <b>Maximum power</b>     | The PoE power budget for the switch or line card. The PoE controller allocates power to the PoE ports from this budget.                                                                                                                                                                                                                                                                                                                                   |
| <b>Power consumption</b> | Total amount of power being used by the PoE ports at the time the command is executed.                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Guard Band</b>        | Amount of power that has been placed in reserve for power demand spikes and that cannot be allocated to a PoE interface.                                                                                                                                                                                                                                                                                                                                  |

Table 63: show poe controller Output Fields (*continued*)

| Field Name    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Management    | Power management mode: either <b>Class</b> or <b>Static</b> or <b>high-power</b> .<br><br><b>NOTE:</b> The mode <b>high-power</b> is available on only ACX2000 routers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Status        | Status of the PoE controller: <ul style="list-style-type: none"> <li>• <b>AF_ENHANCE</b>—Controller supports enhanced PoE. The maximum power per PoE port is 18.6 W in static mode (15.4 W in class mode).</li> <li>• <b>DEVICE FAIL</b>—Software download to the controller has failed or the PoE controller is not initialized because of a hardware failure.</li> <li>• <b>DOWNLOAD_INIT</b>—Software download to the controller is in the initial phase.</li> <li>• <b>AF_MODE</b>—Controller supports standard IEEE 802.3af. The maximum power per PoE port is 15.4 W.</li> <li>• <b>AT/AF COMBO</b>—Controller supports a mix of standard IEEE 802.3af and IEEE 802.3at (PoE+) ports. The maximum power per port is 30 W for IEEE 802.3at (PoE+) ports and 15.4 W for the IEEE 802.3af ports.</li> <li>• <b>AT_MODE</b>—Controller supports IEEE 802.3at (PoE+). The maximum power per PoE port is 30 W.</li> <li>• <b>SW_DOWNLOAD (n%)</b>—Software download to the controller is in progress.</li> </ul> |
| Lldp Priority | Link Layer Discovery Protocol (LLDP) priority operating state. The state can be <b>Enabled</b> or <b>Disabled</b> .<br><br>LLDP priority allows the PoE controller to assign interfaces the power priority provided by the connected powered device by using LLDP power negotiation rather than the power priority configured on the switch interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## Sample Output

### show poe controller (EX3200 Switch)

```
user@switch> show poe controller
Controller Maximum Power Guard Management Status Lldp
index      power  consumption band    ment      Status  Priority
0          130.00W  81.20W   10W    Static    AF_ENHANCE Disabled
```

### show poe controller (EX8200 Switch)

```
user@switch> show poe controller
Controller Maximum Power Guard Management Status Lldp
index      power  consumption band    ment      Status  Priority
0          792.00W  603.50W   0W     Class    AT/AF COMBO Disabled
4          915.00W  781.00W   0W     Class    AT/AF COMBO Disabled
7          915.00W   0.00W    0W     Class    AT/AF COMBO Disabled
```

### show poe controller (Controller Software Upgrade in Progress)

```
user@switch> show poe controller
Controller Maximum Power Guard Management Status Lldp
index      power  consumption band    ment      Status  Priority
0          130.00W   0.00W    0W     Static    AF_ENHANCE Disabled
```

```
8**      130.00W  0.00W      0W   Static      SW_DOWNLOAD(10%) Disabled
```

```
**New PoE software upgrade available.
```

```
Use 'request system firmware upgrade poe fpc-slot <slot>'
```

```
This procedure will take around 10 minutes (recommended to be performed during  
maintenance)
```

#### show poe controller (ACX2000 Router)

```
user@host> show poe controller
```

| Controller<br>index | Maximum<br>power | Power<br>consumption | Guard<br>band | Management | Status | Lldp<br>Priority |
|---------------------|------------------|----------------------|---------------|------------|--------|------------------|
| 0                   | 130.0 W          | 14.2 W               | 0 W           | high-power | UP     |                  |

## show poe telemetries interface (ACX2000 Routers)

|                                 |                                                                                                                                                                                                                                                                 |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>show poe telemetries interface <i>interface-name</i> (<i>entries</i>   <i>all</i>)</code>                                                                                                                                                                 |
| <b>Release Information</b>      | Command introduced in Junos OS Release 12.2 for ACX2000 Series Universal Access Routers.                                                                                                                                                                        |
| <b>Description</b>              | <p>Display the history of power consumption on the specified interface.</p> <p>Telemetries must be enabled on the interface before you can display the history of power consumption.</p>                                                                        |
| <b>Options</b>                  | <p><b>interface <i>interface-name</i></b>—Display power consumption records for the specified PoE interface.</p> <p><b>(<i>entries</i>   <i>all</i>)</b>—Specify the number of power consumption records to display. The most recent records are displayed.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><a href="#">show poe interface</a></li> <li><a href="#">show poe controller on page 778</a></li> <li><a href="#">Troubleshooting PoE Interfaces</a></li> </ul>                                                           |
| <b>List of Sample Output</b>    | <p><a href="#">show poe telemetries interface ge-0/1/7 all on page 782</a></p> <p><a href="#">show poe telemetries interface ge-0/1/7 2 on page 782</a></p>                                                                                                     |
| <b>Output Fields</b>            | Table 64 on page 781 lists the output fields for the <b>show poe telemetries interface</b> command. Output fields are listed in the approximate order in which they appear.                                                                                     |

**Table 64: show poe telemetries interface Output Fields**

| Field Name       | Field Description                                                                      |
|------------------|----------------------------------------------------------------------------------------|
| <b>Interface</b> | Name of the interface.                                                                 |
| <b>SI No</b>     | Number of the record for the specified interface. Record number 1 is the most recent.  |
| <b>Timestamp</b> | Date and time when the power-consumption data was gathered.                            |
| <b>Power</b>     | Amount of power provided by the specified interface at the time the data was gathered. |
| <b>Voltage</b>   | Maximum voltage provided by the specified interface at the time the data was gathered. |

## Sample Output

**show poe telemetries interface ge-0/1/7 all**

```
user@switch> show poe telemetries interface ge-0/1/7 all
Interface  S1 No    Timestamp                Power    Voltage
          1     Mon May 14 00:45:05 2012 14.2 W  53.9 V
          2     Mon May 14 00:44:04 2012 14.2 W  53.9 V
          3     Mon May 14 00:43:03 2012 14.2 W  53.9 V
```

**show poe telemetries interface ge-0/1/7 2**

```
user@switch> show poe telemetries interface ge-0/1/7 2
Interface  S1 No    Timestamp                Power    Voltage
          1     Mon May 14 00:46:05 2012 14.2 W  53.9 V
          2     Mon May 14 00:47:04 2012 14.2 W  53.9 V
```

## show ptp clock

|                                 |                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show ptp clock                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>      | Command introduced in Junos OS Release 12.2.<br>Command introduced in Junos OS Release 12.3 for ACX Series Routers.                                                                                                                                                                                         |
| <b>Description</b>              | (ACX Series, MX80, MX240, MX480, and MX960 routers) Display the details of the clock configured on the node.                                                                                                                                                                                                |
| <b>Options</b>                  | This command has no options.                                                                                                                                                                                                                                                                                |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">IEEE 1588v2 PTP Boundary Clock Overview on page 25</a></li> <li>• <a href="#">IEEE 1588v2 Precision Timing Protocol (PTP) on ACX Series Universal Access Routers on page 28</a></li> <li>• <a href="#">Precision Time Protocol Overview</a></li> </ul> |
| <b>List of Sample Output</b>    | <a href="#">show ptp clock on page 784</a><br><a href="#">show ptp clock (ACX Series Routers) on page 785</a>                                                                                                                                                                                               |
| <b>Output Fields</b>            | <a href="#">Table 65 on page 783</a> lists the output fields for the <b>show ptp clock</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                 |

**Table 65: show ptp clock Output Fields**

| Field Name                        | Field Description                                                                                                                                      |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Slot Number</b>                | Number of the FPC or MIC slot.                                                                                                                         |
| <b>Two-step Clock</b>             | Whether the clock provides time information which is a combination of an event message and a subsequent general message: <b>True</b> or <b>False</b> . |
| <b>Clock Identity</b>             | Clock identity of the slave or client as defined in IEEE 1588.                                                                                         |
| <b>Total Ports on Device</b>      | Total number of PTP ports on the router.                                                                                                               |
| <b>Clock Class</b>                | Attribute of an ordinary or boundary clock that denotes the traceability of the time or frequency distributed by the grandmaster clock.                |
| <b>Clock Accuracy</b>             | Indicates the expected accuracy of a clock when it is the grandmaster, or in the event it becomes the grandmaster.                                     |
| <b>Log Variance</b>               | Represents an estimate of the variations of the local clock when it is not synchronized via PTP to another clock.                                      |
| <b>Clock Priority<sup>1</sup></b> | Priority value of the clock. Lower value takes precedence.                                                                                             |

Table 65: show ptp clock Output Fields (*continued*)

| Field Name                    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Clock Priority2</b>        | Prioritize the masters to avoid confusion when the <b>Clock Priority1</b> value is the same for different masters in a network.                                                                                                                                                                                                                                                                                                                             |
| <b>UTC Offset</b>             | Offset between International Atomic Time (TAI) and Coordinated Universal Time (UTC) times. The value is 34 seconds as of January 2012.                                                                                                                                                                                                                                                                                                                      |
| <b>Leap59</b>                 | When <b>TRUE</b> , the last minute of the current UTC day has only 59 seconds (instead of the 60 SI seconds).                                                                                                                                                                                                                                                                                                                                               |
| <b>Leap61</b>                 | When <b>TRUE</b> , the last minute of the current UTC day has 61 seconds (instead of the 60 SI seconds).                                                                                                                                                                                                                                                                                                                                                    |
| <b>Time Traceable</b>         | When <b>TRUE</b> , the timescale and the UTC offset are traceable to a primary reference.                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Frequency Traceable</b>    | When <b>TRUE</b> , frequency determining the timescale is traceable to a primary reference.                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Time Source</b>            | Time source external to the Precision Time Protocol (PTP), which provides time and/or frequency as appropriate. The time source is traceable to the international standards laboratories maintaining clocks that form the basis for the International Atomic Time (TAI) and Universal Coordinated Time (UTC) timescales. Examples of these are Global Positioning System (GPS), NTP, and National Institute of Standards and Technology (NIST) timeservers. |
| <b>Delay Req Sending Time</b> | Interval in seconds between the delay-request messages sent by the slave to the master.                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Steps Removed</b>          | Number of boundary clocks between the local clock and the foreign master clock.                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Slave-only</b>             | Set to <b>TRUE</b> , when the system is used in ordinary slave clock mode; otherwise, <b>FALSE</b> .                                                                                                                                                                                                                                                                                                                                                        |
| <b>Parent Id</b>              | EUI-64 clock identifier of the immediate upstream master clock.                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>GMC Id</b>                 | EUI-64 clock identifier of the grandmaster clock.                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>GMC Class</b>              | Denotes the grandmaster clock's traceability of the distributed time or frequency.                                                                                                                                                                                                                                                                                                                                                                          |
| <b>GMC Accuracy</b>           | Indicates the expected accuracy of the grandmaster clock.                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>GMC Variance</b>           | Represents an estimate of the variations of the grandmaster clock.                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>GMC Priority1</b>          | <b>Priority1-value</b> of the grandmaster clock.                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>GMC Priority2</b>          | <b>Priority2-value</b> of the grandmaster clock.                                                                                                                                                                                                                                                                                                                                                                                                            |

## Sample Output

### show ptp clock

```

user@host> run show ptp clock
Clock Details:

Slot Number           : 7
Default Data:

```



```

Two-step Clock      : FALSE
00:05:85:ff:fe:73:ef:d0
Total Ports on Device : 0
Clock Accuracy      : 49
Clock Priority1     : 128
UTC Offset          : 33
Leap61              : FALSE
Frequency Traceable : FALSE
Delay Req Sending Time: 0
Slave-only          : NA
Parent Data:
Parent Id           : 00:18:0b:ff:ff:20:01:62
GMC Id              : 00:18:0b:ff:ff:20:01:62
GMC Accuracy        : 254
GMC Priority1        : 0
Global Data:
UTC Offset          : 34
Leap-61             : FALSE
Freq Traceable      : FALSE
Time master         : 160

Clock Identity :
Clock Class      : 255
Log Variance     : -12944
Clock Priority2: 128
Leap59           : FALSE
Time Traceable   : FALSE
Time master      : 0
Steps Removed    : 1

GMC Class        : 52
GMC Variance     : 11952
GMC Priority2     : 0

Leap-59          : FALSE
Time traceable   : FALSE
Time Scale       : FALSE

```

#### show ptp clock (ACX Series Routers)

```

user@host> run show ptp clock
Clock Details:
Slot Number      : 0
Default Data:
Two-step Clock   : FALSE
84:18:88:ff:fe:c0:7a:00
Total Ports on Device : 0
Clock Accuracy    : 34
Clock Priority1   : 128
UTC Offset        : 0
Leap61           : FALSE
Frequency Traceable : FALSE
Delay Req Sending Time: 0
Slave-only        : NA
Parent Data:
Parent Id         : 00:00:64:ff:fe:01:01:02
GMC Id            : 00:00:64:ff:fe:01:01:02
GMC Accuracy      : 35
GMC Priority1      : 128
Global Data:
UTC Offset        : 0
Leap-61           : FALSE
Freq Traceable    : FALSE
Time source       : 16

Clock Identity :
Clock Class      : 255
Log Variance     : 15353
Clock Priority2: 128
Leap59           : FALSE
Time Traceable   : FALSE
Time Source      : 0
Steps Removed    : 0

GMC Class        : 80
GMC Variance     : 0
GMC Priority2     : 128

Leap-59          : FALSE
Time tracable    : FALSE
Time Scale       : FALSE

```

## show ptp global-information

|                                 |                                                                                                                                                                                                                                                 |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show ptp global-information                                                                                                                                                                                                                     |
| <b>Release Information</b>      | Command introduced in Junos OS Release 12.2.                                                                                                                                                                                                    |
| <b>Description</b>              | Show Precision Time Protocol (PTP)–related global information.                                                                                                                                                                                  |
| <b>Options</b>                  | This command has no options.                                                                                                                                                                                                                    |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">IEEE 1588v2 PTP Boundary Clock Overview on page 25</a></li> <li>• <a href="#">IEEE 1588v2 Precision Timing Protocol (PTP) on ACX Series Universal Access Routers on page 28</a></li> </ul> |
| <b>List of Sample Output</b>    | <a href="#">show ptp global-information on page 787</a>                                                                                                                                                                                         |
| <b>Output Fields</b>            | <a href="#">Table 66 on page 786</a> lists the output fields for the <b>show ptp global-information</b> command. Output fields are listed in the approximate order in which they appear.                                                        |

**Table 66: show ptp global-information Output Fields**

| Field Name               | Field Description                                                                                                                                                                                                                                            |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PTP Global Configuration | Configured PTP, master, and slave parameters.                                                                                                                                                                                                                |
| Domain Number            | PTP domain with values from 0 through 127. The default value is 0. Only one PTP domain is supported at any given point in time.                                                                                                                              |
| Transport Encapsulation  | Name of the encapsulation type: Ipv4.                                                                                                                                                                                                                        |
| Clock mode               | Clock mode is either boundary or ordinary.                                                                                                                                                                                                                   |
| Priority Level1          | Priority value of the clock: 0 through 255. The default is 128. The lower value takes precedence.                                                                                                                                                            |
| Priority Level2          | Priority value of the clock: 0 through 255. The default is 128. This value is used to differentiate and prioritize the master clocks when the <b>priority1-value</b> is the same for different master clocks in a network. The lower value takes precedence. |
| Unicast Negotiation      | Method by which the announce, synchronization, and delay-response packet rates are negotiated between the master and the slave or client before a PTP session is established. Unicast negotiation is enabled or disabled.                                    |
| ESMC QL From Clock Class | Denotes whether the conversion from clock class to QL is enabled or disabled.                                                                                                                                                                                |
| Clock Class/ESMC QL      | Denotes the user defined clock class to QL conversion.                                                                                                                                                                                                       |

Table 66: show ptp global-information Output Fields (*continued*)

| Field Name               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Slave Parameters</b>  | <p>Parameters configured on the slave clock:</p> <ul style="list-style-type: none"> <li>• <b>Sync Interval</b>—Log mean interval between synchronization messages requested during unicast negotiation.</li> <li>• <b>Delay Request Interval</b>—Log mean interval between delay-response messages requested during unicast negotiation.</li> <li>• <b>Announce Interval</b>—Log mean interval between announce messages requested during unicast negotiation.</li> <li>• <b>Announce Timeout</b>—Number of announce messages missed and detected by the slave, resulting in the slave identifying the master as unreachable.</li> <li>• <b>Grant Duration</b>—Length of time a unicast grant is assigned for unicast negotiation.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Master Parameters</b> | <p>Parameters configured on the master clock:</p> <ul style="list-style-type: none"> <li>• <b>Sync Interval</b>—Log mean interval between synchronization messages sent to a configured manual slave.</li> <li>• <b>Announce Interval</b>—Log mean interval between announce messages sent to a configured manual slave.</li> <li>• The minimum and maximum parameters below are the minimum and maximum values accepted during unicast negotiation from remote clients: <ul style="list-style-type: none"> <li>• <b>Min Announce Interval</b>—Log<sub>2</sub> value, which means that announce messages are sent once every eight seconds.</li> <li>• <b>Max Announce Interval</b>—Maximum acceptable interval between announce messages</li> <li>• <b>Min Sync Interval</b>—Minimum acceptable interval between synchronization messages.</li> <li>• <b>Max Sync Interval</b>—Log<sub>2</sub> value, which means that the maximum synchronization rate is 128 messages per second.</li> <li>• <b>Min Delay Response Interval</b>—Minimum acceptable interval between delay-response messages.</li> <li>• <b>Max Delay Response Interval</b>—Maximum acceptable interval between delay-response messages.</li> </ul> </li> <li>• <b>Clock Step</b>—Synchronous timing message: one-step or two-step. With two-step, a subsequent follow-up message is received after the first synchronous message.</li> </ul> |
| <b>Number of Slaves</b>  | Number of slaves configured on the router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Number of Masters</b> | Number of masters configured on the router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

## Sample Output

### show ptp global-information

```

user@host> show ptp global-information
PTP Global Configuration:
Domain number       : 0
Transport Encapsulation : IPv4
Clock mode          : Boundary
Priority Level1      : 128
Priority Level2      : 128
Unicast Negotiation  : Disabled
ESMC QL From Clock Class: Disabled
Clock Class/ESMC QL  : -
Slave Parameters:

```

Sync Interval : not applicable  
Delay Request Interval: -6 (64 packets per second)  
Announce Interval : not applicable  
Announce Timeout : 3  
Grant Duration : not applicable

Master Parameters:

Sync Interval : -6 (64 packets per second)  
Announce Interval : 1 (1 packet every 2 seconds)  
Min Announce Interval : 3 (1 packet every 8 seconds)  
Max Announce Interval : 0 (1 packet per second)  
Min Sync Interval : 0 (1 packet per second)  
Max Sync Interval : -7 (128 packets per second)  
Min Delay Response Interval : 0 (1 packet per second)  
Max Delay Response Interval : -7 (128 packets per second)  
Clock Step : one-step

Number of Slaves : 1  
Number of Masters : 1

## show ptp lock-status

|                                 |                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show ptp lock-status                                                                                                                                                                                                                                                                                        |
| <b>Release Information</b>      | Command introduced in Junos OS Release 12.2.                                                                                                                                                                                                                                                                |
| <b>Description</b>              | (ACX Series, MX80, MX240, MX480, and MX960 routers) Display information about the lock status of the slave. The output verifies whether the slave is aligned to the grandmaster (master clock) or not.                                                                                                      |
| <b>Options</b>                  | <b>detail</b> —Display detailed information about the lock status of the slave.                                                                                                                                                                                                                             |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">IEEE 1588v2 PTP Boundary Clock Overview on page 25</a></li> <li>• <a href="#">IEEE 1588v2 Precision Timing Protocol (PTP) on ACX Series Universal Access Routers on page 28</a></li> <li>• <a href="#">Precision Time Protocol Overview</a></li> </ul> |
| <b>List of Sample Output</b>    | <a href="#">show ptp lock-status on page 790</a><br><a href="#">show ptp lock-status (ACX Series) on page 790</a><br><a href="#">show ptp lock-status detail (ACX Series) on page 790</a>                                                                                                                   |
| <b>Output Fields</b>            | <a href="#">Table 67 on page 789</a> lists the output fields for the <b>show ptp lock-status</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                           |

**Table 67: show ptp lock-status Output Fields**

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                   |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Lock State</b>              | State of the slave clock with respect to its master clock: <ul style="list-style-type: none"> <li>• Freerun</li> <li>• Holdover</li> <li>• Phase Aligned</li> <li>• Acquiring</li> <li>• Initializing</li> <li>• Freq locked</li> </ul>                                                             |
| <b>Phase offset</b>            | Time offset information of a slave clock with respect to its master clock. Precision of this time offset is 1 nanosecond.                                                                                                                                                                           |
| <b>Selected Master Details</b> | Details include the following: <ul style="list-style-type: none"> <li>• <b>Upstream Master address</b>—The address of the remote master from which the slave acquires the clock.</li> <li>• <b>Slave interface</b>—The slave interface on this router corresponding to the Master above.</li> </ul> |

## Sample Output

### show ptp lock-status

```
user@host> run show ptp lock-status
Lock Status:

Lock State      : 5 (PHASE ALIGNED)
Phase offset    : 0.000000001 sec
```

### show ptp lock-status (ACX Series)

```
user@host> show ptp lock-status
Lock Status:

Lock State      : 1 (FREERUN)
Phase offset    : 0.000000869 sec
```

### show ptp lock-status detail (ACX Series)

```
user@host> show ptp lock-status detail
Lock Status:

Lock State      : 5 (PHASE ALIGNED)
Phase offset    : 0.000000030 sec

Selected Master Details:
Upstream Master address : 13.13.13.1
Slave interface        : ge-0/1/5.0
```

## show ptp statistics

|                                 |                                                                                                                                                                                                                                                 |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show ptp statistics<br><brief   detail>                                                                                                                                                                                                         |
| <b>Release Information</b>      | Command introduced in Junos OS Release 12.3.                                                                                                                                                                                                    |
| <b>Description</b>              | Display information about Precision Time Protocol (PTP) statistics.                                                                                                                                                                             |
| <b>Options</b>                  | <b>brief</b> —Display brief statistics about the operation of configured PTP clocks.<br><b>detail</b> —Display detailed statistics about the operation of configured PTP clocks.                                                                |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">IEEE 1588v2 PTP Boundary Clock Overview on page 25</a></li> <li>• <a href="#">IEEE 1588v2 Precision Timing Protocol (PTP) on ACX Series Universal Access Routers on page 28</a></li> </ul> |
| <b>List of Sample Output</b>    | <a href="#">show ptp statistics on page 792</a><br><a href="#">show ptp statistics detail on page 792</a>                                                                                                                                       |
| <b>Output Fields</b>            | Table 68 on page 791 lists the output fields for the <b>show ptp statistics</b> command. Output fields are listed in the approximate order in which they appear.                                                                                |

**Table 68: show ptp statistics Output Fields**

| Field Name     | Field Description                                                                                                                                                     |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Local Address  | IP address of the local PTP master and slave interfaces.                                                                                                              |
| Remote Address | IP address of the remote PTP master and slave interfaces.                                                                                                             |
| Role           | Function performed by an Ethernet interface configured as a slave or master.                                                                                          |
| Stream         | Stream ID uniquely identifies the connection between one master and one slave.                                                                                        |
| Received       | 1588v2 packets received by the master or slave interface.                                                                                                             |
| Transmitted    | 1588v2 packets transmitted by the master or slave interface.                                                                                                          |
| Signalling     | Packet count for signalling messages: <ul style="list-style-type: none"> <li>• Rx—Number of packets received.</li> <li>• Tx—Number of packets transmitted.</li> </ul> |
| Announce       | Packet count for announce messages: <ul style="list-style-type: none"> <li>• Rx—Number of packets received.</li> <li>• Tx—Number of packets transmitted.</li> </ul>   |

Table 68: show ptp statistics Output Fields (*continued*)

| Field Name   | Field Description                                                                                                                                                                        |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sync</b>  | Packet count for synchronization messages: <ul style="list-style-type: none"> <li>Rx—Number of packets received.</li> <li>Tx—Number of packets transmitted.</li> </ul>                   |
| <b>Delay</b> | Packet count for delay request or response messages: <ul style="list-style-type: none"> <li>Rx—Number of packets received.</li> <li>Tx—Number of packets transmitted.</li> </ul>         |
| <b>Error</b> | Packet count for signal loss errors: <ul style="list-style-type: none"> <li>Rx—Number of packets received with errors.</li> <li>Tx—Number of packets transmitted with errors.</li> </ul> |

## Sample Output

### show ptp statistics

```

user@host> show ptp statistics
Local Address  Remote Address  Role  Stream    Received  Transmitted
2.2.2.2        10.10.20.50     Slave  0         45716     22826
6.6.6.2        6.6.6.1         Master  4         24960     74880

```

### show ptp statistics detail

```

user@host> show ptp statistics detail
Local Address  Remote Address  Role  Stream    Received  Transmitted
2.2.2.2        10.10.20.50     Slave  0         47009     23470
    Signalling  Announce      Sync    Delay    Error
Rx:           5      184      23399   23426     0
Tx:          45       0         0     23426     0

6.6.6.2        6.6.6.1         Master  4         25600     76800
    Signalling  Announce      Sync    Delay    Error
Rx:           0       0         0     25600     0
Tx:           0    25600    25600   25600     0

```



## show route

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                      | <pre>show route &lt;all&gt; &lt;destination-prefix&gt; &lt;logical-system (all   logical-system-name)&gt; &lt;private&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Syntax (EX Series Switches)</b> | <pre>show route &lt;all&gt; &lt;destination-prefix&gt; &lt;private&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Release Information</b>         | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Option <b>private</b> introduced in Junos OS Release 9.5.</p> <p>Option <b>private</b> introduced in Junos OS Release 9.5 for EX Series switches.</p>                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>                 | Display the active entries in the routing tables.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>                     | <p><b>none</b>—Display brief information about all active entries in the routing tables.</p> <p><b>all</b>—(Optional) Display information about all routing tables, including private, or internal, routing tables.</p> <p><b>destination-prefix</b>—(Optional) Display active entries for the specified address or range of addresses.</p> <p><b>logical-system (all   logical-system-name)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>private</b>—(Optional) Display information only about all private, or internal, routing tables.</p> |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Related Documentation</b>       | <ul style="list-style-type: none"> <li>• <i>Example: Configuring RIP</i></li> <li>• <i>Example: Configuring RIPng</i></li> <li>• <i>Example: Configuring IS-IS</i></li> <li>• <i>Examples: Configuring Internal BGP Peering</i></li> <li>• <i>Examples: Configuring External BGP Peering</i></li> <li>• <i>Examples: Configuring OSPF Routing Policy</i></li> </ul>                                                                                                                                                                                                                                        |
| <b>List of Sample Output</b>       | <p><a href="#">show route on page 796</a></p> <p><a href="#">show route on page 796</a></p> <p><a href="#">show route destination-prefix on page 797</a></p> <p><a href="#">show route extensive on page 797</a></p>                                                                                                                                                                                                                                                                                                                                                                                       |

**Output Fields** Table 69 on page 794 describes the output fields for the **show route** command. Output fields are listed in the approximate order in which they appear.

**Table 69: show route Output Fields**

| Field Name                      | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>routing-table-name</i>       | Name of the routing table (for example, inet.0).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <i>number destinations</i>      | Number of destinations for which there are routes in the routing table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <i>number routes</i>            | <p>Number of routes in the routing table and total number of routes in the following states:</p> <ul style="list-style-type: none"> <li>• <b>active</b> (routes that are active).</li> <li>• <b>holddown</b> (routes that are in the pending state before being declared inactive). A holddown route was once the active route and is no longer the active route. The route is in the holddown state because a protocol still has interest in the route, meaning that the interest bit is set. A protocol might have its interest bit set on the previously active route because the protocol is still advertising the route. The route will be deleted after all protocols withdraw their advertisement of the route and remove their interest bit. A persistent holddown state often means that the interested protocol is not releasing its interest bit properly.</li> </ul> <p>However, if you have configured advertisement of multiple routes (with the <b>add-path</b> or <b>advertise-inactive</b> statement), the holddown bit is most likely set because BGP is advertising the route as an active route. In this case, you can ignore the holddown state because nothing is wrong.</p> <ul style="list-style-type: none"> <li>• <b>hidden</b> (routes that are not used because of a routing policy).</li> </ul> |
| <i>destination-prefix</i>       | <p>Route destination (for example:10.0.0.1/24). Sometimes the route information is presented in another format, such as:</p> <ul style="list-style-type: none"> <li>• <b>MPLS-label</b> (for example, 80001).</li> <li>• <b>interface-name</b> (for example, ge-1/0/2).</li> <li>• <b>neighbor-address:control-word-status:encapsulation type:vc-id:source</b> (Layer 2 circuit only. For example, 10.1.1.195:NoCtrlWord:1:1:Local/96): <ul style="list-style-type: none"> <li>• <b>neighbor-address</b>—Address of the neighbor.</li> <li>• <b>control-word-status</b>—Whether the use of the control word has been negotiated for this virtual circuit: <b>NoCtrlWord</b> or <b>CtrlWord</b>.</li> <li>• <b>encapsulation type</b>—Type of encapsulation, represented by a number: (1) Frame Relay DLCI, (2) ATM AAL5 VCC transport, (3) ATM transparent cell transport, (4) Ethernet, (5) VLAN Ethernet, (6) HDLC, (7) PPP, (8) ATM VCC cell transport, (10) ATM VPC cell transport.</li> <li>• <b>vc-id</b>—Virtual circuit identifier.</li> <li>• <b>source</b>—Source of the advertisement: <b>Local</b> or <b>Remote</b>.</li> </ul> </li> </ul>                                                                                                                                                                      |
| <b>[ protocol, preference ]</b> | <p>Protocol from which the route was learned and the preference value for the route.</p> <ul style="list-style-type: none"> <li>• <b>+</b>—A plus sign indicates the active route, which is the route installed from the routing table into the forwarding table.</li> <li>• <b>-</b>—A hyphen indicates the last active route.</li> <li>• <b>*</b>—An asterisk indicates that the route is both the active and the last active route. An asterisk before a <b>to</b> line indicates the best subpath to the route.</li> </ul> <p>In every routing metric except for the BGP <b>LocalPref</b> attribute, a lesser value is preferred. In order to use common comparison routines, Junos OS stores the 1's complement of the <b>LocalPref</b> value in the <b>Preference2</b> field. For example, if the <b>LocalPref</b> value for Route 1 is 100, the <b>Preference2</b> value is -101. If the <b>LocalPref</b> value for Route 2 is 155, the <b>Preference2</b> value is -156. Route 2 is preferred because it has a higher <b>LocalPref</b> value and a lower <b>Preference2</b> value.</p>                                                                                                                                                                                                                               |

Table 69: show route Output Fields (*continued*)

| Field Name                                        | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>weeks:days</i><br><i>hours:minutes:seconds</i> | How long the route been known (for example, <b>2w4d 13:11:14</b> , or 2 weeks, 4 days, 13 hours, 11 minutes, and 14 seconds).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>metric</b>                                     | Cost value of the indicated route. For routes within an AS, the cost is determined by the IGP and the individual protocol metrics. For external routes, destinations, or routing domains, the cost is determined by a preference value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>localpref</b>                                  | Local preference value included in the route.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>from</b>                                       | Interface from which the route was received.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>AS path</b>                                    | <p>AS path through which the route was learned. The letters at the end of the AS path indicate the path origin, providing an indication of the state of the route at the point at which the AS path originated:</p> <ul style="list-style-type: none"> <li>• <b>I</b>—IGP.</li> <li>• <b>E</b>—EGP.</li> <li>• <b>?</b>—Incomplete; typically, the AS path was aggregated.</li> </ul> <p>When AS path numbers are included in the route, the format is as follows:</p> <ul style="list-style-type: none"> <li>• <b>[ ]</b>—Brackets enclose the local AS number associated with the AS path if more than one AS number is configured on the routing device, or if AS path prepending is configured.</li> <li>• <b>{ }</b>—Braces enclose AS sets, which are groups of AS numbers in which the order does not matter. A set commonly results from route aggregation. The numbers in each AS set are displayed in ascending order.</li> <li>• <b>( )</b>—Parentheses enclose a confederation.</li> <li>• <b>( [ ] )</b>—Parentheses and brackets enclose a confederation set.</li> </ul> <p><b>NOTE:</b> In Junos OS Release 10.3 and later, the AS path field displays an unrecognized attribute and associated hexadecimal value if BGP receives attribute 128 (attribute set) and you have not configured an independent domain in any routing instance.</p> |
| <b>validation-state</b>                           | <p>(BGP-learned routes) Validation status of the route:</p> <ul style="list-style-type: none"> <li>• <b>Invalid</b>—Indicates that the prefix is found, but either the corresponding AS received from the EBGP peer is not the AS that appears in the database, or the prefix length in the BGP update message is longer than the maximum length permitted in the database.</li> <li>• <b>Unknown</b>—Indicates that the prefix is not among the prefixes or prefix ranges in the database.</li> <li>• <b>Valid</b>—Indicates that the prefix and autonomous system pair are found in the database.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>to</b>                                         | <p>Next hop to the destination. An angle bracket (&gt;) indicates that the route is the selected route.</p> <p>If the destination is <b>Discard</b>, traffic is dropped.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

Table 69: show route Output Fields (*continued*)

| Field Name | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>via</b> | <p>Interface used to reach the next hop. If there is more than one interface available to the next hop, the interface that is actually used is followed by the word <b>Selected</b>. This field can also contain the following information:</p> <ul style="list-style-type: none"> <li>• <b>Weight</b>—Value used to distinguish primary, secondary, and fast reroute backup routes. Weight information is available when MPLS label-switched path (LSP) link protection, node-link protection, or fast reroute is enabled, or when the standby state is enabled for secondary paths. A lower weight value is preferred. Among routes with the same weight value, load balancing is possible.</li> <li>• <b>Balance</b>—Balance coefficient indicating how traffic of unequal cost is distributed among next hops when a routing device is performing unequal-cost load balancing. This information is available when you enable BGP multipath load balancing.</li> <li>• <b>lsp-path-name</b>—Name of the LSP used to reach the next hop.</li> <li>• <b>label-action</b>—MPLS label and operation occurring at the next hop. The operation can be <b>pop</b> (where a label is removed from the top of the stack), <b>push</b> (where another label is added to the label stack), or <b>swap</b> (where a label is replaced by another label). For VPNs, expect to see multiple <b>push</b> operations, corresponding to the inner and outer labels required for VPN routes (in the case of a direct PE-to-PE connection, the VPN route would have the inner label push only).</li> </ul> |

## Sample Output

### show route

```

user@host> show route
inet.0: 11 destinations, 12 routes (11 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

1:65500:1:10.0.0.20/240
    *[MVPN/70] 19:53:41, metric2 1
    Indirect
1:65500:1:10.0.0.40/240
    *[BGP/170] 19:53:29, localpref 100, from 10.0.0.30
    AS path: I
    > to 10.0.24.4 via lt-0/3/0.24, label-switched-path toD
    [BGP/170] 19:53:26, localpref 100, from 10.0.0.33
    AS path: I
    > to 10.0.24.4 via lt-0/3/0.24, label-switched-path toD
1:65500:1:10.0.0.60/240
    *[BGP/170] 19:53:29, localpref 100, from 10.0.0.30
    AS path: I
    > to 10.0.28.8 via lt-0/3/0.28, label-switched-path toF
    [BGP/170] 19:53:25, localpref 100, from 10.0.0.33
    AS path: I
    > to 10.0.28.8 via lt-0/3/0.28, label-switched-path toF

```

### show route

The following sample output shows a VPN route with composite next hops enabled. The first **Push** operation corresponds to the outer label. The second **Push** operation corresponds to the inner label.

```

user@host> show route 70.0.0.0

13979:665001.inet.0: 871 destinations, 3556 routes (871 active, 0 holddown, 0
hidden)

```

+ = Active Route, - = Last Active, \* = Both

```
70.0.0.0/24      @[BGP/170] 00:28:32, localpref 100, from 10.9.9.160
                  AS path: 13980 ?
                  > to 10.100.0.42 via ae2.0, Push 16, Push 300368(top)
                  [BGP/170] 00:28:28, localpref 100, from 10.9.9.169
                  AS path: 13980 ?
                  > to 10.100.0.42 via ae2.0, Push 126016, Push 300368(top)
#[Multipath/255] 00:28:28, metric2 102
                  > to 10.100.0.42 via ae2.0, Push 16, Push 300368(top)
                  to 10.100.0.42 via ae2.0, Push 16, Push 300368(top)
```

### show route destination-prefix

```
user@host> show route 172.16.0.0/12
```

```
inet.0: 10 destinations, 10 routes (9 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both
```

```
172.16.0.0/12      *[Static/5] 2w4d 12:54:27
                  > to 192.168.167.254 via fxp0.0
```

### show route extensive

```
user@host> show route extensive
```

```
v1.mvpn.0: 5 destinations, 8 routes (5 active, 1 holddown, 0 hidden)
1:65500:1:10.0.0.40/240 (1 entry, 1 announced)
  *BGP Preference: 170/-101
    PMSI: Flags 0x0: Label[0:0:0]: PIM-SM: Sender 10.0.0.40 Group 225.1.1.1

    Next hop type: Indirect
    Address: 0x92455b8
    Next-hop reference count: 2
    Source: 10.0.0.30
    Protocol next hop: 10.0.0.40
    Indirect next hop: 2 no-forward
    State: <Active Int Ext>
      Local AS: 65500 Peer AS: 65500
    Age: 3 Metric2: 1
    Task: BGP_65500.10.0.0.30+179
    Announcement bits (2): 0-PIM.v1 1-mvpn global task
    AS path: I (Originator) Cluster list: 10.0.0.30
    AS path: Originator ID: 10.0.0.40
    Communities: target:65520:100
    Import Accepted
    Localpref: 100
    Router ID: 10.0.0.30
    Primary Routing Table bgp.mvpn.0
    Indirect next hops: 1
      Protocol next hop: 10.0.0.40 Metric: 1
      Indirect next hop: 2 no-forward
      Indirect path forwarding next hops: 1
        Next hop type: Router
        Next hop: 10.0.24.4 via lt-0/3/0.24 weight 0x1
      10.0.0.40/32 Originating RIB: inet.3
        Metric: 1 Node path count: 1
        Forwarding nexthops: 1
          Nexthop: 10.0.24.4 via lt-0/3/0.24
```

## show route active-path

---

|                                    |                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                      | <code>show route active-path</code><br><code>&lt;brief   detail   extensive   terse&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                                                |
| <b>Syntax (EX Series Switches)</b> | <code>show route active-path</code><br><code>&lt;brief   detail   extensive   terse&gt;</code>                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>         | Command introduced in Junos OS Release 8.0.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                       |
| <b>Description</b>                 | Display all active routes for destinations. An active route is a route that is selected as the best path. Inactive routes are not displayed.                                                                                                                                                                                                                                            |
| <b>Options</b>                     | <b>none</b> —Display all active routes.<br><br><b>brief   detail   extensive   terse</b> —(Optional) Display the specified level of output. If you do not specify a level of output, the system defaults to <b>brief</b> .<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>List of Sample Output</b>       | <a href="#">show route active-path on page 798</a><br><a href="#">show route active-path brief on page 799</a><br><a href="#">show route active-path detail on page 799</a><br><a href="#">show route active-path extensive on page 800</a><br><a href="#">show route active-path terse on page 802</a>                                                                                 |
| <b>Output Fields</b>               | For information about output fields, see the output field tables for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                                                                                                          |

## Sample Output

### show route active-path

```
user@host> show route active-path

inet.0: 7 destinations, 7 routes (6 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

10.255.70.19/32    *[Direct/0] 21:33:52
                  > via lo0.0
10.255.71.50/32    *[IS-IS/15] 00:18:13, metric 10
                  > to 100.1.2.1 via so-2/1/3.0
100.1.2.0/24      *[Direct/0] 00:18:36
                  > via so-2/1/3.0
100.1.2.2/32      *[Local/0] 00:18:41
                  Local via so-2/1/3.0
192.168.64.0/21   *[Direct/0] 21:33:52
```

```

> via fxp0.0
192.168.70.19/32  *Local/0] 21:33:52
                  Local via fxp0.0

```

### show route active-path brief

The output for the **show route active-path brief** command is identical to that for the **show route active-path** command. For sample output, see [show route active-path on page 798](#).

### show route active-path detail

```

user@host> show route active-path detail

inet.0: 7 destinations, 7 routes (6 active, 0 holddown, 1 hidden)

10.255.70.19/32 (1 entry, 1 announced)
  *Direct Preference: 0
    Next hop type: Interface
    Next-hop reference count: 3
    Next hop: via lo0.0, selected
    State: <Active Int>
    Local AS: 200
    Age: 21:37:10
    Task: IF
    Announcement bits (3): 2-IS-IS 5-Resolve tree 2 6-Resolve tree 3

    AS path: I

10.255.71.50/32 (1 entry, 1 announced)
  *IS-IS Preference: 15
    Level: 1
    Next hop type: Router, Next hop index: 397
    Next-hop reference count: 4
    Next hop: 100.1.2.1 via so-2/1/3.0, selected
    State: <Active Int>
    Local AS: 200
    Age: 21:31 Metric: 10
    Task: IS-IS
    Announcement bits (4): 0-KRT 2-IS-IS 5-Resolve tree 2 6-Resolve
tree 3
    AS path: I

100.1.2.0/24 (1 entry, 1 announced)
  *Direct Preference: 0
    Next hop type: Interface
    Next-hop reference count: 3
    Next hop: via so-2/1/3.0, selected
    State: <Active Int>
    Local AS: 200
    Age: 21:54
    Task: IF
    Announcement bits (3): 2-IS-IS 5-Resolve tree 2 6-Resolve tree 3

    AS path: I

100.1.2.2/32 (1 entry, 1 announced)
  *Local Preference: 0
    Next hop type: Local
    Next-hop reference count: 11
    Interface: so-2/1/3.0
    State: <Active NoReadvrt Int>

```

```
Local AS: 200
Age: 21:59
Task: IF
Announcement bits (2): 5-Resolve tree 2 6-Resolve tree 3
AS path: I

192.168.64.0/21 (1 entry, 1 announced)
*Direct Preference: 0
Next hop type: Interface
Next-hop reference count: 3
Next hop: via fxp0.0, selected
State: <Active Int>
Local AS: 200
Age: 21:37:10
Task: IF
Announcement bits (2): 5-Resolve tree 2 6-Resolve tree 3
AS path: I

192.168.70.19/32 (1 entry, 1 announced)
*Local Preference: 0
Next hop type: Local
Next-hop reference count: 11
Interface: fxp0.0
State: <Active NoReadvrt Int>
Local AS: 200
Age: 21:37:10
Task: IF
Announcement bits (2): 5-Resolve tree 2 6-Resolve tree 3
AS path: I
```

#### show route active-path extensive

```
user@host> show route active-path extensive

inet.0: 7 destinations, 7 routes (6 active, 0 holddown, 1 hidden)
10.255.70.19/32 (1 entry, 1 announced)
TSI:
IS-IS level 1, LSP fragment 0
IS-IS level 2, LSP fragment 0
*Direct Preference: 0
Next hop type: Interface
Next-hop reference count: 3
Next hop: via lo0.0, selected
State: <Active Int>
Local AS: 200
Age: 21:39:47
Task: IF
Announcement bits (3): 2-IS-IS 5-Resolve tree 2 6-Resolve tree 3
AS path: I

10.255.71.50/32 (1 entry, 1 announced)
TSI:
KRT in-kernel 10.255.71.50/32 -> {100.1.2.1}
IS-IS level 2, LSP fragment 0
*IS-IS Preference: 15
Level: 1
Next hop type: Router, Next hop index: 397
Next-hop reference count: 4
Next hop: 100.1.2.1 via so-2/1/3.0, selected
State: <Active Int>
```



```

Local AS: 200
Age: 24:08 Metric: 10
Task: IS-IS
Announcement bits (4): 0-KRT 2-IS-IS 5-Resolve tree 2 6-Resolve
tree 3
AS path: I

100.1.2.0/24 (1 entry, 1 announced)
TSI:
IS-IS level 1, LSP fragment 0
IS-IS level 2, LSP fragment 0
*Direct Preference: 0
Next hop type: Interface
Next-hop reference count: 3
Next hop: via so-2/1/3.0, selected
State: <Active Int>
Local AS: 200
Age: 24:31
Task: IF
Announcement bits (3): 2-IS-IS 5-Resolve tree 2 6-Resolve tree 3
AS path: I

100.1.2.2/32 (1 entry, 1 announced)
*Local Preference: 0
Next hop type: Local
Next-hop reference count: 11
Interface: so-2/1/3.0
State: <Active NoReadvrt Int>
Local AS: 200
Age: 24:36
Task: IF
Announcement bits (2): 5-Resolve tree 2 6-Resolve tree 3
AS path: I

192.168.64.0/21 (1 entry, 1 announced)
*Direct Preference: 0
Next hop type: Interface
Next-hop reference count: 3
Next hop: via fxp0.0, selected
State: <Active Int>
Local AS: 200
Age: 21:39:47
Task: IF
Announcement bits (2): 5-Resolve tree 2 6-Resolve tree 3
AS path: I

192.168.70.19/32 (1 entry, 1 announced)
*Local Preference: 0
Next hop type: Local
Next-hop reference count: 11
Interface: fxp0.0
State: <Active NoReadvrt Int>
Local AS: 200
Age: 21:39:47
Task: IF
Announcement bits (2): 5-Resolve tree 2 6-Resolve tree 3
AS path: I

```

**show route active-path terse**

```
user@host> show route active-path terse
```

```
inet.0: 7 destinations, 7 routes (6 active, 0 holddown, 1 hidden)
```

```
+ = Active Route, - = Last Active, * = Both
```

| A | Destination      | P | Prf | Metric 1 | Metric 2 | Next hop    | AS path |
|---|------------------|---|-----|----------|----------|-------------|---------|
| * | 10.255.70.19/32  | D | 0   |          |          | >1o0.0      |         |
| * | 10.255.71.50/32  | I | 15  | 10       |          | >100.1.2.1  |         |
| * | 100.1.2.0/24     | D | 0   |          |          | >so-2/1/3.0 |         |
| * | 100.1.2.2/32     | L | 0   |          |          | Local       |         |
| * | 192.168.64.0/21  | D | 0   |          |          | >fxp0.0     |         |
| * | 192.168.70.19/32 | L | 0   |          |          | Local       |         |

## show route advertising-protocol

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>show route advertising-protocol <i>protocol neighbor-address</i></code><br><code>&lt;brief   detail   extensive   terse&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Description</b>              | Display the routing information as it has been prepared for advertisement to a particular neighbor of a particular dynamic routing protocol.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                  | <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b><i>neighbor-address</i></b>—Address of the neighboring router to which the route entry is being transmitted.</p> <p><b><i>protocol</i></b>—Protocol transmitting the route:</p> <ul style="list-style-type: none"> <li>• <b>bgp</b>—Border Gateway Protocol</li> <li>• <b>dvmrp</b>—Distance Vector Multicast Routing Protocol</li> <li>• <b>msdp</b>—Multicast Source Discovery Protocol</li> <li>• <b>pim</b>—Protocol Independent Multicast</li> <li>• <b>rip</b>—Routing Information Protocol</li> <li>• <b>ripng</b>—Routing Information Protocol next generation</li> </ul> |
| <b>Additional Information</b>   | Routes displayed are routes that the routing table has exported into the routing protocol and that have been filtered by the associated protocol's <b>export</b> routing policy statements.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Example: Configuring the MED Attribute Directly</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>List of Sample Output</b>    | <a href="#">show route advertising-protocol bgp (Layer 3 VPN) on page 805</a><br><a href="#">show route advertising-protocol bgp detail on page 806</a><br><a href="#">show route advertising-protocol bgp detail (Layer 2 VPN) on page 806</a><br><a href="#">show route advertising-protocol bgp detail (Layer 3 VPN) on page 806</a><br><a href="#">show route advertising-protocol bgp extensive all (Next Hop Self with RIB-out IP Address) on page 806</a>                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Output Fields</b>            | <a href="#">Table 70 on page 804</a> lists the output fields for the <b>show route advertising-protocol</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

Table 70: show route advertising-protocol Output Fields

| Field Name                                   | Field Description                                                                                                                                                                                                                                                                                                                                                                                             | Level of Output         |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <i>routing-table-name</i>                    | Name of the routing table—for example, inet.0.                                                                                                                                                                                                                                                                                                                                                                | All levels              |
| <i>number destinations</i>                   | Number of destinations for which there are routes in the routing table.                                                                                                                                                                                                                                                                                                                                       | All levels              |
| <i>number routes</i>                         | Number of routes in the routing table and total number of routes in the following states: <ul style="list-style-type: none"> <li>• <b>active</b> (routes that are active)</li> <li>• <b>holddown</b> (routes that are in the pending state before being declared inactive)</li> <li>• <b>hidden</b> (routes that are not used because of a routing policy)</li> </ul>                                         | All levels              |
| <b>Prefix</b>                                | Destination prefix.                                                                                                                                                                                                                                                                                                                                                                                           | <b>brief none</b>       |
| <i>destination-prefix (entry, announced)</i> | Destination prefix. The <b>entry</b> value is the number of routes for this destination, and the <b>announced</b> value is the number of routes being announced for this destination.                                                                                                                                                                                                                         | <b>detail extensive</b> |
| <b>BGP group and type</b>                    | BGP group name and type ( <b>Internal</b> or <b>External</b> ).                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive</b> |
| <b>Route Distinguisher</b>                   | Unique 64-bit prefix augmenting each IP subnet.                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive</b> |
| <b>Advertised Label</b>                      | Incoming label advertised by the LDP. When an IP packet enters a label-switched path (LSP), the ingress router examines the packet and assigns it a label based on its destination, placing the label in the packet's header. The label transforms the packet from one that is forwarded based on its IP routing information to one that is forwarded based on information associated with the label.         | <b>detail extensive</b> |
| <b>Label-Base, range</b>                     | First label in a block of labels and label block size. A remote PE router uses this first label when sending traffic toward the advertising PE router.                                                                                                                                                                                                                                                        | <b>detail extensive</b> |
| <b>VPN Label</b>                             | Virtual private network (VPN) label. Packets are sent between CE and PE routers by advertising VPN labels. VPN labels transit over either an RSVP or an LDP LSP tunnel.                                                                                                                                                                                                                                       | <b>detail extensive</b> |
| <b>Nexthop</b>                               | Next hop to the destination. An angle bracket (>) indicates that the route is the selected route.<br><br>If the next-hop advertisement to the peer is <b>Self</b> , and the RIB-out next hop is a specific IP address, the RIB-out IP address is included in the extensive output. See <a href="#">show route advertising-protocol bgp extensive all (Next Hop Self with RIB-out IP Address)</a> on page 806. | All levels              |
| <b>MED</b>                                   | Multiple exit discriminator value included in the route.                                                                                                                                                                                                                                                                                                                                                      | <b>brief</b>            |
| <b>Lclpref or Localpref</b>                  | Local preference value included in the route.                                                                                                                                                                                                                                                                                                                                                                 | All levels              |

Table 70: show route advertising-protocol Output Fields (*continued*)

| Field Name                 | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Level of Output         |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>AS path</b>             | <p>AS path through which the route was learned. The letters at the end of the AS path indicate the path origin, providing an indication of the state of the route at the point at which the AS path originated:</p> <ul style="list-style-type: none"> <li>• <b>I</b>—IGP.</li> <li>• <b>E</b>—EGP.</li> <li>• <b>?</b>—Incomplete; typically, the AS path was aggregated.</li> </ul> <p>When AS path numbers are included in the route, the format is as follows:</p> <ul style="list-style-type: none"> <li>• <b>[ ]</b>—Brackets enclose the local AS number associated with the AS path if configured on the router, or if AS path prepending is configured.</li> <li>• <b>{ }</b>—Braces enclose AS sets, which are groups of AS numbers in which the order does not matter. A set commonly results from route aggregation. The numbers in each AS set are displayed in ascending order.</li> <li>• <b>( )</b>—Parentheses enclose a confederation.</li> <li>• <b>( [ ] )</b>—Parentheses and brackets enclose a confederation set.</li> </ul> <p><b>NOTE:</b> In Junos OS Release 10.3 and later, the AS path field displays an unrecognized attribute and associated hexadecimal value if BGP receives attribute 128 (attribute set) and you have not configured an independent domain in any routing instance.</p> | All levels              |
| <b>Communities</b>         | Community path attribute for the route. See the output field table for the <a href="#">show route detail</a> command for all possible values for this field.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive</b> |
| <b>AIGP</b>                | Accumulated interior gateway protocol (AIGP) BGP attribute.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive</b> |
| <b>Attrset AS</b>          | Number, local preference, and path of the autonomous system (AS) that originated the route. These values are stored in the <b>Attrset</b> attribute at the originating router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive</b> |
| <b>Layer2-info: encaps</b> | Layer 2 encapsulation (for example, VPLS).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive</b> |
| <b>control flags</b>       | Control flags: <b>none</b> or <b>Site Down</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive</b> |
| <b>mtu</b>                 | Maximum transmission unit (MTU) of the Layer 2 circuit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive</b> |

## Sample Output

### show route advertising-protocol bgp (Layer 3 VPN)

```

user@host> show route advertising-protocol bgp 10.255.14.171
VPN-A.inet.0: 6 destinations, 6 routes (6 active, 0 holddown, 0 hidden)
Prefix                Nexthop                MED    Lclpref AS path
10.255.14.172/32      Self                    1       100 I
VPN-B.inet.0: 6 destinations, 6 routes (6 active, 0 holddown, 0 hidden)
Prefix                Nexthop                MED    Lclpref AS path
10.255.14.181/32      Self                    2       100 I

```

### show route advertising-protocol bgp detail

```
user@host> show route advertising-protocol bgp 111.222.1.3 detail
bgp20.inet.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
111.222.1.11/32 (1 entry, 1 announced)
  BGP group pe-pe type Internal
    Route Distinguisher: 111.255.14.11:69
    Advertised Label: 100000
    next hop: Self
    Localpref: 100
    AS path: 2 I
    Communities: target:69:20
    AIGP 210
111.8.0.0/16 (1 entry, 1 announced)
  BGP group pe-pe type Internal
    Route Distinguisher: 111.255.14.11:69
    Advertised Label: 100000
    Next hop: Self
    Localpref: 100
    AS path: 2 I
    Communities: target:69:20
    AIGP 210
```

### show route advertising-protocol bgp detail (Layer 2 VPN)

```
user@host> show route advertising-protocol bgp 192.168.24.1 detail
vpn-a.l2vpn.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)
192.168.16.1:1:1:1/96 (1 entry, 1 announced)
  BGP group int type Internal
    Route Distinguisher: 192.168.16.1:1
    Label-base : 32768, range : 3
    Nexthop: Self
    Localpref: 100
    AS path: I
    Communities: target:65412:100
    AIGP 210
    Layer2-info: encaps:VLAN, control flags:, mtu:
```

### show route advertising-protocol bgp detail (Layer 3 VPN)

```
user@host> show route advertising-protocol bgp 10.255.14.176 detail
vpna.inet.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
* 10.49.0.0/30 (1 entry, 1 announced)
  BGP group ibgp type Internal
    Route Distinguisher: 10.255.14.174:2
    VPN Label: 101264
    Nexthop: Self
    Localpref: 100
    AS path: I
    Communities: target:200:100
    AIGP 210
    AttrSet AS: 100
      Localpref: 100
      AS path: I
  ...
```

### show route advertising-protocol bgp extensive all (Next Hop Self with RIB-out IP Address)

```
user@host> show route advertising-protocol bgp 200.0.0.2 170.0.1.0/24 extensive all
inet.0: 13 destinations, 19 routes (13 active, 0 holddown, 6 hidden)
  170.0.1.0/24 (2 entries, 1 announced)
```

```
BGP group eBGP-INTEROP type External
  Nexthop: Self (rib-out 10.100.3.2)
  AS path: [4713] 200 I
...
```

## show route all

---

|                                    |                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                      | <code>show route all</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                                                                         |
| <b>Syntax (EX Series Switches)</b> | <code>show route all</code>                                                                                                                                                                                                                                                                                                                   |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                         |
| <b>Description</b>                 | Display information about all routes in all routing tables, including private, or internal, tables.                                                                                                                                                                                                                                           |
| <b>Options</b>                     | <b>none</b> —Display information about all routes in all routing tables, including private, or internal, tables.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.                                                                 |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                          |
| <b>List of Sample Output</b>       | <a href="#">show route all on page 808</a>                                                                                                                                                                                                                                                                                                    |
| <b>Output Fields</b>               | In Junos OS Release 9.5 and later, only the output fields for the <b>show route all</b> command display all routing tables, including private, or hidden, routing tables. The output field table of the <a href="#">show route</a> command does not display entries for private, or hidden, routing tables in Junos OS Release 9.5 and later. |

## Sample Output

### show route all

The following example displays a snippet of output from the **show route** command and then displays the same snippet of output from the **show route all** command:

```
user@host> show route
mpls.0: 7 destinations, 7 routes (5 active, 0 holddown, 2 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both
0          *[MPLS/0] 2d 02:24:39, metric 1
            Receive
1          *[MPLS/0] 2d 02:24:39, metric 1
            Receive
2          *[MPLS/0] 2d 02:24:39, metric 1
            Receive
800017     *[VPLS/7] 1d 14:00:16
            > via vt-3/2/0.32769, Pop
800018     *[VPLS/7] 1d 14:00:26
            > via vt-3/2/0.32772, Pop

user@host> show route all
mpls.0: 7 destinations, 7 routes (5 active, 0 holddown, 2 hidden)
Restart Complete
```



```
+ = Active Route, - = Last Active, * = Both
0          *[MPLS/0] 2d 02:19:12, metric 1
           Receive
1          *[MPLS/0] 2d 02:19:12, metric 1
           Receive
2          *[MPLS/0] 2d 02:19:12, metric 1
           Receive
800017     *[VPLS/7] 1d 13:54:49
           > via vt-3/2/0.32769, Pop
800018     *[VPLS/7] 1d 13:54:59
           > via vt-3/2/0.32772, Pop
vt-3/2/0.32769 [VPLS/7] 1d 13:54:49
              Unusable
vt-3/2/0.32772 [VPLS/7] 1d 13:54:59
              Unusable
```

## show route aspath-regex

---

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                      | <code>show route aspath-regex <i>regular-expression</i></code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Syntax (EX Series Switches)</b> | <code>show route aspath-regex <i>regular-expression</i></code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>                 | Display the entries in the routing table that match the specified autonomous system (AS) path regular expression.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Options</b>                     | <p><b><i>regular-expression</i></b>—Regular expression that matches an entire AS path.</p> <p><b><i>logical-system (all   logical-system-name)</i></b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Additional Information</b>      | <p>You can specify a regular expression as:</p> <ul style="list-style-type: none"><li>• An individual AS number</li><li>• A period wildcard used in place of an AS number</li><li>• An AS path regular expression that is enclosed in parentheses</li></ul> <p>You also can include the operators described in the table of AS path regular expression operators in the <i>Junos Policy Framework Configuration Guide</i>. The following list summarizes these operators:</p> <ul style="list-style-type: none"><li>• <b><i>{m,n}</i></b>—At least <i>m</i> and at most <i>n</i> repetitions of the AS path term.</li><li>• <b><i>{m}</i></b>—Exactly <i>m</i> repetitions of the AS path term.</li><li>• <b><i>{m,}</i></b>—<i>m</i> or more repetitions of the AS path term.</li><li>• <b><i>*</i></b>—Zero or more repetitions of an AS path term.</li><li>• <b><i>+</i></b>—One or more repetitions of an AS path term.</li><li>• <b><i>?</i></b>—Zero or one repetition of an AS path term.</li><li>• <b><i>aspath_term   aspath_term</i></b>—Match one of the two AS path terms.</li></ul> <p>When you specify more than one AS number or path term, or when you include an operator in the regular expression, enclose the entire regular expression in quotation marks. For example, to match any path that contains AS number 234, specify the following command:</p> <pre>show route aspath-regex ". * 234 . *"</pre> |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

|                       |                                                                                                                                                                                    |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Related Documentation | <ul style="list-style-type: none"> <li>• <i>Example: Using AS Path Regular Expressions</i></li> </ul>                                                                              |
| List of Sample Output | <a href="#">show route aspath-regex (Matching a Specific AS Number) on page 811</a><br><a href="#">show route aspath-regex (Matching Any Path with Two AS Numbers) on page 811</a> |
| Output Fields         | For information about output fields, see the output field table for the <a href="#">show route</a> command.                                                                        |

## Sample Output

### show route aspath-regex (Matching a Specific AS Number)

```

user@host> show route aspath-regex 65477
inet.0: 46411 destinations, 46411 routes (46409 active, 0 holddown, 2 hidden)
+ = Active Route, - = Last Active, * = Both

111.222.1.0/25      *[BGP/170] 00:08:48, localpref 100, from 111.222.2.24
                   AS Path: [65477] ({65488 65535}) IGP
                   to 111.222.18.225 via fpa0.0(111.222.18.233)
111.222.1.128/25   *[IS-IS/15] 09:15:37, metric 37, tag 1
                   to 111.222.18.225 via fpa0.0(111.222.18.233)
                   [BGP/170] 00:08:48, localpref 100, from 111.222.2.24
                   AS Path: [65477] ({65488 65535}) IGP
                   to 111.222.18.225 via fpa0.0(111.222.18.233)
...

```

### show route aspath-regex (Matching Any Path with Two AS Numbers)

```

user@host> show route aspath-regex ?.* 234 3561.*?
inet.0: 46351 destinations, 46351 routes (46349 active, 0 holddown, 2 hidden)
+ = Active Route, - = Last Active, * = Both

9.20.0.0/17        *[BGP/170] 01:35:00, localpref 100, from 131.103.20.49
                   AS Path: [666] 234 3561 2685 2686 Incomplete
                   to 192.156.169.1 via 192.156.169.14(so-0/0/0)
12.10.231.0/24     *[BGP/170] 01:35:00, localpref 100, from 131.103.20.49
                   AS Path: [666] 234 3561 5696 7369 IGP
                   to 192.156.169.1 via 192.156.169.14(so-0/0/0)
24.64.32.0/19      *[BGP/170] 01:34:59, localpref 100, from 131.103.20.49
                   AS Path: [666] 234 3561 6327 IGP
                   to 192.156.169.1 via 192.156.169.14(so-0/0/0)
...

```

## show route best

---

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                      | <code>show route best <i>destination-prefix</i></code><br><code>&lt;brief   detail   extensive   terse&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                                                      |
| <b>Syntax (EX Series Switches)</b> | <code>show route best <i>destination-prefix</i></code><br><code>&lt;brief   detail   extensive   terse&gt;</code>                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                                            |
| <b>Description</b>                 | Display the route in the routing table that is the best route to the specified address or range of addresses. The best route is the longest matching route.                                                                                                                                                                                                                                                      |
| <b>Options</b>                     | <b>brief   detail   extensive   terse</b> —(Optional) Display the specified level of output. If you do not specify a level of output, the system defaults to <b>brief</b> .<br><br><b><i>destination-prefix</i></b> —Address or range of addresses.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>List of Sample Output</b>       | <a href="#">show route best on page 812</a><br><a href="#">show route best detail on page 813</a><br><a href="#">show route best extensive on page 814</a><br><a href="#">show route best terse on page 814</a>                                                                                                                                                                                                  |
| <b>Output Fields</b>               | For information about output fields, see the output field tables for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                                                                                                                                   |

## Sample Output

### show route best

```
user@host> show route best 10.255.70.103
inet.0: 24 destinations, 25 routes (23 active, 0 holddown, 1 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both
10.255.70.103/32    *[OSPF/10] 1d 13:19:20, metric 2
                  > to 10.31.1.6 via ge-3/1/0.0
                  via so-0/3/0.0

inet.3: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both
10.255.70.103/32    *[RSVP/7] 1d 13:20:13, metric 2
                  > via so-0/3/0.0, label-switched-path green-r1-r3

private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)
```

```

+ = Active Route, - = Last Active, * = Both
10.0.0.0/8      *[Direct/0] 2d 01:43:34
                 > via fxp2.0
                 [Direct/0] 2d 01:43:34
                 > via fxp1.0

```

### show route best detail

```

user@host> show route best 10.255.70.103 detail
inet.0: 24 destinations, 25 routes (23 active, 0 holddown, 1 hidden)
Restart Complete
10.255.70.103/32 (1 entry, 1 announced)
    *OSPF Preference: 10
        Next-hop reference count: 9
        Next hop: 10.31.1.6 via ge-3/1/0.0, selected
        Next hop: via so-0/3/0.0
        State: <Active Int>
        Local AS: 69
        Age: 1d 13:20:06 Metric: 2
        Area: 0.0.0.0
        Task: OSPF
        Announcement bits (2): 0-KRT 3-Resolve tree 2
        AS path: I

inet.3: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
Restart Complete
10.255.70.103/32 (1 entry, 1 announced)
    State: <FlashAll>
    *RSVP Preference: 7
        Next-hop reference count: 5
        Next hop: via so-0/3/0.0 weight 0x1, selected
        Label-switched-path green-r1-r3
        Label operation: Push 100016
        State: <Active Int>
        Local AS: 69
        Age: 1d 13:20:59 Metric: 2
        Task: RSVP
        Announcement bits (1): 1-Resolve tree 2
        AS path: I

private1__inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)
10.0.0.0/8 (2 entries, 0 announced)
    *Direct Preference: 0
        Next hop type: Interface
        Next-hop reference count: 1
        Next hop: via fxp2.0, selected
        State: <Active Int>
        Age: 2d 1:44:20
        Task: IF
        AS path: I
    Direct Preference: 0
        Next hop type: Interface
        Next-hop reference count: 1
        Next hop: via fxp1.0, selected
        State: <NotBest Int>
        Inactive reason: No difference
        Age: 2d 1:44:20
        Task: IF
        AS path: I

```

### show route best extensive

The output for the **show route best extensive** command is identical to that for the **show route best detail** command. For sample output, see [show route best detail on page 813](#).

### show route best terse

```
user@host> show route best 10.255.70.103 terse
inet.0: 24 destinations, 25 routes (23 active, 0 holddown, 1 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both

A Destination      P Prf  Metric 1  Metric 2  Next hop      AS path
* 10.255.70.103/32  0 10      2          >10.31.1.6
                               so-0/3/0.0

inet.3: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both

A Destination      P Prf  Metric 1  Metric 2  Next hop      AS path
* 10.255.70.103/32  R  7      2          >so-0/3/0.0

private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

A Destination      P Prf  Metric 1  Metric 2  Next hop      AS path
* 10.0.0.0/8        D  0          >fxp2.0
                    D  0          >fxp1.0
```

## show route brief

|                                    |                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                      | show route brief<br><destination-prefix><br><logical-system (all   logical-system-name)>                                                                                                                                                                                                                                                     |
| <b>Syntax (EX Series Switches)</b> | show route brief<br><destination-prefix>                                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                        |
| <b>Description</b>                 | Display brief information about the active entries in the routing tables.                                                                                                                                                                                                                                                                    |
| <b>Options</b>                     | <p><b>none</b>—Display all active entries in the routing table.</p> <p><b>destination-prefix</b>—(Optional) Display active entries for the specified address or range of addresses.</p> <p><b>logical-system (all   logical-system-name)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                         |
| <b>List of Sample Output</b>       | <a href="#">show route brief on page 815</a>                                                                                                                                                                                                                                                                                                 |
| <b>Output Fields</b>               | For information about output fields, see the Output Field table of the <a href="#">show route</a> command.                                                                                                                                                                                                                                   |

## Sample Output

### show route brief

```

user@host> show route brief
inet.0: 10 destinations, 10 routes (9 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

0.0.0.0/0          *[Static/5] 1w5d 20:30:29
                   Discard
10.255.245.51/32   *[Direct/0] 2w4d 13:11:14
                   > via lo0.0
172.16.0.0/12      *[Static/5] 2w4d 13:11:14
                   > to 192.168.167.254 via fxp0.0
192.168.0.0/18     *[Static/5] 1w5d 20:30:29
                   > to 192.168.167.254 via fxp0.0
192.168.40.0/22    *[Static/5] 2w4d 13:11:14
                   > to 192.168.167.254 via fxp0.0
192.168.64.0/18    *[Static/5] 2w4d 13:11:14
                   > to 192.168.167.254 via fxp0.0
192.168.164.0/22   *[Direct/0] 2w4d 13:11:14
                   > via fxp0.0
192.168.164.51/32  *[Local/0] 2w4d 13:11:14
                   Local via fxp0.0
207.17.136.192/32 *[Static/5] 2w4d 13:11:14

```

```

> to 192.168.167.254 via fxp0.0
green.inet.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both
100.101.0.0/16    *[Direct/0] 1w5d 20:30:28
                  > via fe-0/0/3.0
100.101.2.3/32   *[Local/0] 1w5d 20:30:28
                  Local via fe-0/0/3.0
224.0.0.5/32     *[OSPF/10] 1w5d 20:30:29, metric 1
                  MultiRecv
```



## show route community

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                      | <code>show route community <i>as-number:community-value</i></code><br><brief   detail   extensive   terse><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Syntax (EX Series Switches)</b> | <code>show route community <i>as-number:community-value</i></code><br><brief   detail   extensive   terse>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b>                 | Display the route entries in each routing table that are members of a Border Gateway Protocol (BGP) community.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Options</b>                     | <p><b><i>as-number:community-value</i></b>—One or more community identifiers. <b><i>as-number</i></b> is the AS number, and <b><i>community-value</i></b> is the community identifier. When you specify more than one community identifier, enclose the identifiers in double quotation marks. Community identifiers can include wildcards.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Additional Information</b>      | Specifying the community option displays all routes matching the community found within the routing table. The community option does not limit the output to only the routes being advertised to the neighbor after any egress routing policy.                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Related Documentation</b>       | <ul style="list-style-type: none"> <li><a href="#">show route detail on page 826</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>List of Sample Output</b>       | <a href="#">show route community on page 817</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Output Fields</b>               | For information about output fields, see the output field tables for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                                                                                                                                                                                                                                                                                                                                 |

## Sample Output

### show route community

```

user@host> show route community 234:80
inet.0: 46511 destinations, 46511 routes (46509 active, 0 holddown, 2 hidden)
+ = Active Route, - = Last Active, * = Both

4.0.0.0/8          *[BGP/170] 03:33:07, localpref 100, from 131.103.20.49
                   AS Path: {666} 234 2548 1 IGP
                   to 192.156.169.1 via 192.156.169.14(so-0/0/0)
6.0.0.0/8          *[BGP/170] 03:33:07, localpref 100, from 131.103.20.49

```

```
9.2.0.0/16      AS Path: {666} 234 2548 568 721 Incomplete
                  to 192.156.169.1 via 192.156.169.14(so-0/0/0)
                  *[BGP/170] 03:33:06, localpref 100, from 131.103.20.49
                  AS Path: {666} 234 2548 1673 1675 1747 IGP
                  to 192.156.169.1 via 192.156.169.14(so-0/0/0)
```

## show route community-name

|                                    |                                                                                                                                                                                                                                                                                                 |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                      | <code>show route community-name <i>community-name</i></code><br><brief   detail   extensive   terse><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                    |
| <b>Syntax (EX Series Switches)</b> | <code>show route community-name <i>community-name</i></code><br><brief   detail   extensive   terse>                                                                                                                                                                                            |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                           |
| <b>Description</b>                 | Display the route entries in each routing table that are members of a Border Gateway Protocol (BGP) community, specified by a community name.                                                                                                                                                   |
| <b>Options</b>                     | <i>community-name</i> —Name of the community.<br><br>brief   detail   extensive   terse—(Optional) Display the specified level of output.<br><br>logical-system (all   <i>logical-system-name</i> )—(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                            |
| <b>List of Sample Output</b>       | <a href="#">show route community-name on page 819</a>                                                                                                                                                                                                                                           |
| <b>Output Fields</b>               | For information about output fields, see the output field tables for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                  |

## Sample Output

### show route community-name

```

user@host> show route community-name red-com
inet.0: 17 destinations, 17 routes (16 active, 0 holddown, 1 hidden)

inet.3: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

instance1.inet.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

red.inet.0: 11 destinations, 11 routes (11 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

10.255.245.212/32  *[BGP/170] 00:04:40, localpref 100, from 10.255.245.204
                   AS path: 300 I
                   > to 100.1.2.2 via ge-1/1/0.0, label-switched-path to_fix
20.20.20.20/32    *[BGP/170] 00:04:40, localpref 100, from 10.255.245.204
                   AS path: I
                   > to 100.1.2.2 via ge-1/1/0.0, label-switched-path to_fix
100.1.4.0/24     *[BGP/170] 00:04:40, localpref 100, from 10.255.245.204
                   AS path: I
                   > to 100.1.2.2 via ge-1/1/0.0, label-switched-path to_fix

```

```
iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

mpls.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)

bgp.l3vpn.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

10.255.245.204:10:10.255.245.212/32
    *[BGP/170] 00:06:40, localpref 100, from 10.255.245.204
        AS path: 300 I
        > to 100.1.2.2 via ge-1/1/0.0, label-switched-path to_fix
10.255.245.204:10:20.20.20.20/32
    *[BGP/170] 00:36:02, localpref 100, from 10.255.245.204
        AS path: I
        > to 100.1.2.2 via ge-1/1/0.0, label-switched-path to_fix
10.255.245.204:10:100.1.4.0/24
    *[BGP/170] 00:36:02, localpref 100, from 10.255.245.204
        AS path: I
        > to 100.1.2.2 via ge-1/1/0.0, label-switched-path to_fix

inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

instance1.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
```

## show route damping

|                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Syntax</b>                                   | show route damping (decayed   history   suppressed)<br><brief   detail   extensive   terse><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| <b>Syntax (EX Series Switch and QFX Series)</b> | show route damping (decayed   history   suppressed)<br><brief   detail   extensive   terse>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
| <b>Release Information</b>                      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| <b>Description</b>                              | Display the BGP routes for which updates might have been reduced because of route flap damping.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| <b>Options</b>                                  | <b>brief   detail   extensive   terse</b> —(Optional) Display the specified level of output. If you do not specify a level of output, the system defaults to brief.<br><br><b>decayed</b> —Display route damping entries that might no longer be valid, but are not suppressed.<br><br><b>history</b> —Display entries that have already been withdrawn, but have been logged.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.<br><br><b>suppressed</b> —Display entries that have been suppressed and are no longer being installed into the forwarding table or exported by routing protocols. |  |
| <b>Required Privilege Level</b>                 | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Related Documentation</b>                    | <ul style="list-style-type: none"> <li><i>clear bgp damping</i></li> <li><i>show policy damping</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| <b>List of Sample Output</b>                    | <a href="#">show route damping decayed detail on page 824</a><br><a href="#">show route damping history on page 825</a><br><a href="#">show route damping history detail on page 825</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| <b>Output Fields</b>                            | Table 71 on page 821 lists the output fields for the <b>show route damping</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |

Table 71: show route damping Output Fields

| Field Name                | Field Description                                                       | Level of Output |
|---------------------------|-------------------------------------------------------------------------|-----------------|
| <i>routing-table-name</i> | Name of the routing table—for example, <i>inet.0</i> .                  | All levels      |
| <i>destinations</i>       | Number of destinations for which there are routes in the routing table. | All levels      |

Table 71: show route damping Output Fields (*continued*)

| Field Name                                   | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Level of Output         |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <i>number routes</i>                         | Number of routes in the routing table and total number of routes in the following states: <ul style="list-style-type: none"> <li>• <b>active</b></li> <li>• <b>holdddown</b> (routes that are in a pending state before being declared inactive)</li> <li>• <b>hidden</b> (the routes are not used because of a routing policy)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | All levels              |
| <i>destination-prefix (entry, announced)</i> | Destination prefix. The <b>entry</b> value is the number of routes for this destination, and the <b>announced</b> value is the number of routes being announced for this destination.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive</b> |
| <i>[protocol, preference]</i>                | Protocol from which the route was learned and the preference value for the route. <ul style="list-style-type: none"> <li>• <b>+</b>—A plus sign indicates the active route, which is the route installed from the routing table into the forwarding table.</li> <li>• <b>-</b>—A hyphen indicates the last active route.</li> <li>• <b>*</b>—An asterisk indicates that the route is both the active and the last active route. An asterisk before a <b>to</b> line indicates the best subpath to the route.</li> </ul> <p>In every routing metric except for the BGP <b>LocalPref</b> attribute, a lesser value is preferred. In order to use common comparison routines, Junos OS stores the 1's complement of the <b>LocalPref</b> value in the <b>Preference2</b> field. For example, if the <b>LocalPref</b> value for Route 1 is 100, the <b>Preference2</b> value is -101. If the <b>LocalPref</b> value for Route 2 is 155, the <b>Preference2</b> value is -156. Route 2 is preferred because it has a higher <b>LocalPref</b> value and a lower <b>Preference2</b> value.</p> | All levels              |
| <b>Next-hop reference count</b>              | Number of references made to the next hop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive</b> |
| <b>Source</b>                                | IP address of the route source.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail extensive</b> |
| <b>Next hop</b>                              | Network layer address of the directly reachable neighboring system.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive</b> |
| <b>via</b>                                   | Interface used to reach the next hop. If there is more than one interface available to the next hop, the interface that is actually used is followed by the word <b>Selected</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive</b> |
| <b>Protocol next hop</b>                     | Network layer address of the remote routing device that advertised the prefix. This address is used to derive a forwarding next hop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive</b> |
| <b>Indirect next hop</b>                     | Index designation used to specify the mapping between protocol next hops, tags, kernel export policy, and the forwarding next hops.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive</b> |
| <b>State</b>                                 | Flags for this route. For a description of possible values for this field, see the output field table for the <a href="#">show route detail</a> command.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive</b> |
| <b>Local AS</b>                              | AS number of the local routing device.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>detail extensive</b> |
| <b>Peer AS</b>                               | AS number of the peer routing device.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive</b> |

Table 71: show route damping Output Fields (*continued*)

| Field Name              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Level of Output  |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Age                     | How long the route has been known.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | detail extensive |
| Metric                  | Metric for the route.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | detail extensive |
| Task                    | Name of the protocol that has added the route.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | detail extensive |
| Announcement bits       | List of protocols that announce this route. <b>n-Resolve inet</b> indicates that the route is used for route resolution for next hops found in the routing table. <b>n</b> is an index used by Juniper Networks customer support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | detail extensive |
| AS path                 | <p>AS path through which the route was learned. The letters at the end of the AS path indicate the path origin, providing an indication of the state of the route at the point at which the AS path originated:</p> <ul style="list-style-type: none"> <li>• I—IGP.</li> <li>• E—EGP.</li> <li>• ?—Incomplete; typically, the AS path was aggregated.</li> </ul> <p>When AS path numbers are included in the route, the format is as follows:</p> <ul style="list-style-type: none"> <li>• [ ]—Brackets enclose the local AS number associated with the AS path if more than one AS number is configured on the routing device or if AS path prepending is configured.</li> <li>• { }—Braces enclose AS sets, which are groups of AS numbers in which the order does not matter. A set commonly results from route aggregation. The numbers in each AS set are displayed in ascending order.</li> <li>• ( )—Parentheses enclose a confederation.</li> <li>• ( [ ] )—Parentheses and brackets enclose a confederation set.</li> </ul> <p><b>NOTE:</b> In Junos OS Release 10.3 and later, the AS path field displays an unrecognized attribute and associated hexadecimal value if BGP receives attribute 128 (attribute set) and you have not configured an independent domain in any routing instance.</p> | All levels       |
| to                      | Next hop to the destination. An angle bracket (>) indicates that the route is the selected route.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | brief none       |
| via                     | Interface used to reach the next hop. If there is more than one interface available to the next hop, the interface that is actually used is followed by the word <b>Selected</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | brief none       |
| Communities             | Community path attribute for the route. See the output field table for the <a href="#">show route detail</a> command.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | detail extensive |
| Localpref               | Local preference value included in the route.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | All levels       |
| Router ID               | BGP router ID as advertised by the neighbor in the open message.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | detail extensive |
| Merit (last update/now) | Last updated and current figure-of-merit value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | detail extensive |

Table 71: show route damping Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                        | Level of Output         |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>damping-parameters</b> | Name that identifies the damping parameters used, which is defined in the damping statement at the <b>[edit policy-options]</b> hierarchy level.                         | <b>detail extensive</b> |
| <b>Last update</b>        | Time of most recent change in path attributes.                                                                                                                           | <b>detail extensive</b> |
| <b>First update</b>       | Time of first change in path attributes, which started the route damping process.                                                                                        | <b>detail extensive</b> |
| <b>Flaps</b>              | Number of times the route has gone up or down or its path attributes have changed.                                                                                       | <b>detail extensive</b> |
| <b>Suppressed</b>         | ( <b>suppressed</b> keyword only) This route is currently suppressed. A suppressed route does not appear in the forwarding table and routing protocols do not export it. | All levels              |
| <b>Reusable in</b>        | ( <b>suppressed</b> keyword only) Time when a suppressed route will again be available.                                                                                  | All levels              |
| <b>Preference will be</b> | ( <b>suppressed</b> keyword only) Preference value that will be applied to the route when it is again active.                                                            | All levels              |

## Sample Output

### show route damping decayed detail

```

user@host> show route damping decayed detail
inet.0: 173319 destinations, 1533668 routes (172625 active, 4 holddown, 108083
hidden)
10.0.111.0/24 (7 entries, 1 announced)
  *BGP      Preference: 170/-101
             Next-hop reference count: 151973
             Source: 172.23.2.129
             Next hop: via so-1/2/0.0
             Next hop: via so-5/1/0.0, selected
             Next hop: via so-6/0/0.0
             Protocol next hop: 172.23.2.129
             Indirect next hop: 89a1a00 264185
             State: <Active Ext>
             Local AS: 65000 Peer AS: 65490
             Age: 3:28      Metric2: 0
             Task: BGP_65490.172.23.2.129+179
             Announcement bits (6): 0-KRT 1-RT 4-KRT 5-BGP.0.0.0.0+179

  6-Resolve tree 2 7-Resolve tree 3
    AS path: 65490 65520 65525 65525 65525 I ()
    Communities: 65501:390 65501:2000 65501:3000 65504:701
    Localpref: 100
    Router ID: 172.23.2.129
    Merit (last update/now): 1934/1790
    damping-parameters: damping-high
    Last update: 00:03:28 First update: 00:06:40
    Flaps: 2

```



### show route damping history

```

user@host> show route damping history
inet.0: 173320 destinations, 1533529 routes (172624 active, 6 holddown, 108122
hidden)
+ = Active Route, - = Last Active, * = Both

10.108.0.0/15      [BGP ] 2d 22:47:58, localpref 100
                  AS path: 65220 65501 65502 I
                  > to 192.168.60.85 via so-3/1/0.0

```

### show route damping history detail

```

user@host> show route damping history detail
inet.0: 173319 destinations, 1533435 routes (172627 active, 2 holddown, 108105
hidden)
10.108.0.0/15 (3 entries, 1 announced)
    BGP                /-101
        Next-hop reference count: 69058
        Source: 192.168.60.85
        Next hop: 192.168.60.85 via so-3/1/0.0, selected
        State: <Hidden Ext>
        Inactive reason: Unusable path
        Local AS: 65000 Peer AS: 65220
        Age: 2d 22:48:10
        Task: BGP_65220.192.168.60.85+179
        AS path: 65220 65501 65502 I ()
        Communities: 65501:390 65501:2000 65501:3000 65504:3561
        Localpref: 100
        Router ID: 192.168.80.25
        Merit (last update/now): 1000/932
        damping-parameters: set-normal
        Last update:          00:01:05 First update:          00:01:05
        Flaps: 1

```

## show route detail

|                                    |                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                      | show route detail<br><destination-prefix><br><logical-system (all   logical-system-name)>                                                                                                                                                                                                                                                                   |
| <b>Syntax (EX Series Switches)</b> | show route detail<br><destination-prefix>                                                                                                                                                                                                                                                                                                                   |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                       |
| <b>Description</b>                 | Display detailed information about the active entries in the routing tables.                                                                                                                                                                                                                                                                                |
| <b>Options</b>                     | <p><b>none</b>—Display all active entries in the routing table on all systems.</p> <p><b>destination-prefix</b>—(Optional) Display active entries for the specified address or range of addresses.</p> <p><b>logical-system (all   logical-system-name)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                        |
| <b>List of Sample Output</b>       | <a href="#">show route detail on page 834</a><br><a href="#">show route detail (with BGP Multipath) on page 840</a><br><a href="#">show route label detail (Multipoint LDP Inband Signaling for Point-to-Multipoint LSPs) on page 840</a>                                                                                                                   |
| <b>Output Fields</b>               | Table 72 on page 826 describes the output fields for the <b>show route detail</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                          |

**Table 72: show route detail Output Fields**

| Field Name                 | Field Description                                                                                                                                                                                                                                                                                                                                               |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>routing-table-name</i>  | Name of the routing table (for example, inet.0).                                                                                                                                                                                                                                                                                                                |
| <i>number destinations</i> | Number of destinations for which there are routes in the routing table.                                                                                                                                                                                                                                                                                         |
| <i>number routes</i>       | Number of routes in the routing table and total number of routes in the following states: <ul style="list-style-type: none"> <li><b>active</b> (routes that are active)</li> <li><b>holddown</b> (routes that are in the pending state before being declared inactive)</li> <li><b>hidden</b> (routes that are not used because of a routing policy)</li> </ul> |

Table 72: show route detail Output Fields (*continued*)

| Field Name                                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>route-destination</i><br>(entry, announced) | <p>Route destination (for example:10.0.0.1/24). The <b>entry</b> value is the number of routes for this destination, and the <b>announced</b> value is the number of routes being announced for this destination. Sometimes the route destination is presented in another format, such as:</p> <ul style="list-style-type: none"> <li>• <b>MPLS-label</b> (for example, 80001).</li> <li>• <b>interface-name</b> (for example, ge-1/0/2).</li> <li>• <b>neighbor-address:control-word-status:encapsulation type:vc-id:source</b> (Layer 2 circuit only; for example, 10.1.1.195:NoCtrlWord:1:1:Local/96). <ul style="list-style-type: none"> <li>• <b>neighbor-address</b>—Address of the neighbor.</li> <li>• <b>control-word-status</b>—Whether the use of the control word has been negotiated for this virtual circuit: <b>NoCtrlWord</b> or <b>CtrlWord</b>.</li> <li>• <b>encapsulation type</b>—Type of encapsulation, represented by a number: (1) Frame Relay DLCI, (2) ATM AAL5 VCC transport, (3) ATM transparent cell transport, (4) Ethernet, (5) VLAN Ethernet, (6) HDLC, (7) PPP, (8) ATM VCC cell transport, (10) ATM VPC cell transport.</li> <li>• <b>vc-id</b>—Virtual circuit identifier.</li> <li>• <b>source</b>—Source of the advertisement: <b>Local</b> or <b>Remote</b>.</li> </ul> </li> </ul> |
| label stacking                                 | <p>(Next-to-the-last-hop routing device for MPLS only) Depth of the MPLS label stack, where the label-popping operation is needed to remove one or more labels from the top of the stack. A pair of routes is displayed, because the pop operation is performed only when the stack depth is two or more labels.</p> <ul style="list-style-type: none"> <li>• <b>S=0 route</b> indicates that a packet with an incoming label stack depth of 2 or more exits this routing device with one fewer label (the label-popping operation is performed).</li> <li>• If there is no <b>S=</b> information, the route is a normal MPLS route, which has a stack depth of 1 (the label-popping operation is not performed).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| [ <i>protocol, preference</i> ]                | <p>Protocol from which the route was learned and the preference value for the route.</p> <ul style="list-style-type: none"> <li>• <b>+—</b>A plus sign indicates the active route, which is the route installed from the routing table into the forwarding table.</li> <li>• <b>- —</b>A hyphen indicates the last active route.</li> <li>• <b>*—</b>An asterisk indicates that the route is both the active and the last active route. An asterisk before a <b>to</b> line indicates the best subpath to the route.</li> </ul> <p>In every routing metric except for the BGP <b>LocalPref</b> attribute, a lesser value is preferred. In order to use common comparison routines, Junos OS stores the 1's complement of the <b>LocalPref</b> value in the <b>Preference2</b> field. For example, if the <b>LocalPref</b> value for Route 1 is 100, the <b>Preference2</b> value is -101. If the <b>LocalPref</b> value for Route 2 is 155, the <b>Preference2</b> value is -156. Route 2 is preferred because it has a higher <b>LocalPref</b> value and a lower <b>Preference2</b> value.</p>                                                                                                                                                                                                                           |
| Level                                          | <p>(IS-IS only). In IS-IS, a single AS can be divided into smaller groups called areas. Routing between areas is organized hierarchically, allowing a domain to be administratively divided into smaller areas. This organization is accomplished by configuring Level 1 and Level 2 intermediate systems. Level 1 systems route within an area. When the destination is outside an area, they route toward a Level 2 system. Level 2 intermediate systems route between areas and toward other ASs.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Route Distinguisher                            | IP subnet augmented with a 64-bit prefix.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Next-hop type                                  | Type of next hop. For a description of possible values for this field, see <a href="#">Table 73 on page 830</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

Table 72: show route detail Output Fields (*continued*)

| Field Name                                           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Next-hop reference count</b>                      | Number of references made to the next hop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Flood nexthop branches exceed maximum message</b> | Indicates that the number of flood next-hop branches exceeded the system limit of 32 branches, and only a subset of the flood next-hop branches were installed in the kernel.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Source</b>                                        | IP address of the route source.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Next hop</b>                                      | Network layer address of the directly reachable neighboring system.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>via</b>                                           | <p>Interface used to reach the next hop. If there is more than one interface available to the next hop, the name of the interface that is actually used is followed by the word <b>Selected</b>. This field can also contain the following information:</p> <ul style="list-style-type: none"> <li>• <b>Weight</b>—Value used to distinguish primary, secondary, and fast reroute backup routes. Weight information is available when MPLS label-switched path (LSP) link protection, node-link protection, or fast reroute is enabled, or when the standby state is enabled for secondary paths. A lower weight value is preferred. Among routes with the same weight value, load balancing is possible.</li> <li>• <b>Balance</b>—Balance coefficient indicating how traffic of unequal cost is distributed among next hops when a routing device is performing unequal-cost load balancing. This information is available when you enable BGP multipath load balancing.</li> </ul> |
| <b>Label-switched-path<br/>lsp-path-name</b>         | Name of the LSP used to reach the next hop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Label operation</b>                               | MPLS label and operation occurring at this routing device. The operation can be <b>pop</b> (where a label is removed from the top of the stack), <b>push</b> (where another label is added to the label stack), or <b>swap</b> (where a label is replaced by another label).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Interface</b>                                     | (Local only) Local interface name.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Protocol next hop</b>                             | Network layer address of the remote routing device that advertised the prefix. This address is used to derive a forwarding next hop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Indirect next hop</b>                             | Index designation used to specify the mapping between protocol next hops, tags, kernel export policy, and the forwarding next hops.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>State</b>                                         | State of the route (a route can be in more than one state). See <a href="#">Table 74 on page 832</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Local AS</b>                                      | AS number of the local routing device.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Age</b>                                           | How long the route has been known.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>AIGP</b>                                          | Accumulated interior gateway protocol (AIGP) BGP attribute.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Metricn</b>                                       | Cost value of the indicated route. For routes within an AS, the cost is determined by IGP and the individual protocol metrics. For external routes, destinations, or routing domains, the cost is determined by a preference value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

Table 72: show route detail Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MED-plus-IGP</b>            | Metric value for BGP path selection to which the IGP cost to the next-hop destination has been added.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>TTL-Action</b>              | For MPLS LSPs, state of the TTL propagation attribute. Can be enabled or disabled for all RSVP-signaled and LDP-signaled LSPs or for specific VRF routing instances.<br><br>For sample output, see <a href="#">show route table</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Task</b>                    | Name of the protocol that has added the route.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Announcement bits</b>       | List of protocols that announce this route. <b>n-Resolve inet</b> indicates that the route is used for route resolution for next hops found in the routing table. <b>n</b> is an index used by Juniper Networks customer support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>AS path</b>                 | <p>AS path through which the route was learned. The letters at the end of the AS path indicate the path origin, providing an indication of the state of the route at the point at which the AS path originated:</p> <ul style="list-style-type: none"> <li>• <b>I</b>—IGP.</li> <li>• <b>E</b>—EGP.</li> <li>• <b>Recorded</b>—The AS path is recorded by the sample process (sampled).</li> <li>• <b>?</b>—Incomplete; typically, the AS path was aggregated.</li> </ul> <p>When AS path numbers are included in the route, the format is as follows:</p> <ul style="list-style-type: none"> <li>• <b>[ ]</b>—Brackets enclose the number that precedes the AS path. This number represents the number of ASs present in the AS path, when calculated as defined in RFC 4271. This value is used in the AS-path merge process, as defined in RFC 4893.</li> <li>• <b>[ ]</b>—If more than one AS number is configured on the routing device, or if AS path prepending is configured, brackets enclose the local AS number associated with the AS path.</li> <li>• <b>{ }</b>—Braces enclose AS sets, which are groups of AS numbers in which the order does not matter. A set commonly results from route aggregation. The numbers in each AS set are displayed in ascending order.</li> <li>• <b>( )</b>—Parentheses enclose a confederation.</li> <li>• <b>( [ ] )</b>—Parentheses and brackets enclose a confederation set.</li> </ul> <p><b>NOTE:</b> In Junos OS Release 10.3 and later, the AS path field displays an unrecognized attribute and associated hexadecimal value if BGP receives attribute 128 (attribute set) and you have not configured an independent domain in any routing instance.</p> |
| <b>FECs bound to route</b>     | Point-to-multipoint root address, multicast source address, and multicast group address when multipoint LDP (M-LDP) inband signaling is configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>VC Label</b>                | MPLS label assigned to the Layer 2 circuit virtual connection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>MTU</b>                     | Maximum transmission unit (MTU) of the Layer 2 circuit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>VLAN ID</b>                 | VLAN identifier of the Layer 2 circuit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Prefixes bound to route</b> | Forwarding equivalent class (FEC) bound to this route. Applicable only to routes installed by LDP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Communities</b>             | Community path attribute for the route. See <a href="#">Table 75 on page 834</a> for all possible values for this field.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

Table 72: show route detail Output Fields (*continued*)

| Field Name                       | Field Description                                                                                                                                                      |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Layer2-info: encaps</b>       | Layer 2 encapsulation (for example, VPLS).                                                                                                                             |
| <b>control flags</b>             | Control flags: <b>none</b> or <b>Site Down</b> .                                                                                                                       |
| <b>mtu</b>                       | Maximum transmission unit (MTU) information.                                                                                                                           |
| <b>Label-Base, range</b>         | First label in a block of labels and label block size. A remote PE routing device uses this first label when sending traffic toward the advertising PE routing device. |
| <b>status vector</b>             | Layer 2 VPN and VPLS network layer reachability information (NLRI).                                                                                                    |
| <b>Accepted Multipath</b>        | Current active path when BGP multipath is configured.                                                                                                                  |
| <b>Accepted MultipathContrib</b> | Path currently contributing to BGP multipath.                                                                                                                          |
| <b>Localpref</b>                 | Local preference value included in the route.                                                                                                                          |
| <b>Router ID</b>                 | BGP router ID as advertised by the neighbor in the open message.                                                                                                       |
| <b>Primary Routing Table</b>     | In a routing table group, the name of the primary routing table in which the route resides.                                                                            |
| <b>Secondary Tables</b>          | In a routing table group, the name of one or more secondary tables in which the route resides.                                                                         |

Table 73 on page 830 describes all possible values for the Next-hop Types output field.

Table 73: Next-hop Types Output Field Values

| Next-Hop Type            | Description                                                                                                                                                                                                                                                                    |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Broadcast (bcast)</b> | Broadcast next hop.                                                                                                                                                                                                                                                            |
| <b>Deny</b>              | Deny next hop.                                                                                                                                                                                                                                                                 |
| <b>Discard</b>           | Discard next hop.                                                                                                                                                                                                                                                              |
| <b>Flood</b>             | Flood next hop. Consists of components called branches, up to a maximum of 32 branches. Each flood next-hop branch sends a copy of the traffic to the forwarding interface. Used by point-to-multipoint RSVP, point-to-multipoint LDP, point-to-multipoint CCC, and multicast. |
| <b>Hold</b>              | Next hop is waiting to be resolved into a unicast or multicast type.                                                                                                                                                                                                           |
| <b>Indexed (idxd)</b>    | Indexed next hop.                                                                                                                                                                                                                                                              |

Table 73: Next-hop Types Output Field Values (*continued*)

| Next-Hop Type                   | Description                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Indirect (indr)</b>          | Used with applications that have a protocol next hop address that is remote. You are likely to see this next-hop type for internal BGP (IBGP) routes when the BGP next hop is a BGP neighbor that is not directly connected.                                                                                                                                                                               |
| <b>Interface</b>                | Used for a network address assigned to an interface. Unlike the router next hop, the interface next hop does not reference any specific node on the network.                                                                                                                                                                                                                                               |
| <b>Local (locl)</b>             | Local address on an interface. This next-hop type causes packets with this destination address to be received locally.                                                                                                                                                                                                                                                                                     |
| <b>Multicast (mcst)</b>         | Wire multicast next hop (limited to the LAN).                                                                                                                                                                                                                                                                                                                                                              |
| <b>Multicast discard (mdsc)</b> | Multicast discard.                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Multicast group (mgrp)</b>   | Multicast group member.                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Receive (recv)</b>           | Receive.                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Reject (rjct)</b>            | Discard. An ICMP unreachable message was sent.                                                                                                                                                                                                                                                                                                                                                             |
| <b>Resolve (rslv)</b>           | Resolving next hop.                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Routed multicast (mcrt)</b>  | Regular multicast next hop.                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Router</b>                   | <p>A specific node or set of nodes to which the routing device forwards packets that match the route prefix.</p> <p>To qualify as next-hop type router, the route must meet the following criteria:</p> <ul style="list-style-type: none"> <li>• Must not be a direct or local subnet for the routing device.</li> <li>• Must have a next hop that is directly connected to the routing device.</li> </ul> |
| <b>Table</b>                    | Routing table next hop.                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Unicast (ucst)</b>           | Unicast.                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Unilist (ulst)</b>           | List of unicast next hops. A packet sent to this next hop goes to any next hop in the list.                                                                                                                                                                                                                                                                                                                |

Table 74 on page 832 describes all possible values for the State output field. A route can be in more than one state (for example, **<Active NoReadvrt Int Ext>**).

Table 74: State Output Field Values

| Value                                                    | Description                                                                                                                                                                          |
|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Accounting</b>                                        | Route needs accounting.                                                                                                                                                              |
| <b>Active</b>                                            | Route is active.                                                                                                                                                                     |
| <b>Always Compare MED</b>                                | Path with a lower multiple exit discriminator (MED) is available.                                                                                                                    |
| <b>AS path</b>                                           | Shorter AS path is available.                                                                                                                                                        |
| <b>Cisco Non-deterministic MED selection</b>             | Cisco nondeterministic MED is enabled, and a path with a lower MED is available.                                                                                                     |
| <b>Clone</b>                                             | Route is a clone.                                                                                                                                                                    |
| <b>Cluster list length</b>                               | Length of cluster list sent by the route reflector.                                                                                                                                  |
| <b>Delete</b>                                            | Route has been deleted.                                                                                                                                                              |
| <b>Ex</b>                                                | Exterior route.                                                                                                                                                                      |
| <b>Ext</b>                                               | BGP route received from an external BGP neighbor.                                                                                                                                    |
| <b>FlashAll</b>                                          | Forces all protocols to be notified of a change to any route, active or inactive, for a prefix. When not set, protocols are informed of a prefix only when the active route changes. |
| <b>Hidden</b>                                            | Route not used because of routing policy.                                                                                                                                            |
| <b>IfCheck</b>                                           | Route needs forwarding RPF check.                                                                                                                                                    |
| <b>IGP metric</b>                                        | Path through next hop with lower IGP metric is available.                                                                                                                            |
| <b>Inactive reason</b>                                   | Flags for this route, which was not selected as best for a particular destination.                                                                                                   |
| <b>Initial</b>                                           | Route being added.                                                                                                                                                                   |
| <b>Int</b>                                               | Interior route.                                                                                                                                                                      |
| <b>Int Ext</b>                                           | BGP route received from an internal BGP peer or a BGP confederation peer.                                                                                                            |
| <b>Interior &gt; Exterior &gt; Exterior via Interior</b> | Direct, static, IGP, or EBGp path is available.                                                                                                                                      |
| <b>Local Preference</b>                                  | Path with a higher local preference value is available.                                                                                                                              |
| <b>Martian</b>                                           | Route is a martian (ignored because it is obviously invalid).                                                                                                                        |



Table 74: State Output Field Values (*continued*)

| Value                                 | Description                                                                                                                                                                                                                       |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MartianOK</b>                      | Route exempt from martian filtering.                                                                                                                                                                                              |
| <b>Next hop address</b>               | Path with lower metric next hop is available.                                                                                                                                                                                     |
| <b>No difference</b>                  | Path from neighbor with lower IP address is available.                                                                                                                                                                            |
| <b>NoReadvrt</b>                      | Route not to be advertised.                                                                                                                                                                                                       |
| <b>NotBest</b>                        | Route not chosen because it does not have the lowest MED.                                                                                                                                                                         |
| <b>Not Best in its group</b>          | Incoming BGP AS is not the best of a group (only one AS can be the best).                                                                                                                                                         |
| <b>NotInstall</b>                     | Route not to be installed in the forwarding table.                                                                                                                                                                                |
| <b>Number of gateways</b>             | Path with a greater number of next hops is available.                                                                                                                                                                             |
| <b>Origin</b>                         | Path with a lower origin code is available.                                                                                                                                                                                       |
| <b>Pending</b>                        | Route pending because of a hold-down configured on another route.                                                                                                                                                                 |
| <b>Release</b>                        | Route scheduled for release.                                                                                                                                                                                                      |
| <b>RIB preference</b>                 | Route from a higher-numbered routing table is available.                                                                                                                                                                          |
| <b>Route Distinguisher</b>            | 64-bit prefix added to IP subnets to make them unique.                                                                                                                                                                            |
| <b>Route Metric or MED comparison</b> | Route with a lower metric or MED is available.                                                                                                                                                                                    |
| <b>Route Preference</b>               | Route with lower preference value is available                                                                                                                                                                                    |
| <b>Router ID</b>                      | Path through a neighbor with lower ID is available.                                                                                                                                                                               |
| <b>Secondary</b>                      | Route not a primary route.                                                                                                                                                                                                        |
| <b>Unusable path</b>                  | Path is not usable because of one of the following conditions: <ul style="list-style-type: none"> <li>• The route is damped.</li> <li>• The route is rejected by an import policy.</li> <li>• The route is unresolved.</li> </ul> |
| <b>Update source</b>                  | Last tiebreaker is the lowest IP address value.                                                                                                                                                                                   |

Table 75 on page 834 describes the possible values for the Communities output field.

Table 75: Communities Output Field Values

| Value                                                   | Description                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>area-number</i>                                      | 4 bytes, encoding a 32-bit area number. For AS-external routes, the value is <b>0</b> . A nonzero value identifies the route as internal to the OSPF domain, and as within the identified area. Area numbers are relative to a particular OSPF domain.                                                  |
| <b>bandwidth: local AS number:link-bandwidth-number</b> | Link-bandwidth community value used for unequal-cost load balancing. When BGP has several candidate paths available for multipath purposes, it does not perform unequal-cost load balancing according to the link-bandwidth community unless all candidate paths have this attribute.                   |
| <b>domain-id</b>                                        | Unique configurable number that identifies the OSPF domain.                                                                                                                                                                                                                                             |
| <b>domain-id-vendor</b>                                 | Unique configurable number that further identifies the OSPF domain.                                                                                                                                                                                                                                     |
| <i>link-bandwidth-number</i>                            | Link-bandwidth number: from <b>0</b> through <b>4,294,967,295</b> (bytes per second).                                                                                                                                                                                                                   |
| <i>local AS number</i>                                  | Local AS number: from <b>1</b> through <b>65,535</b> .                                                                                                                                                                                                                                                  |
| <i>options</i>                                          | 1 byte. Currently this is only used if the route type is <b>5</b> or <b>7</b> . Setting the least significant bit in the field indicates that the route carries a type 2 metric.                                                                                                                        |
| <b>origin</b>                                           | (Used with VPNs) Identifies where the route came from.                                                                                                                                                                                                                                                  |
| <i>ospf-route-type</i>                                  | 1 byte, encoded as <b>1</b> or <b>2</b> for intra-area routes (depending on whether the route came from a type 1 or a type 2 LSA); <b>3</b> for summary routes; <b>5</b> for external routes (area number must be <b>0</b> ); <b>7</b> for NSSA routes; or <b>129</b> for sham link endpoint addresses. |
| <b>route-type-vendor</b>                                | Displays the area number, OSPF route type, and option of the route. This is configured using the BGP extended community attribute <b>0x8000</b> . The format is <b>area-number:ospf-route-type:options</b> .                                                                                            |
| <b>rte-type</b>                                         | Displays the area number, OSPF route type, and option of the route. This is configured using the BGP extended community attribute <b>0x0306</b> . The format is <b>area-number:ospf-route-type:options</b> .                                                                                            |
| <b>target</b>                                           | Defines which VPN the route participates in; <b>target</b> has the format <b>32-bit IP address:16-bit number</b> . For example, 10.19.0.0:100.                                                                                                                                                          |
| <b>unknown IANA</b>                                     | Incoming IANA codes with a value between <b>0x1</b> and <b>0x7fff</b> . This code of the BGP extended community attribute is accepted, but it is not recognized.                                                                                                                                        |
| <b>unknown OSPF vendor community</b>                    | Incoming IANA codes with a value above <b>0x8000</b> . This code of the BGP extended community attribute is accepted, but it is not recognized.                                                                                                                                                         |

## Sample Output

### show route detail

```
user@host> show route detail
```

```
inet.0: 22 destinations, 23 routes (21 active, 0 holddown, 1 hidden)
```

```

10.10.0.0/16 (1 entry, 1 announced)
  *Static Preference: 5
    Next-hop reference count: 29
    Next hop: 192.168.71.254 via fxp0.0, selected
    State: <Active NoReadvrt Int Ext>
    Local AS: 69
    Age: 1:31:43
    Task: RT
    Announcement bits (2): 0-KRT 3-Resolve tree 2
    AS path: I

10.31.1.0/30 (2 entries, 1 announced)
  *Direct Preference: 0
    Next hop type: Interface
    Next-hop reference count: 2
    Next hop: via so-0/3/0.0, selected
    State: <Active Int>
    Local AS: 69
    Age: 1:30:17
    Task: IF
    Announcement bits (1): 3-Resolve tree 2
    AS path: I
  OSPF Preference: 10
    Next-hop reference count: 1
    Next hop: via so-0/3/0.0, selected
    State: <Int>
    Inactive reason: Route Preference
    Local AS: 69
    Age: 1:30:17 Metric: 1
    Area: 0.0.0.0
    Task: OSPF
    AS path: I

10.31.1.1/32 (1 entry, 1 announced)
  *Local Preference: 0
    Next hop type: Local
    Next-hop reference count: 7
    Interface: so-0/3/0.0
    State: <Active NoReadvrt Int>
    Local AS: 69
    Age: 1:30:20
    Task: IF
    Announcement bits (1): 3-Resolve tree 2
    AS path: I

...

10.31.2.0/30 (1 entry, 1 announced)
  *OSPF Preference: 10
    Next-hop reference count: 9
    Next hop: via so-0/3/0.0
    Next hop: 10.31.1.6 via ge-3/1/0.0, selected
    State: <Active Int>
    Local AS: 69
    Age: 1:29:56 Metric: 2
    Area: 0.0.0.0
    Task: OSPF
    Announcement bits (2): 0-KRT 3-Resolve tree 2
    AS path: I

...

```

```
224.0.0.2/32 (1 entry, 1 announced)
  *PIM    Preference: 0
          Next-hop reference count: 18
          State: <Active NoReadvrt Int>
          Local AS:    69
          Age: 1:31:45
          Task: PIM Recv
          Announcement bits (2): 0-KRT 3-Resolve tree 2
          AS path: I

...

224.0.0.22/32 (1 entry, 1 announced)
  *IGMP   Preference: 0
          Next-hop reference count: 18
          State: <Active NoReadvrt Int>
          Local AS:    69
          Age: 1:31:43
          Task: IGMP
          Announcement bits (2): 0-KRT 3-Resolve tree 2
          AS path: I

inet.3: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

10.255.70.103/32 (1 entry, 1 announced)
  State: <FlashAll>
  *RSVP   Preference: 7
          Next-hop reference count: 6
          Next hop: 10.31.1.6 via ge-3/1/0.0 weight 0x1, selected
          Label-switched-path green-r1-r3
          Label operation: Push 100096
          State: <Active Int>
          Local AS:    69
          Age: 1:25:49   Metric: 2
          Task: RSVP
          Announcement bits (2): 1-Resolve tree 1 2-Resolve tree 2
          AS path: I

10.255.71.238/32 (1 entry, 1 announced)
  State: <FlashAll>
  *RSVP   Preference: 7
          Next-hop reference count: 6
          Next hop: via so-0/3/0.0 weight 0x1, selected
          Label-switched-path green-r1-r2
          State: <Active Int>
          Local AS:    69
          Age: 1:25:49   Metric: 1
          Task: RSVP
          Announcement bits (2): 1-Resolve tree 1 2-Resolve tree 2
          AS path: I

private__inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

47.0005.80ff.f800.0000.0108.0001.0102.5507.1052/152 (1 entry, 0 announced)
  *Direct Preference: 0
          Next hop type: Interface
          Next-hop reference count: 1
          Next hop: via lo0.0, selected
```

```

        State: <Active Int>
        Local AS: 69
        Age: 1:31:44
        Task: IF
        AS path: I

mpls.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
0 (1 entry, 1 announced)
    *MPLS Preference: 0
        Next hop type: Receive
        Next-hop reference count: 6
        State: <Active Int>
        Local AS: 69
        Age: 1:31:45 Metric: 1
        Task: MPLS
        Announcement bits (1): 0-KRT
        AS path: I

...

mpls.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
299776 (1 entry, 1 announced)
TSI:
KRT in-kernel 299776 /52 -> {Flood}
    *RSVP Preference: 7
        Next hop type: Flood
        Next-hop reference count: 130
        Flood nexthop branches exceed maximum
        Address: 0x8ea65d0

...

800010 (1 entry, 1 announced)
    *VPLS Preference: 7
        Next-hop reference count: 2
        Next hop: via vt-3/2/0.32769, selected
        Label operation: Pop
        State: <Active Int>
        Age: 1:29:30
        Task: Common L2 VC
        Announcement bits (1): 0-KRT
        AS path: I

vt-3/2/0.32769 (1 entry, 1 announced)
    *VPLS Preference: 7
        Next-hop reference count: 2
        Next hop: 10.31.1.6 via ge-3/1/0.0 weight 0x1, selected
        Label-switched-path green-r1-r3
        Label operation: Push 800012, Push 100096(top)
        Protocol next hop: 10.255.70.103
        Push 800012
        Indirect next hop: 87272e4 1048574
        State: <Active Int>
        Age: 1:29:30 Metric2: 2
        Task: Common L2 VC
        Announcement bits (2): 0-KRT 1-Common L2 VC
        AS path: I
        Communities: target:11111:1 Layer2-info: encaps:VPLS,
        control flags:, mtu: 0

inet6.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)

```

```
abcd::10:255:71:52/128 (1 entry, 0 announced)
  *Direct Preference: 0
    Next hop type: Interface
    Next-hop reference count: 1
    Next hop: via lo0.0, selected
    State: <Active Int>
    Local AS: 69
    Age: 1:31:44
    Task: IF
    AS path: I

fe80::280:42ff:fe10:f179/128 (1 entry, 0 announced)
  *Direct Preference: 0
    Next hop type: Interface
    Next-hop reference count: 1
    Next hop: via lo0.0, selected
    State: <Active NoReadvrt Int>
    Local AS: 69
    Age: 1:31:44
    Task: IF
    AS path: I

ff02::2/128 (1 entry, 1 announced)
  *PIM Preference: 0
    Next-hop reference count: 18
    State: <Active NoReadvrt Int>
    Local AS: 69
    Age: 1:31:45
    Task: PIM Recv6
    Announcement bits (1): 0-KRT
    AS path: I

ff02::d/128 (1 entry, 1 announced)
  *PIM Preference: 0
    Next-hop reference count: 18
    State: <Active NoReadvrt Int>
    Local AS: 69
    Age: 1:31:45
    Task: PIM Recv6
    Announcement bits (1): 0-KRT
    AS path: I

ff02::16/128 (1 entry, 1 announced)
  *MLD Preference: 0
    Next-hop reference count: 18
    State: <Active NoReadvrt Int>
    Local AS: 69
    Age: 1:31:43
    Task: MLD
    Announcement bits (1): 0-KRT
    AS path: I

private.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

fe80::280:42ff:fe10:f179/128 (1 entry, 0 announced)
  *Direct Preference: 0
    Next hop type: Interface
    Next-hop reference count: 1
    Next hop: via lo0.16385, selected
    State: <Active NoReadvrt Int>
    Age: 1:31:44
```

```

Task: IF
AS path: I

green.l2vpn.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)

10.255.70.103:1:3:1/96 (1 entry, 1 announced)
  *BGP Preference: 170/-101
    Route Distinguisher: 10.255.70.103:1
    Next-hop reference count: 7
    Source: 10.255.70.103
    Protocol next hop: 10.255.70.103
    Indirect next hop: 2 no-forward
    State: <Secondary Active Int Ext>
    Local AS: 69 Peer AS: 69
    Age: 1:25:49 Metric2: 1
    AIGP 210
    Task: BGP_69.10.255.70.103+179
    Announcement bits (1): 0-green-l2vpn
    AS path: I
    Communities: target:11111:1 Layer2-info: encaps:VPLS,
    control flags:, mtu: 0
    Label-base: 800008, range: 8
    Localpref: 100
    Router ID: 10.255.70.103
    Primary Routing Table bgp.l2vpn.0

10.255.71.52:1:1:1/96 (1 entry, 1 announced)
  *L2VPN Preference: 170/-1
    Next-hop reference count: 5
    Protocol next hop: 10.255.71.52
    Indirect next hop: 0 -
    State: <Active Int Ext>
    Age: 1:31:40 Metric2: 1
    Task: green-l2vpn
    Announcement bits (1): 1-BGP.0.0.0.0+179
    AS path: I
    Communities: Layer2-info: encaps:VPLS, control flags:Site-Down,
    mtu: 0
    Label-base: 800016, range: 8, status-vector: 0x9F

10.255.71.52:1:5:1/96 (1 entry, 1 announced)
  *L2VPN Preference: 170/-101
    Next-hop reference count: 5
    Protocol next hop: 10.255.71.52
    Indirect next hop: 0 -
    State: <Active Int Ext>
    Age: 1:31:40 Metric2: 1
    Task: green-l2vpn
    Announcement bits (1): 1-BGP.0.0.0.0+179
    AS path: I
    Communities: Layer2-info: encaps:VPLS, control flags:, mtu: 0
    Label-base: 800008, range: 8, status-vector: 0x9F

...

l2circuit.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
10.245.255.63:CtrlWord:4:3:Local/96 (1 entry, 1 announced)
  *L2CKT Preference: 7
    Next hop: via so-1/1/2.0 weight 1, selected
    Label-switched-path my-lsp
    Label operation: Push 100000[0]

```

```
Protocol next hop: 10.245.255.63 Indirect next hop: 86af000 296
State: <Active Int>
Local AS: 99
Age: 10:21
Task: 12 circuit
Announcement bits (1): 0-LDP
AS path: I
VC Label 100000, MTU 1500, VLAN ID 512
```

### show route detail (with BGP Multipath)

```
user@host> show route detail

10.1.1.8/30 (2 entries, 1 announced)
  *BGP Preference: 170/-101
    Next hop type: Router, Next hop index: 262142
    Address: 0x901a010
    Next-hop reference count: 2
    Source: 10.1.1.2
    Next hop: 10.1.1.2 via ge-0/3/0.1, selected
    Next hop: 10.1.1.6 via ge-0/3/0.5
    State: <Active Ext>
    Local AS: 1 Peer AS: 2
    Age: 5:04:43
    Task: BGP_2.10.1.1.2+59955
    Announcement bits (1): 0-KRT
    AS path: 2 I
    Accepted Multipath
    Localpref: 100
    Router ID: 1.1.1.2
  BGP Preference: 170/-101
    Next hop type: Router, Next hop index: 678
    Address: 0x8f97520
    Next-hop reference count: 9
    Source: 10.1.1.6
    Next hop: 10.1.1.6 via ge-0/3/0.5, selected
    State: <NotBest Ext>
    Inactive reason: Not Best in its group - Active preferred
    Local AS: 1 Peer AS: 2
    Age: 5:04:43
    Task: BGP_2.10.1.1.6+58198
    AS path: 2 I
    Accepted MultipathContrib
    Localpref: 100
    Router ID: 1.1.1.3
```

### show route label detail (Multipoint LDP Inband Signaling for Point-to-Multipoint LSPs)

```
user@host> show route label 299872 detail
mpls.0: 13 destinations, 13 routes (13 active, 0 holddown, 0 hidden)
299872 (1 entry, 1 announced)
  *LDP Preference: 9
    Next hop type: Flood
    Next-hop reference count: 3
    Address: 0x9097d90
    Next hop: via vt-0/1/0.1
    Next-hop index: 661
    Label operation: Pop
    Address: 0x9172130
    Next hop: via so-0/0/3.0
    Next-hop index: 654
```



```
Label operation: Swap 299872
State: **Active Int>
Local AS: 1001
Age: 8:20      Metric: 1
Task: LDP
Announcement bits (1): 0-KRT
AS path: I
FECs bound to route: P2MP root-addr 10.255.72.166, grp 232.1.1.1,
src 192.168.142.2
```

## show route exact

---

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                      | <code>show route exact <i>destination-prefix</i></code><br><code>&lt;brief   detail   extensive   terse&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                                                     |
| <b>Syntax (EX Series Switches)</b> | <code>show route exact <i>destination-prefix</i></code><br><code>&lt;brief   detail   extensive   terse&gt;</code>                                                                                                                                                                                                                                                                                               |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                                            |
| <b>Description</b>                 | Display only the routes that exactly match the specified address or range of addresses.                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>                     | <b>brief   detail   extensive   terse</b> —(Optional) Display the specified level of output. If you do not specify a level of output, the system defaults to <b>brief</b> .<br><br><b><i>destination-prefix</i></b> —Address or range of addresses.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>List of Sample Output</b>       | <a href="#">show route exact on page 842</a><br><a href="#">show route exact detail on page 842</a><br><a href="#">show route exact extensive on page 843</a><br><a href="#">show route exact terse on page 843</a>                                                                                                                                                                                              |
| <b>Output Fields</b>               | For information about output fields, see the output field tables for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                                                                                                                                   |

## Sample Output

### show route exact

```
user@host> show route exact 207.17.136.0/24

inet.0: 24 destinations, 25 routes (23 active, 0 holddown, 1 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both
207.17.136.0/24    *[Static/5] 2d 03:30:22
                  > to 192.168.71.254 via fxp0.0
```

### show route exact detail

```
user@host> show route exact 207.17.136.0/24 detail

inet.0: 24 destinations, 25 routes (23 active, 0 holddown, 1 hidden)
Restart Complete
207.17.136.0/24 (1 entry, 1 announced)
    *Static Preference: 5
```

```

Next-hop reference count: 29
Next hop: 192.168.71.254 via fxp0.0, selected
State: <Active NoReadvrt Int Ext>
Local AS: 69
Age: 2d 3:30:26
Task: RT
Announcement bits (2): 0-KRT 3-Resolve tree 2
AS path: I

```

### show route exact extensive

```

user@host> show route exact 207.17.136.0/24 extensive
inet.0: 22 destinations, 23 routes (21 active, 0 holddown, 1 hidden)
207.17.136.0/24 (1 entry, 1 announced)
TSI:
KRT in-kernel 207.17.136.0/24 -> {192.168.71.254}
  *Static Preference: 5
    Next-hop reference count: 29
    Next hop: 192.168.71.254 via fxp0.0, selected
    State: <Active NoReadvrt Int Ext>
    Local AS: 69
    Age: 1:25:18
    Task: RT
    Announcement bits (2): 0-KRT 3-Resolve tree 2
    AS path: I

```

### show route exact terse

```

user@host> show route exact 207.17.136.0/24 terse

inet.0: 22 destinations, 23 routes (21 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both
A Destination      P Prf  Metric 1   Metric 2   Next hop      AS path
* 207.17.136.0/24  S   5                      >192.168.71.254

```

## show route export

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                      | show route export<br><brief   detail><br><instance <instance-name>   routing-table-name><br><logical-system (all   logical-system-name)>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Syntax (EX Series Switches)</b> | show route export<br><brief   detail><br><instance <instance-name>   routing-table-name>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Description</b>                 | Display policy-based route export information. Policy-based export simplifies the process of exchanging route information between routing instances.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>                     | <p><b>none</b>—(Same as <b>brief</b>.) Display standard information about policy-based export for all instances and routing tables on all systems.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>instance &lt;instance-name&gt;</b>—(Optional) Display a particular routing instance for which policy-based export is currently enabled.</p> <p><b>logical-system (all   logical-system-name)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>routing-table-name</b>—(Optional) Display information about policy-based export for all routing tables whose name begins with this string (for example, inet.0 and inet6.0 are both displayed when you run the <b>show route export inet</b> command).</p> |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>List of Sample Output</b>       | <a href="#">show route export on page 845</a><br><a href="#">show route export detail on page 845</a><br><a href="#">show route export instance detail on page 845</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Output Fields</b>               | Table 76 on page 844 lists the output fields for the <b>show route export</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

**Table 76: show route export Output Fields**

| Field Name                 | Field Description                                                                                                                                           | Level of Output   |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Table or <i>table-name</i> | Name of the routing tables that either import or export routes.                                                                                             | All levels        |
| Routes                     | Number of routes exported from this table into other tables. If a particular route is exported to different tables, the counter will only increment by one. | <b>brief</b> none |
| Export                     | Whether the table is currently exporting routes to other tables: Y or N (Yes or No).                                                                        | <b>brief</b> none |

Table 76: show route export Output Fields (*continued*)

| Field Name    | Field Description                                                                                                                                                                                                                                                                                                                                                                       | Level of Output |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Import        | Tables currently importing routes from the originator table. (Not displayed for tables that are not exporting any routes.)                                                                                                                                                                                                                                                              | <b>detail</b>   |
| Flags         | <p>(<b>instance</b> keyword only) Flags for this feature on this instance:</p> <ul style="list-style-type: none"> <li>• <b>config auto-policy</b>—The policy was deduced from the configured IGP export policies.</li> <li>• <b>cleanup</b>—Configuration information for this instance is no longer valid.</li> <li>• <b>config</b>—The instance was explicitly configured.</li> </ul> | <b>detail</b>   |
| Options       | <p>(<b>instance</b> keyword only) Configured option displays the type of routing tables the feature handles:</p> <ul style="list-style-type: none"> <li>• <b>unicast</b>—Indicates <i>instance.inet.0</i>.</li> <li>• <b>multicast</b>—Indicates <i>instance.inet.2</i>.</li> <li>• <b>unicast multicast</b>—Indicates <i>instance.inet.0</i> and <i>instance.inet.2</i>.</li> </ul>    | <b>detail</b>   |
| Import policy | ( <b>instance</b> keyword only) Policy that <b>route export</b> uses to construct the import-export matrix. Not displayed if the instance type is <b>vrf</b> .                                                                                                                                                                                                                          | <b>detail</b>   |
| Instance      | ( <b>instance</b> keyword only) Name of the routing instance.                                                                                                                                                                                                                                                                                                                           | <b>detail</b>   |
| Type          | ( <b>instance</b> keyword only) Type of routing instance: <b>forwarding</b> , <b>non-forwarding</b> , or <b>vrf</b> .                                                                                                                                                                                                                                                                   | <b>detail</b>   |

## Sample Output

### show route export

```

user@host> show route export
Table      Export      Routes
inet.0     N            0
black.inet.0 Y           3
red.inet.0 Y            4

```

### show route export detail

```

user@host> show route export detail
inet.0                                Routes:    0
black.inet.0                          Routes:    3
  Import: [ inet.0 ]
red.inet.0                             Routes:    4
  Import: [ inet.0 ]

```

### show route export instance detail

```

user@host> show route export instance detail
Instance: master                      Type: forwarding
Flags: <config auto-policy> Options: <unicast multicast>
Import policy: [ (ospf-master-from-red || isis-master-from-black) ]

```

Instance: black  
Instance: red

Type: non-forwarding  
Type: non-forwarding

## show route extensive

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                      | show route extensive<br><destination-prefix><br><logical-system (all   logical-system-name)>                                                                                                                                                                                                                                                                                                                                                         |
| <b>Syntax (EX Series Switches)</b> | show route extensive<br><destination-prefix>                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>                 | Display extensive information about the active entries in the routing tables.                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Options</b>                     | <p><b>none</b>—Display all active entries in the routing table.</p> <p><b>destination-prefix</b>—(Optional) Display active entries for the specified address or range of addresses.</p> <p><b>logical-system (all   logical-system-name)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p>                                                                                                         |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>List of Sample Output</b>       | <a href="#">show route extensive on page 853</a><br><a href="#">show route extensive (Access Route) on page 859</a><br><a href="#">show route extensive (BGP PIC Edge) on page 860</a><br><a href="#">show route extensive (FRR and LFA) on page 860</a><br><a href="#">show route extensive (Route Reflector) on page 861</a><br><a href="#">show route label detail (Multipoint LDP Inband Signaling for Point-to-Multipoint LSPs) on page 861</a> |
| <b>Output Fields</b>               | <p><a href="#">Table 77 on page 847</a> describes the output fields for the <b>show route extensive</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                         |

**Table 77: show route extensive Output Fields**

| Field Name                 | Field Description                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>routing-table-name</i>  | Name of the routing table (for example, inet.0).                                                                                                                                                                                                                                                                                                                   |
| <i>number destinations</i> | Number of destinations for which there are routes in the routing table.                                                                                                                                                                                                                                                                                            |
| <i>number routes</i>       | Number of routes in the routing table and total number of routes in the following states: <ul style="list-style-type: none"> <li><b>active</b> (routes that are active).</li> <li><b>holddown</b> (routes that are in the pending state before being declared inactive).</li> <li><b>hidden</b> (routes that are not used because of a routing policy).</li> </ul> |

Table 77: show route extensive Output Fields (*continued*)

| Field Name                                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>route-destination</b><br>(entry, announced) | <p>Route destination (for example: 10.0.0.1/24). The <b>entry</b> value is the number of route for this destination, and the <b>announced</b> value is the number of routes being announced for this destination. Sometimes the route destination is presented in another format, such as:</p> <ul style="list-style-type: none"> <li>• <b>MPLS-label</b> (for example, 80001).</li> <li>• <b>interface-name</b> (for example, ge-1/0/2).</li> <li>• <b>neighbor-address:control-word-status:encapsulation type:vc-id:source</b> (Layer 2 circuit only; for example, 10.1.1.195:NoCtrlWord:1:1:Local/96).</li> <li>• <b>neighbor-address</b>—Address of the neighbor.</li> <li>• <b>control-word-status</b>—Whether the use of the control word has been negotiated for this virtual circuit: <b>NoCtrlWord</b> or <b>CtrlWord</b>.</li> <li>• <b>encapsulation type</b>—Type of encapsulation, represented by a number: (1) Frame Relay DLCI, (2) ATM AAL5 VCC transport, (3) ATM transparent cell transport, (4) Ethernet, (5) VLAN Ethernet, (6) HDLC, (7) PPP, (8) ATM VCC cell transport, (10) ATM VPC cell transport.</li> <li>• <b>vc-id</b>—Virtual circuit identifier.</li> <li>• <b>source</b>—Source of the advertisement: <b>Local</b> or <b>Remote</b>.</li> </ul> |
| <b>TSI</b>                                     | Protocol header information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>label stacking</b>                          | <p>(Next-to-the-last-hop routing device for MPLS only) Depth of the MPLS label stack, where the label-popping operation is needed to remove one or more labels from the top of the stack. A pair of routes is displayed, because the pop operation is performed only when the stack depth is two or more labels.</p> <ul style="list-style-type: none"> <li>• <b>S=0 route</b> indicates that a packet with an incoming label stack depth of two or more exits this router with one fewer label (the label-popping operation is performed).</li> <li>• If there is no <b>S=</b> information, the route is a normal MPLS route, which has a stack depth of 1 (the label-popping operation is not performed).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>[protocol, preference]</b>                  | <p>Protocol from which the route was learned and the preference value for the route.</p> <ul style="list-style-type: none"> <li>• <b>+</b>—A plus sign indicates the active route, which is the route installed from the routing table into the forwarding table.</li> <li>• <b>-</b>—A hyphen indicates the last active route.</li> <li>• <b>*</b>—An asterisk indicates that the route is both the active and the last active route. An asterisk before a <b>to</b> line indicates the best subpath to the route.</li> </ul> <p>In every routing metric except for the BGP <b>LocalPref</b> attribute, a lesser value is preferred. In order to use common comparison routines, Junos OS stores the 1's complement of the <b>LocalPref</b> value in the <b>Preference2</b> field. For example, if the <b>LocalPref</b> value for Route 1 is 100, the <b>Preference2</b> value is -101. If the <b>LocalPref</b> value for Route 2 is 155, the <b>Preference2</b> value is -156. Route 2 is preferred because it has a higher <b>LocalPref</b> value and a lower <b>Preference2</b> value.</p>                                                                                                                                                                                  |
| <b>Level</b>                                   | <p>(IS-IS only). In IS-IS, a single autonomous system (AS) can be divided into smaller groups called areas. Routing between areas is organized hierarchically, allowing a domain to be administratively divided into smaller areas. This organization is accomplished by configuring Level 1 and Level 2 intermediate systems. Level 1 systems route within an area. When the destination is outside an area, they route toward a Level 2 system. Level 2 intermediate systems route between areas and toward other ASs.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Route Distinguisher</b>                     | IP subnet augmented with a 64-bit prefix.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |



Table 77: show route extensive Output Fields (*continued*)

| Field Name                                           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Next-hop type</b>                                 | Type of next hop. For a description of possible values for this field, see the Output Field table in the <a href="#">show route detail</a> command.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Next-hop reference count</b>                      | Number of references made to the next hop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Flood nexthop branches exceed maximum message</b> | Indicates that the number of flood next-hop branches exceeded the system limit of 32 branches, and only a subset of the flood next-hop branches were installed in the kernel.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Source</b>                                        | IP address of the route source.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Next hop</b>                                      | Network layer address of the directly reachable neighboring system.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>via</b>                                           | <p>Interface used to reach the next hop. If there is more than one interface available to the next hop, the name of the interface that is actually used is followed by the word <b>Selected</b>. This field can also contain the following information:</p> <ul style="list-style-type: none"> <li>• <b>Weight</b>—Value used to distinguish primary, secondary, and fast reroute backup routes. Weight information is available when MPLS label-switched path (LSP) link protection, node-link protection, or fast reroute is enabled, or when the standby state is enabled for secondary paths. A lower weight value is preferred. Among routes with the same weight value, load balancing is possible.</li> <li>• <b>Balance</b>—Balance coefficient indicating how traffic of unequal cost is distributed among next hops when a routing device is performing unequal-cost load balancing. This information is available when you enable BGP multipath load balancing.</li> </ul> |
| <b>Label-switched-path <i>lsp-path-name</i></b>      | Name of the LSP used to reach the next hop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Label operation</b>                               | MPLS label and operation occurring at this routing device. The operation can be <b>pop</b> (where a label is removed from the top of the stack), <b>push</b> (where another label is added to the label stack), or <b>swap</b> (where a label is replaced by another label).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Offset</b>                                        | Whether the metric has been increased or decreased by an offset value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Interface</b>                                     | (Local only) Local interface name.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Protocol next hop</b>                             | Network layer address of the remote routing device that advertised the prefix. This address is used to recursively derive a forwarding next hop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b><i>label-operation</i></b>                        | MPLS label and operation occurring at this routing device. The operation can be <b>pop</b> (where a label is removed from the top of the stack), <b>push</b> (where another label is added to the label stack), or <b>swap</b> (where a label is replaced by another label).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

Table 77: show route extensive Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Indirect next hops</b> | <p>When present, a list of nodes that are used to resolve the path to the next-hop destination, in the order that they are resolved.</p> <p>When BGP PIC Edge is enabled, the output lines that contain <b>Indirect next hop: weight</b> follow next hops that the software can use to repair paths where a link failure occurs. The next-hop weight has one of the following values:</p> <ul style="list-style-type: none"><li>• 0x1 indicates active next hops.</li><li>• 0x4000 indicates passive next hops.</li></ul> |
| <b>State</b>              | State of the route (a route can be in more than one state). See the Output Field table in the <a href="#">show route detail</a> command.                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Session ID</b>         | The BFD session ID number that represents the protection using MPLS fast reroute (FRR) and loop-free alternate (LFA).                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Weight</b>             | <p>Weight for the backup path. If the weight of an indirect next hop is larger than zero, the weight value is shown.</p> <p>For sample output, see <a href="#">show route table</a>.</p>                                                                                                                                                                                                                                                                                                                                  |

Table 77: show route extensive Output Fields (*continued*)

| Field Name      | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inactive reason | <p>If the route is inactive, the reason for its current state is indicated. Typical reasons include:</p> <ul style="list-style-type: none"> <li>• <b>Active preferred</b>—Currently active route was selected over this route.</li> <li>• <b>Always compare MED</b>—Path with a lower multiple exit discriminator (MED) is available.</li> <li>• <b>AS path</b>—Shorter AS path is available.</li> <li>• <b>Cisco Non-deterministic MED selection</b>—Cisco nondeterministic MED is enabled and a path with a lower MED is available.</li> <li>• <b>Cluster list length</b>—Path with a shorter cluster list length is available.</li> <li>• <b>Forwarding use only</b>—Path is only available for forwarding purposes.</li> <li>• <b>IGP metric</b>—Path through the next hop with a lower IGP metric is available.</li> <li>• <b>IGP metric type</b>—Path with a lower OSPF link-state advertisement type is available.</li> <li>• <b>Interior &gt; Exterior &gt; Exterior via Interior</b>—Direct, static, IGP, or EBGp path is available.</li> <li>• <b>Local preference</b>—Path with a higher local preference value is available.</li> <li>• <b>Next hop address</b>—Path with a lower metric next hop is available.</li> <li>• <b>No difference</b>—Path from a neighbor with a lower IP address is available.</li> <li>• <b>Not Best in its group</b>—Occurs when multiple peers of the same external AS advertise the same prefix and are grouped together in the selection process. When this reason is displayed, an additional reason is provided (typically one of the other reasons listed).</li> <li>• <b>Number of gateways</b>—Path with a higher number of next hops is available.</li> <li>• <b>Origin</b>—Path with a lower origin code is available.</li> <li>• <b>OSPF version</b>—Path does not support the indicated OSPF version.</li> <li>• <b>RIB preference</b>—Route from a higher-numbered routing table is available.</li> <li>• <b>Route distinguisher</b>—64-bit prefix added to IP subnets to make them unique.</li> <li>• <b>Route metric or MED comparison</b>—Route with a lower metric or MED is available.</li> <li>• <b>Route preference</b>—Route with a lower preference value is available.</li> <li>• <b>Router ID</b>—Path through a neighbor with a lower ID is available.</li> <li>• <b>Unusable path</b>—Path is not usable because of one of the following conditions: the route is damped, the route is rejected by an import policy, or the route is unresolved.</li> <li>• <b>Update source</b>—Last tiebreaker is the lowest IP address value.</li> </ul> |
| Local AS        | Autonomous system (AS) number of the local routing device.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Age             | How long the route has been known.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| AIGP            | Accumulated interior gateway protocol (AIGP) BGP attribute.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Metric          | Cost value of the indicated route. For routes within an AS, the cost is determined by IGP and the individual protocol metrics. For external routes, destinations, or routing domains, the cost is determined by a preference value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| MED-plus-IGP    | Metric value for BGP path selection to which the IGP cost to the next-hop destination has been added.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| TTL-Action      | <p>For MPLS LSPs, state of the TTL propagation attribute. Can be enabled or disabled for all RSVP-signaled and LDP-signaled LSPs or for specific VRF routing instances.</p> <p>For sample output, see <a href="#">show route table</a>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

Table 77: show route extensive Output Fields (*continued*)

| Field Name                           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Task</b>                          | Name of the protocol that has added the route.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Announcement bits</b>             | List of protocols that announce this route. <b>n-Resolve inet</b> indicates that the route is used for route resolution for next hops found in the routing table. <b>n</b> is an index used by Juniper Networks customer support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>AS path</b>                       | <p>AS path through which the route was learned. The letters at the end of the AS path indicate the path origin, providing an indication of the state of the route at the point at which the AS path originated:</p> <ul style="list-style-type: none"> <li>• <b>I</b>—IGP.</li> <li>• <b>E</b>—EGP.</li> <li>• <b>Recorded</b>—The AS path is recorded by the sample process (sampled).</li> <li>• <b>?</b>—Incomplete; typically, the AS path was aggregated.</li> </ul> <p>When AS path numbers are included in the route, the format is as follows:</p> <ul style="list-style-type: none"> <li>• <b>[ ]</b>—Brackets enclose the local AS number associated with the AS path if more than one AS number is configured on the routing device, or if AS path prepending is configured.</li> <li>• <b>{ }</b>—Braces enclose AS sets, which are groups of AS numbers in which the order does not matter. A set commonly results from route aggregation. The numbers in each AS set are displayed in ascending order.</li> <li>• <b>( )</b>—Parentheses enclose a confederation.</li> <li>• <b>( [ ] )</b>—Parentheses and brackets enclose a confederation set.</li> </ul> <p><b>NOTE:</b> In Junos OS Release 10.3 and later, the AS path field displays an unrecognized attribute and associated hexadecimal value if BGP receives attribute 128 (attribute set) and you have not configured an independent domain in any routing instance.</p> |
| <b>FECs bound to route</b>           | Point-to-multipoint root address, multicast source address, and multicast group address when multipoint LDP (M-LDP) inband signaling is configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>AS path: I &lt;Originator&gt;</b> | (For route reflected output only) Originator ID attribute set by the route reflector.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>VC Label</b>                      | MPLS label assigned to the Layer 2 circuit virtual connection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>MTU</b>                           | Maximum transmission unit (MTU) of the Layer 2 circuit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>VLAN ID</b>                       | VLAN identifier of the Layer 2 circuit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Cluster list</b>                  | (For route reflected output only) Cluster ID sent by the route reflector.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Originator ID</b>                 | (For route reflected output only) Address of router that originally sent the route to the route reflector.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Prefixes bound to route</b>       | Forwarding equivalent class (FEC) bound to this route. Applicable only to routes installed by LDP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Communities</b>                   | Community path attribute for the route. See the Output Field table in the <a href="#">show route detail</a> command for all possible values for this field.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Layer2-info: encaps</b>           | Layer 2 encapsulation (for example, VPLS).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

Table 77: show route extensive Output Fields (*continued*)

| Field Name                   | Field Description                                                                                                                                                                                                                                                                                                |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>control flags</b>         | Control flags: <b>none</b> or Site Down.                                                                                                                                                                                                                                                                         |
| <b>mtu</b>                   | Maximum transmission unit (MTU) information.                                                                                                                                                                                                                                                                     |
| <b>Label-Base, range</b>     | First label in a block of labels and label block size. A remote PE routing device uses this first label when sending traffic toward the advertising PE routing device.                                                                                                                                           |
| <b>status vector</b>         | Layer 2 VPN and VPLS network layer reachability information (NLRI).                                                                                                                                                                                                                                              |
| <b>Localpref</b>             | Local preference value included in the route.                                                                                                                                                                                                                                                                    |
| <b>Router ID</b>             | BGP router ID as advertised by the neighbor in the open message.                                                                                                                                                                                                                                                 |
| <b>Primary Routing Table</b> | In a routing table group, the name of the primary routing table in which the route resides.                                                                                                                                                                                                                      |
| <b>Secondary Tables</b>      | In a routing table group, the name of one or more secondary tables in which the route resides.                                                                                                                                                                                                                   |
| <b>Originating RIB</b>       | Name of the routing table whose active route was used to determine the forwarding next-hop entry in the resolution database. For example, in the case of inet.0 resolving through inet.0 and inet.3, this field indicates which routing table, inet.0 or inet.3, provided the best path for a particular prefix. |
| <b>Node path count</b>       | Number of nodes in the path.                                                                                                                                                                                                                                                                                     |
| <b>Forwarding nexthops</b>   | Number of forwarding next hops. The forwarding next hop is the network layer address of the directly reachable neighboring system (if applicable) and the interface used to reach it.                                                                                                                            |

## Sample Output

### show route extensive

```

user@host> show route extensive
inet.0: 22 destinations, 23 routes (21 active, 0 holddown, 1 hidden)
10.10.0.0/16 (1 entry, 1 announced)
TSI:
KRT in-kernel 10.10.0.0/16 -> {192.168.71.254}
  *Static Preference: 5
    Next-hop reference count: 29
    Next hop: 192.168.71.254 via fxp0.0, selected
    State: <Active NoReadvrt Int Ext>
    Local AS: 69
    Age: 1:34:06
    Task: RT
    Announcement bits (2): 0-KRT 3-Resolve tree 2
    AS path: I

10.31.1.0/30 (2 entries, 1 announced)
  *Direct Preference: 0
    Next hop type: Interface
    Next-hop reference count: 2
    Next hop: via so-0/3/0.0, selected
    State: <Active Int>

```

```
Local AS: 69
Age: 1:32:40
Task: IF
Announcement bits (1): 3-Resolve tree 2
AS path: I
OSPF Preference: 10
Next-hop reference count: 1
Next hop: via so-0/3/0.0, selected
State: <Int>
Inactive reason: Route Preference
Local AS: 69
Age: 1:32:40 Metric: 1
Area: 0.0.0.0
Task: OSPF
AS path: I

10.31.1.1/32 (1 entry, 1 announced)
*Local Preference: 0
Next hop type: Local
Next-hop reference count: 7
Interface: so-0/3/0.0
State: <Active NoReadvrt Int>
Local AS: 69
Age: 1:32:43
Task: IF
Announcement bits (1): 3-Resolve tree 2
AS path: I

...

10.31.2.0/30 (1 entry, 1 announced)
TSI:
KRT in-kernel 10.31.2.0/30 -> {10.31.1.6}
*OSPF Preference: 10
Next-hop reference count: 9
Next hop: via so-0/3/0.0
Next hop: 10.31.1.6 via ge-3/1/0.0, selected
State: <Active Int>
Local AS: 69
Age: 1:32:19 Metric: 2
Area: 0.0.0.0
Task: OSPF
Announcement bits (2): 0-KRT 3-Resolve tree 2
AS path: I

...

224.0.0.2/32 (1 entry, 1 announced)
TSI:
KRT in-kernel 224.0.0.2/32 -> {}
*PIM Preference: 0
Next-hop reference count: 18
State: <Active NoReadvrt Int>
Local AS: 69
Age: 1:34:08
Task: PIM Recv
Announcement bits (2): 0-KRT 3-Resolve tree 2
AS path: I

...
```

```

224.0.0.22/32 (1 entry, 1 announced)
TSI:
KRT in-kernel 224.0.0.22/32 -> {}
    *IGMP   Preference: 0
           Next-hop reference count: 18
           State: <Active NoReadvrt Int>
           Local AS:    69
           Age: 1:34:06
           Task: IGMP
           Announcement bits (2): 0-KRT 3-Resolve tree 2
           AS path: I

inet.3: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

10.255.70.103/32 (1 entry, 1 announced)
State: <FlashAll>
    *RSVP   Preference: 7
           Next-hop reference count: 6
           Next hop: 10.31.1.6 via ge-3/1/0.0 weight 0x1, selected
           Label-switched-path green-r1-r3
           Label operation: Push 100096
           State: <Active Int>
           Local AS:    69
           Age: 1:28:12   Metric: 2
           Task: RSVP
           Announcement bits (2): 1-Resolve tree 1 2-Resolve tree 2
           AS path: I

10.255.71.238/32 (1 entry, 1 announced)
State: <FlashAll>
    *RSVP   Preference: 7
           Next-hop reference count: 6
           Next hop: via so-0/3/0.0 weight 0x1, selected
           Label-switched-path green-r1-r2
           State: <Active Int>
           Local AS:    69
           Age: 1:28:12   Metric: 1
           Task: RSVP
           Announcement bits (2): 1-Resolve tree 1 2-Resolve tree 2
           AS path: I

private1__inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

...

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

47.0005.80ff.f800.0000.0108.0001.0102.5507.1052/152 (1 entry, 0 announced)
    *Direct Preference: 0
           Next hop type: Interface
           Next-hop reference count: 1
           Next hop: via lo0.0, selected
           State: <Active Int>
           Local AS:    69
           Age: 1:34:07
           Task: IF
           AS path: I

mpls.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)

0 (1 entry, 1 announced)

```

```

TSI:
KRT in-kernel 0 /36 -> {}
    *MPLS Preference: 0
        Next hop type: Receive
        Next-hop reference count: 6
        State: <Active Int>
        Local AS: 69
        Age: 1:34:08 Metric: 1
        Task: MPLS
        Announcement bits (1): 0-KRT
        AS path: I

...

mpls.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
299776 (1 entry, 1 announced)
TSI:
KRT in-kernel 299776 /52 -> {Flood}
    *RSVP Preference: 7
        Next hop type: Flood
        Next-hop reference count: 130
        Flood nexthop branches exceed maximum
        Address: 0x8ea65d0

...

800010 (1 entry, 1 announced)

TSI:
KRT in-kernel 800010 /36 -> {vt-3/2/0.32769}
    *VPLS Preference: 7
        Next-hop reference count: 2
        Next hop: via vt-3/2/0.32769, selected
        Label operation: Pop
        State: <Active Int>
        Age: 1:31:53
        Task: Common L2 VC
        Announcement bits (1): 0-KRT
        AS path: I

vt-3/2/0.32769 (1 entry, 1 announced)
TSI:
KRT in-kernel vt-3/2/0.32769.0 /16 -> {indirect(1048574)}
    *VPLS Preference: 7
        Next-hop reference count: 2
        Next hop: 10.31.1.6 via ge-3/1/0.0 weight 0x1, selected
        Label-switched-path green-r1-r3
        Label operation: Push 800012, Push 100096(top)
        Protocol next hop: 10.255.70.103
        Push 800012
        Indirect next hop: 87272e4 1048574
        State: <Active Int>
        Age: 1:31:53 Metric2: 2
        Task: Common L2 VC
        Announcement bits (2): 0-KRT 1-Common L2 VC
        AS path: I
        Communities: target:11111:1 Layer2-info: encaps:VPLS,
        control flags:, mtu: 0
        Indirect next hops: 1
            Protocol next hop: 10.255.70.103 Metric: 2
            Push 800012
            Indirect next hop: 87272e4 1048574

```



```

Indirect path forwarding next hops: 1
  Next hop: 10.31.1.6 via ge-3/1/0.0 weight 0x1
10.255.70.103/32 Originating RIB: inet.3
  Metric: 2                               Node path count: 1
  Forwarding nexthops: 1
    Nexthop: 10.31.1.6 via ge-3/1/0.0

inet6.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)

abcd::10:255:71:52/128 (1 entry, 0 announced)
  *Direct Preference: 0
    Next hop type: Interface
    Next-hop reference count: 1
    Next hop: via lo0.0, selected
    State: <Active Int>
    Local AS: 69
    Age: 1:34:07
    Task: IF
    AS path: I

fe80::280:42ff:fe10:f179/128 (1 entry, 0 announced)
  *Direct Preference: 0
    Next hop type: Interface
    Next-hop reference count: 1
    Next hop: via lo0.0, selected
    State: <Active NoReadvrt Int>
    Local AS: 69
    Age: 1:34:07
    Task: IF
    AS path: I

ff02::2/128 (1 entry, 1 announced)
TSI:
KRT in-kerne1 ff02::2/128 -> {}
  *PIM Preference: 0
    Next-hop reference count: 18
    State: <Active NoReadvrt Int>
    Local AS: 69
    Age: 1:34:08
    Task: PIM Recv6
    Announcement bits (1): 0-KRT
    AS path: I

ff02::d/128 (1 entry, 1 announced)
TSI:
KRT in-kerne1 ff02::d/128 -> {}
  *PIM Preference: 0
    Next-hop reference count: 18
    State: <Active NoReadvrt Int>
    Local AS: 69
    Age: 1:34:08
    Task: PIM Recv6
    Announcement bits (1): 0-KRT
    AS path: I

ff02::16/128 (1 entry, 1 announced)
TSI:
KRT in-kerne1 ff02::16/128 -> {}
  *MLD Preference: 0
    Next-hop reference count: 18
    State: <Active NoReadvrt Int>

```

```
Local AS: 69
Age: 1:34:06
Task: MLD
Announcement bits (1): 0-KRT
AS path: I

private.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

fe80::280:42ff:fe10:f179/128 (1 entry, 0 announced)
*Direct Preference: 0
  Next hop type: Interface
  Next-hop reference count: 1
  Next hop: via lo0.16385, selected
  State: <Active NoReadvrt Int>
  Age: 1:34:07
  Task: IF
  AS path: I

green.l2vpn.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)

10.255.70.103:1:3:1/96 (1 entry, 1 announced)
*BGP Preference: 170/-101
  Route Distinguisher: 10.255.70.103:1
  Next-hop reference count: 7
  Source: 10.255.70.103
  Protocol next hop: 10.255.70.103
  Indirect next hop: 2 no-forward
  State: <Secondary Active Int Ext>
  Local AS: 69 Peer AS: 69
  Age: 1:28:12 Metric2: 1
  Task: BGP_69.10.255.70.103+179
  Announcement bits (1): 0-green-l2vpn
  AS path: I
  Communities: target:11111:1 Layer2-info: encaps:VPLS,
  control flags:, mtu: 0
  Label-base: 800008, range: 8
  Localpref: 100
  Router ID: 10.255.70.103
  Primary Routing Table bgp.l2vpn.0

10.255.71.52:1:1:1/96 (1 entry, 1 announced)
TSI:
Page 0 idx 0 Type 1 val 8699540
*L2VPN Preference: 170/-1
  Next-hop reference count: 5
  Protocol next hop: 10.255.71.52
  Indirect next hop: 0 -
  State: <Active Int Ext>
  Age: 1:34:03 Metric2: 1
  Task: green-l2vpn
  Announcement bits (1): 1-BGP.0.0.0.0+179
  AS path: I
  Communities: Layer2-info: encaps:VPLS, control flags:Site-Down,
  mtu: 0
  Label-base: 800016, range: 8, status-vector: 0x9F

10.255.71.52:1:5:1/96 (1 entry, 1 announced)
TSI:
Page 0 idx 0 Type 1 val 8699528
*L2VPN Preference: 170/-101
  Next-hop reference count: 5
```

```

Protocol next hop: 10.255.71.52
Indirect next hop: 0 -
State: <Active Int Ext>
Age: 1:34:03 Metric2: 1
Task: green-l2vpn
Announcement bits (1): 1-BGP.0.0.0+179
AS path: I
Communities: Layer2-info: encaps:VPLS, control flags:, mtu: 0
Label-base: 800008, range: 8, status-vector: 0x9F

...

12circuit.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
TSI:

10.245.255.63:CtrlWord:4:3:Local/96 (1 entry, 1 announced)
  *L2CKT Preference: 7
    Next hop: via so-1/1/2.0 weight 1, selected
    Label-switched-path my-lsp
    Label operation: Push 100000[0]
    Protocol next hop: 10.245.255.63 Indirect next hop: 86af000 296
    State: <Active Int>
    Local AS: 99
    Age: 10:21
    Task: 12 circuit
    Announcement bits (1): 0-LDP
    AS path: I
    VC Label 100000, MTU 1500, VLAN ID 512

55.0.0.0/24 (1 entry, 1 announced)
TSI:
KRT queued (pending) add
  55.0.0.0/24 -> {Push 300112}
    *BGP Preference: 170/-101
      Next hop type: Router
      Address: 0x925c208
      Next-hop reference count: 2
      Source: 10.0.0.9
      Next hop: 10.0.0.9 via ge-1/2/0.15, selected
      Label operation: Push 300112
      Label TTL action: prop-ttl
      State: <Active Ext>
      Local AS: 7019 Peer AS: 13979
      Age: 1w0d 23:06:56
      AIGP: 25
      Task: BGP_13979.10.0.0.9+56732
      Announcement bits (1): 0-KRT
      AS path: 13979 7018 I
      Accepted
      Route Label: 300112
      Localpref: 100
      Router ID: 10.9.9.1

```

#### show route extensive (Access Route)

```

user@host> show route 13.160.0.102 extensive
inet.0: 39256 destinations, 39258 routes (39255 active, 0 holddown, 1 hidden)
13.160.0.102/32 (1 entry, 1 announced)
TSI:

```

```
KRT in-kernel 13.160.0.102/32 -> {13.160.0.2}
OSPF area : 0.0.0.0, LSA ID : 13.160.0.102, LSA type : Extern
  *Access Preference: 13
    Next-hop reference count: 78472
    Next hop: 13.160.0.2 via fe-0/0/0.0, selected
    State: <Active Int>
  Age: 12
    Task: RPD Unix Domain Server./var/run/rpd_serv.local
    Announcement bits (2): 0-KRT 1-OSPFv2
    AS path: I
```

### show route extensive (BGP PIC Edge)

```
user@host> show route 1.1.1.6 extensive
ed.inet.0: 6 destinations, 9 routes (6 active, 0 holddown, 0 hidden)
  1.1.1.6/32 (3 entries, 2 announced)
    State: <CalcForwarding>
  TSI:
    KRT in-kernel 1.1.1.6/32 -> {indirect(1048574), indirect(1048577)}
    Page 0 idx 0 Type 1 val 9219e30
    Nexthop: Self
    AS path: [2] 3 I
    Communities: target:2:1
    Path 1.1.1.6 from 1.1.1.4 Vector len 4. Val: 0
  ..
    #Multipath Preference: 255
      Next hop type: Indirect
      Address: 0x93f4010
      Next-hop reference count: 2
  ..
    Protocol next hop: 1.1.1.4
    Push 299824
    Indirect next hop: 944c000 1048574 INH Session ID: 0x3
    Indirect next hop: weight 0x1
    Protocol next hop: 1.1.1.5
    Push 299824
    Indirect next hop: 944c1d8 1048577 INH Session ID: 0x4
    Indirect next hop: weight 0x4000
    State: <ForwardingOnly Int Ext>
    Inactive reason: Forwarding use only
    Age: 25      Metric2: 15
    Validation State: unverified
    Task: RT
    Announcement bits (1): 0-KRT
    AS path: 3 I
    Communities: target:2:1
```

### show route extensive (FRR and LFA)

```
user@host> show route 20.31.2.0 extensive
inet.0: 46 destinations, 49 routes (45 active, 0 holddown, 1 hidden)
  20.31.2.0/24 (2 entries, 1 announced)
    State: FlashAll
  TSI:
    KRT in-kernel 20.31.2.0/24 -> {Push 299776, Push 299792}
    *RSVP Preference: 7/1
      Next hop type: Router, Next hop index: 1048574
      Address: 0xbbbc010
      Next-hop reference count: 5
      Next hop: 10.31.1.2 via ge-2/1/8.0 weight 0x1, selected
      Label-switched-path europa-d-to-europa-e
```

```

Label operation: Push 299776
Label TTL action: prop-ttl
Session Id: 0x201
Next hop: 10.31.2.2 via ge-2/1/4.0 weight 0x4001
Label-switched-path europa-d-to-europa-e
Label operation: Push 299792
Label TTL action: prop-ttl
Session Id: 0x202
State: Active Int
Local AS: 100
Age: 5:31 Metric: 2
Task: RSVP
Announcement bits (1): 0-KRT
AS path: I
OSPF Preference: 10
Next hop type: Router, Next hop index: 615
Address: 0xb9d78c4
Next-hop reference count: 7
Next hop: 10.31.1.2 via ge-2/1/8.0, selected
Session Id: 0x201
State: Int
Inactive reason: Route Preference
Local AS: 100
Age: 5:35 Metric: 3
Area: 0.0.0.0
Task: OSPF
AS path: I

```

#### show route extensive (Route Reflector)

```

user@host> show route extensive
1.0.0.0/8 (1 entry, 1 announced)

TSI:
KRT in-kernel 1.0.0.0/8 -> {indirect(40)}
  *BGP Preference: 170/-101
    Source: 192.168.4.214
    Protocol next hop: 207.17.136.192 Indirect next hop: 84ac908 40
    State: <Active Int Ext>
    Local AS: 10458 Peer AS: 10458
    Age: 3:09 Metric: 0 Metric2: 0
    Task: BGP_10458.192.168.4.214+1033
    Announcement bits (2): 0-KRT 4-Resolve inet.0
    AS path: 3944 7777 I <Originator>
    Cluster list: 1.1.1.1
    Originator ID: 10.255.245.88
    Communities: 7777:7777
    Localpref: 100
    Router ID: 4.4.4.4
    Indirect next hops: 1
      Protocol next hop: 207.17.136.192 Metric: 0
      Indirect next hop: 84ac908 40
      Indirect path forwarding next hops: 0
      Next hop type: Discard

```

#### show route label detail (Multipoint LDP Inband Signaling for Point-to-Multipoint LSPs)

```

user@host> show route label 299872 detail
mpls.0: 13 destinations, 13 routes (13 active, 0 holddown, 0 hidden)
299872 (1 entry, 1 announced)
  *LDP Preference: 9

```

```
Next hop type: Flood
Next-hop reference count: 3
Address: 0x9097d90
Next hop: via vt-0/1/0.1
Next-hop index: 661
Label operation: Pop
Address: 0x9172130
Next hop: via so-0/0/3.0
Next-hop index: 654
Label operation: Swap 299872
State: **Active Int>
Local AS: 1001
Age: 8:20      Metric: 1
Task: LDP
Announcement bits (1): 0-KRT
AS path: I
FECs bound to route: P2MP root-addr 10.255.72.166, grp 232.1.1.1,
src 192.168.142.2
```

## show route flow validation

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                      | show route flow validation<br><brief   detail><br><ip-prefix><br><table table-name><br><logical-system (all   logical-system-name)>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Syntax (EX Series Switches)</b> | show route flow validation<br><brief   detail><br><ip-prefix><br><table table-name>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Description</b>                 | Display flow route information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>                     | <p><b>none</b>—Display flow route information.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output. If you do not specify a level of output, the system defaults to brief.</p> <p><b>ip-prefix</b>—(Optional) IP address for the flow route.</p> <p><b>logical-system (all   logical-system-name)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>table table-name</b>—(Optional) Display flow route information for all routing tables whose name begins with this string (for example, inet.0 and inet6.0 are both displayed when you run the <b>show route flow validation inet</b> command).</p> |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>List of Sample Output</b>       | <a href="#">show route flow validation on page 864</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Output Fields</b>               | Table 78 on page 863 lists the output fields for the <b>show route flow validation</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

**Table 78: show route flow validation Output Fields**

| Field Name                  | Field Description                                                | Level of Output |
|-----------------------------|------------------------------------------------------------------|-----------------|
| <i>routing-table-name</i>   | Name of the routing table (for example, inet.0).                 | All levels      |
| <i>prefix</i>               | Route address.                                                   | All levels      |
| Active unicast route        | Active route in the routing table.                               | All levels      |
| Dependent flow destinations | Number of flows for which there are routes in the routing table. | All levels      |

Table 78: show route flow validation Output Fields (*continued*)

| Field Name         | Field Description                                                       | Level of Output |
|--------------------|-------------------------------------------------------------------------|-----------------|
| Origin             | Source of the route flow.                                               | All levels      |
| Neighbor AS        | Autonomous system identifier of the neighbor.                           | All levels      |
| Flow destination   | Number of entries and number of destinations that match the route flow. | All levels      |
| Unicast best match | Destination that is the best match for the route flow.                  | All levels      |
| Flags              | Information about the route flow.                                       | All levels      |

## Sample Output

### show route flow validation

```
user@host> show route flow validation
inet.0:
10.0.5.0/24Active unicast route
Dependent flow destinations: 1
Origin: 192.168.224.218, Neighbor AS: 65001
Flow destination (3 entries, 1 match origin)
Unicast best match: 10.0.5.0/24
Flags: SubtreeApex Consistent
```



## show route forwarding-table

|                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                        | <pre>show route forwarding-table &lt;detail   extensive   summary&gt; &lt;all&gt; &lt;ccc interface-name&gt; &lt;destination destination-prefix&gt; &lt;family family   matching matching&gt; &lt;interface-name interface-name&gt; &lt;label name&gt; &lt;matching matching&gt; &lt;multicast&gt; &lt;table (default   logical-system-name/routing-instance-name   routing-instance-name)&gt; &lt;vlan (all   vlan-name)&gt; &lt;vpn vpn&gt;</pre>                                                                                     |
| <b>Syntax (MX Series Routers)</b>                    | <pre>show route forwarding-table &lt;detail   extensive   summary&gt; &lt;all&gt; &lt;bridge-domain (all   domain-name)&gt; &lt;ccc interface-name&gt; &lt;destination destination-prefix&gt; &lt;family family   matching matching&gt; &lt;interface-name interface-name&gt; &lt;label name&gt; &lt;learning-vlan-id learning-vlan-id&gt; &lt;matching matching&gt; &lt;multicast&gt; &lt;table (default   logical-system-name/routing-instance-name   routing-instance-name)&gt; &lt;vlan (all   vlan-name)&gt; &lt;vpn vpn&gt;</pre> |
| <b>Syntax (TX Matrix and TX Matrix Plus Routers)</b> | <pre>show route forwarding-table &lt;detail   extensive   summary&gt; &lt;all&gt; &lt;ccc interface-name&gt; &lt;destination destination-prefix&gt; &lt;family family   matching matching&gt; &lt;interface-name interface-name&gt; &lt;matching matching&gt; &lt;label name&gt; &lt;lcc number&gt; &lt;multicast&gt; &lt;table routing-instance-name&gt; &lt;vpn vpn&gt;</pre>                                                                                                                                                         |
| <b>Release Information</b>                           | <p>Command introduced before Junos OS Release 7.4.</p> <p>Option <b>bridge-domain</b> introduced in Junos OS Release 7.5</p> <p>Option <b>learning-vlan-id</b> introduced in Junos OS Release 8.4</p> <p>Options <b>all</b> and <b>vlan</b> introduced in Junos OS Release 9.6.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                                              |

**Description** Display the Routing Engine's forwarding table, including the network-layer prefixes and their next hops. This command is used to help verify that the routing protocol process has relayed the correction information to the forwarding table. 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.



**NOTE:** The Routing Engine copies the forwarding table to the Packet Forwarding Engine, the part of the router that is responsible for forwarding packets. To display the entries in the Packet Forwarding Engine's forwarding table, use the **show pfe route** command.

**Options** **none**—Display the routes in the forwarding tables. By default, the **show route forwarding-table** command does not display information about private, or internal, forwarding tables.

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

**all**—(Optional) Display routing table entries for all forwarding tables, including private, or internal, tables.

**bridge-domain (all | *bridge-domain-name*)**—(MX Series routers only) (Optional) Display route entries for all bridge domains or the specified bridge domain.

**ccc *interface-name***—(Optional) Display route entries for the specified circuit cross-connect interface.

**destination *destination-prefix***—(Optional) Destination prefix.

**family *family***—(Optional) Display routing table entries for the specified family: **fibre-channel**, **fmembers**, **inet**, **inet6**, **iso**, **mpls**, **tnp**, **unix**, **vpls**, or **vlan-classification**.

**interface-name *interface-name***—(Optional) Display routing table entries for the specified interface.

**label *name***—(Optional) Display route entries for the specified label.

**lcc *number***—(TX Matrix and TX matrix Plus routers only) (Optional) On a routing matrix composed of a TX Matrix router and T640 routers, display information for the specified T640 router (or line-card chassis) connected to the TX Matrix router. On a routing matrix composed of the TX Matrix Plus router and T1600 or T4000 routers, display information for the specified router (line-card chassis) connected to the TX Matrix Plus router.

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

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

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

**learning-vlan-id** *learning-vlan-id*—(MX Series routers only) (Optional) Display learned information for all VLANs or for the specified VLAN.

**matching** *matching*—(Optional) Display routing table entries matching the specified prefix or prefix length.

**multicast**—(Optional) Display routing table entries for multicast routes.

**table** (default | *logical-system-name/routing-instance-name* | *routing-instance-name*)—(Optional) Display route entries for all the routing tables in the main routing instance or for the specified routing instance. If your device supports logical systems, you can also display route entries for the specified logical system and routing instance. To view the routing instances on your device, use the [show route instance](#) command.

**vlan** (all | *vlan-name*)—(Optional) Display information for all VLANs or for the specified VLAN.

**vpn** *vpn*—(Optional) Display routing table entries for a specified VPN.

**Required Privilege Level** view

**List of Sample Output** [show route forwarding-table on page 870](#)  
[show route forwarding-table detail on page 871](#)  
[show route forwarding-table destination extensive \(Weights and Balances\) on page 871](#)  
[show route forwarding-table extensive on page 872](#)  
[show route forwarding-table extensive \(RPF\) on page 873](#)  
[show route forwarding-table family mpls on page 874](#)  
[show route forwarding-table family vpls on page 874](#)  
[show route forwarding-table family vpls extensive on page 874](#)  
[show route forwarding-table table default on page 876](#)  
[show route forwarding-table table](#)  
[logical-system-name/routing-instance-name on page 877](#)  
[show route forwarding-table vpn on page 877](#)

**Output Fields** [Table 79 on page 868](#) lists the output fields for the **show route forwarding-table** command. Output fields are listed in the approximate order in which they appear. Field names might be abbreviated (as shown in parentheses) when no level of output is specified, or when the **detail** keyword is used instead of the **extensive** keyword.

Table 79: show route forwarding-table Output Fields

| Field Name              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Level of Output         |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| Logical system          | Name of the logical system. This field is displayed if you specify the <b>table logical-system-name/routing-instance-name</b> option on a device that is configured for and supports logical systems.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | All levels              |
| Routing table           | Name of the routing table (for example, inet, inet6, mpls).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | All levels              |
| Address family          | Address family (for example, IP, IPv6, ISO, MPLS, and VPLS).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | All levels              |
| Destination             | Destination of the route.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive</b> |
| Route Type (Type)       | <p>How the route was placed into the forwarding table. When the <b>detail</b> keyword is used, the route type might be abbreviated (as shown in parentheses):</p> <ul style="list-style-type: none"> <li>• <b>cloned (clon)</b>—(TCP or multicast only) Cloned route.</li> <li>• <b>destination (dest)</b>—Remote addresses directly reachable through an interface.</li> <li>• <b>destination down (iddn)</b>—Destination route for which the interface is unreachable.</li> <li>• <b>interface cloned (ifcl)</b>—Cloned route for which the interface is unreachable.</li> <li>• <b>route down (ifdn)</b>—Interface route for which the interface is unreachable.</li> <li>• <b>ignore (ignr)</b>—Ignore this route.</li> <li>• <b>interface (intf)</b>—Installed as a result of configuring an interface.</li> <li>• <b>permanent (perm)</b>—Routes installed by the kernel when the routing table is initialized.</li> <li>• <b>user</b>—Routes installed by the routing protocol process or as a result of the configuration.</li> </ul> | All levels              |
| Route Reference (RtRef) | Number of routes to reference.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive</b> |
| Flags                   | <p>Route type flags:</p> <ul style="list-style-type: none"> <li>• <b>none</b>—No flags are enabled.</li> <li>• <b>accounting</b>—Route has accounting enabled.</li> <li>• <b>cached</b>—Cache route.</li> <li>• <b>incoming-iface interface-number</b>—Check against incoming interface.</li> <li>• <b>prefix load balance</b>—Load balancing is enabled for this prefix.</li> <li>• <b>rt nh decoupled</b>—Route has been decoupled from the next hop to the destination.</li> <li>• <b>sent to PFE</b>—Route has been sent to the Packet Forwarding Engine.</li> <li>• <b>static</b>—Static route.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>extensive</b>        |
| Next hop                | IP address of the next hop to the destination.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive</b> |

Table 79: show route forwarding-table Output Fields (*continued*)

| Field Name                 | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Level of Output              |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| Next hop Type (Type)       | <p>Next-hop type. When the <b>detail</b> keyword is used, the next-hop type might be abbreviated (as indicated in parentheses):</p> <ul style="list-style-type: none"> <li>• <b>broadcast (bcst)</b>—Broadcast.</li> <li>• <b>deny</b>—Deny.</li> <li>• <b>discard (dscd)</b>—Discard.</li> <li>• <b>hold</b>—Next hop is waiting to be resolved into a unicast or multicast type.</li> <li>• <b>indexed (idxd)</b>—Indexed next hop.</li> <li>• <b>indirect (indr)</b>—Indirect next hop.</li> <li>• <b>local (locl)</b>—Local address on an interface.</li> <li>• <b>routed multicast (mcrd)</b>—Regular multicast next hop.</li> <li>• <b>multicast (mcst)</b>—Wire multicast next hop (limited to the LAN).</li> <li>• <b>multicast discard (mdsc)</b>—Multicast discard.</li> <li>• <b>multicast group (mgrp)</b>—Multicast group member.</li> <li>• <b>receive (rcv)</b>—Receive.</li> <li>• <b>reject (rjct)</b>—Discard. An ICMP unreachable message was sent.</li> <li>• <b>resolve (rslv)</b>—Resolving the next hop.</li> <li>• <b>unicast (ucst)</b>—Unicast.</li> <li>• <b>unilist (ulst)</b>—List of unicast next hops. A packet sent to this next hop goes to any next hop in the list.</li> </ul> | <b>detail extensive</b>      |
| Index                      | Software index of the next hop that is used to route the traffic for a given prefix.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive none</b> |
| Route interface-index      | Logical interface index from which the route is learned. For example, for interface routes, this is the logical interface index of the route itself. For static routes, this field is zero. For routes learned through routing protocols, this is the logical interface index from which the route is learned.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>extensive</b>             |
| Reference (NhRef)          | Number of routes that refer to this next hop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive none</b> |
| Next-hop interface (Netif) | Interface used to reach the next hop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive none</b> |
| Weight                     | Value used to distinguish primary, secondary, and fast reroute backup routes. Weight information is available when MPLS label-switched path (LSP) link protection, node-link protection, or fast reroute is enabled, or when the standby state is enabled for secondary paths. A lower weight value is preferred. Among routes with the same weight value, load balancing is possible (see the <b>Balance</b> field description).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>extensive</b>             |
| Balance                    | Balance coefficient indicating how traffic of unequal cost is distributed among next hops when a router is performing unequal-cost load balancing. This information is available when you enable BGP multipath load balancing.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>extensive</b>             |
| RPF interface              | List of interfaces from which the prefix can be accepted. Reverse path forwarding (RPF) information is displayed only when <b>rpf-check</b> is configured on the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>extensive</b>             |

## Sample Output

### show route forwarding-table

```

user@host> show route forwarding-table
Routing table: default.inet
Internet:
Destination      Type RtRef Next hop          Type Index NhRef Netif
default          perm  0                               rjct  46   4
0.0.0.0/32       perm  0                               dscd  44   1
1.1.1.0/24       ifdn  0                               rslv  608  1 ge-2/0/1.0
1.1.1.0/32       iddn  0 1.1.1.0             recv  606  1 ge-2/0/1.0
1.1.1.1/32       user  0                               rjct  46   4
1.1.1.1/32       intf  0 1.1.1.1             locl  607  2
1.1.1.1/32       iddn  0 1.1.1.1             locl  607  2
1.1.1.255/32     iddn  0 ff:ff:ff:ff:ff:ff    bcst  605  1 ge-2/0/1.0
10.0.0.0/24      intf  0                               rslv  616  1 ge-2/0/0.0
10.0.0.0/32      dest  0 10.0.0.0            recv  614  1 ge-2/0/0.0
10.0.0.1/32      intf  0 10.0.0.1            locl  615  2
10.0.0.1/32      dest  0 10.0.0.1            locl  615  2
10.0.0.255/32    dest  0 10.0.0.255          bcst  613  1 ge-2/0/0.0
10.1.1.0/24      ifdn  0                               rslv  612  1 ge-2/0/1.0
10.1.1.0/32      iddn  0 10.1.1.0            recv  610  1 ge-2/0/1.0
10.1.1.1/32      user  0                               rjct  46   4
10.1.1.1/32      intf  0 10.1.1.1            locl  611  2
10.1.1.1/32      iddn  0 10.1.1.1            locl  611  2
10.1.1.255/32    iddn  0 ff:ff:ff:ff:ff:ff    bcst  609  1 ge-2/0/1.0
10.206.0.0/16    user  0 10.209.63.254        ucst  419  20 fxp0.0
10.209.0.0/16    user  1 0:12:1e:ca:98:0      ucst  419  20 fxp0.0
10.209.0.0/18    intf  0                               rslv  418  1 fxp0.0
10.209.0.0/32    dest  0 10.209.0.0          recv  416  1 fxp0.0
10.209.2.131/32  intf  0 10.209.2.131        locl  417  2
10.209.2.131/32  dest  0 10.209.2.131        locl  417  2
10.209.17.55/32  dest  0 0:30:48:5b:78:d2     ucst  435  1 fxp0.0
10.209.63.42/32  dest  0 0:23:7d:58:92:ca     ucst  434  1 fxp0.0
10.209.63.254/32 dest  0 0:12:1e:ca:98:0      ucst  419  20 fxp0.0
10.209.63.255/32 dest  0 10.209.63.255       bcst  415  1 fxp0.0
10.227.0.0/16    user  0 10.209.63.254        ucst  419  20 fxp0.0

...

Routing table: iso
ISO:
Destination      Type RtRef Next hop          Type Index NhRef Netif
default          perm  0                               rjct  27   1
47.0005.80ff.f800.0000.0108.0003.0102.5524.5220.00
intf  0                               locl  28   1

Routing table: inet6
Internet6:
Destination      Type RtRef Next hop          Type Index NhRef Netif
default          perm  0                               rjct  6   1
ff00::/8         perm  0                               mdsc  4   1
ff02::1/128      perm  0 ff02::1             mcst  3   1

Routing table: ccc
MPLS:
Interface.Label  Type RtRef Next hop          Type Index NhRef Netif

```

```

default          perm      0          rjct 16      1
100004(top) fe-0/0/1.0

```

### show route forwarding-table detail

```

user@host> show route forwarding-table detail
Routing table: inet
Internet:
Destination      Type RtRef Next hop          Type Index NhRef Netif
default          user   2 0:90:69:8e:b1:1b ucst  132   4 fxp0.0
default          perm   0                      rjct  14    1
10.1.1.0/24      intf   0 ff.3.0.21         ucst  322   1 so-5/3/0.0
10.1.1.0/32      dest   0 10.1.1.0          recv  324   1 so-5/3/0.0
10.1.1.1/32      intf   0 10.1.1.1          locl  321    1
10.1.1.255/32    dest   0 10.1.1.255        bcst  323   1 so-5/3/0.0
10.21.21.0/24    intf   0 ff.3.0.21         ucst  326   1 so-5/3/0.0
10.21.21.0/32    dest   0 10.21.21.0        recv  328   1 so-5/3/0.0
10.21.21.1/32    intf   0 10.21.21.1        locl  325    1
10.21.21.255/32  dest   0 10.21.21.255      bcst  327   1 so-5/3/0.0
127.0.0.1/32     intf   0 127.0.0.1         locl  320    1
172.17.28.19/32  clon   1 192.168.4.254     ucst  132   4 fxp0.0
172.17.28.44/32  clon   1 192.168.4.254     ucst  132   4 fxp0.0
...

Routing table: private1__inet
Internet:
Destination      Type RtRef Next hop          Type Index NhRef Netif
default          perm   0                      rjct  46    1
10.0.0.0/8       intf   0                      rslv  136   1 fxp1.0
10.0.0.0/32      dest   0 10.0.0.0          recv  134   1 fxp1.0
10.0.0.4/32      intf   0 10.0.0.4          locl  135    2
10.0.0.4/32      dest   0 10.0.0.4          locl  135    2
...

Routing table: iso
ISO:
Destination      Type RtRef Next hop          Type Index NhRef Netif
default          perm   0                      rjct  38    1

Routing table: inet6
Internet6:
Destination      Type RtRef Next hop          Type Index NhRef Netif
default          perm   0                      rjct  22    1
ff00::/8         perm   0                      mdsc  21    1
ff02::1/128      perm   0 ff02::1          mcst  17    1
...

Routing table: mpls
MPLS:
Destination      Type RtRef Next hop          Type Index NhRef Netif
default          perm   0                      rjct  28    1

```

### show route forwarding-table destination extensive (Weights and Balances)

```

user@host> show route forwarding-table destination 3.4.2.1 extensive
Routing table: inet [Index 0]
Internet:

```

```
Destination: 3.4.2.1/32
Route type: user
Route reference: 0
Flags: sent to PFE
Next-hop type: unilist
Nexthop: 4.4.4.4
Next-hop type: unicast
Next-hop interface: so-1/1/0.0
Nexthop: 145.12.1.2
Next-hop type: unicast
Next-hop interface: so-0/1/2.0

Route interface-index: 0
Index: 262143 Reference: 1
Index: 335 Reference: 2
Weight: 22 Balance: 3
Index: 337 Reference: 2
Weight: 33 Balance: 33
```

### show route forwarding-table extensive

```
user@host> show route forwarding-table extensive
```

```
Routing table: inet [Index 0]
```

```
Internet:
```

```
Destination: default
Route type: user
Route reference: 2
Flags: sent to PFE
Nexthop: 0:90:69:8e:b1:1b
Next-hop type: unicast
Next-hop interface: fxp0.0

Route interface-index: 0
Index: 132 Reference: 4
```

```
Destination: default
Route type: permanent
Route reference: 0
Flags: none
Next-hop type: reject

Route interface-index: 0
Index: 14 Reference: 1
```

```
Destination: 127.0.0.1/32
Route type: interface
Route reference: 0
Flags: sent to PFE
Nexthop: 127.0.0.1
Next-hop type: local

Route interface-index: 0
Index: 320 Reference: 1
```

```
...
```

```
Routing table: private1__inet [Index 1]
```

```
Internet:
```

```
Destination: default
Route type: permanent
Route reference: 0
Flags: sent to PFE
Next-hop type: reject

Route interface-index: 0
Index: 46 Reference: 1
```

```
Destination: 10.0.0.0/8
Route type: interface
Route reference: 0
Flags: sent to PFE
Next-hop type: resolve
Next-hop interface: fxp1.0

Route interface-index: 3
Index: 136 Reference: 1
```

```
...
```

```
Routing table: iso [Index 0]
```

```
ISO:
```



```

Destination: default
  Route type: permanent
  Route reference: 0
  Flags: sent to PFE
  Next-hop type: reject
                                Route interface-index: 0
                                Index: 38      Reference: 1

Routing table: inet6 [Index 0]
Internet6:

Destination: default
  Route type: permanent
  Route reference: 0
  Flags: sent to PFE
  Next-hop type: reject
                                Route interface-index: 0
                                Index: 22      Reference: 1

Destination: ff00::/8
  Route type: permanent
  Route reference: 0
  Flags: sent to PFE
  Next-hop type: multicast discard
                                Route interface-index: 0
                                Index: 21      Reference: 1

...

Routing table: private1__inet6 [Index 1]
Internet6:

Destination: default
  Route type: permanent
  Route reference: 0
  Flags: sent to PFE
  Next-hop type: reject
                                Route interface-index: 0
                                Index: 54      Reference: 1

Destination: fe80::2a0:a5ff:fe3d:375/128
  Route type: interface
  Route reference: 0
  Flags: sent to PFE
  Nexthop: fe80::2a0:a5ff:fe3d:375
  Next-hop type: local
                                Route interface-index: 0
                                Index: 75      Reference: 1

...

```

### show route forwarding-table extensive (RPF)

The next example is based on the following configuration, which enables an RPF check on all routes that are learned from this interface, including the interface route:

```

so-1/1/0 {
  unit 0 {
    family inet {
      rpf-check;
      address 15.95.1.2/30;
    }
  }
}

user@host> show route forwarding-table extensive
Routing table: inet [Index 0]
Internet:
...
...

```

```

Destination: 15.95.1.3/32
Route type: destination
Route reference: 0
Flags: sent to PFE
Next-hop type: broadcast
Next-hop interface: so-1/1/0.0
RPF interface: so-1/1/0.0
Route interface-index: 67
Index: 328
Reference: 1

```

### show route forwarding-table family mpls

```

user@host> show route forwarding-table family mpls
Routing table: mpls
MPLS:
Destination      Type RtRef Next hop      Type Index NhRef Netif
default          perm  0              rjct   19    1
0                user  0              recv   18    3
1                user  0              recv   18    3
2                user  0              recv   18    3
100000           user  0 10.31.1.6      swap  100001 fe-1/1/0.0
800002           user  0              Pop                    vt-0/3/0.32770

vt-0/3/0.32770 (VPLS)
                  user  0              indr   351    4
                  Push 800000, Push 100002(top)

so-0/0/0.0

```

### show route forwarding-table family vpls

```

user@host> show route forwarding-table family vpls
Routing table: green.vpls
VPLS:
Destination      Type RtRef Next hop      Type Index NhRef Netif
default          dynm  0              flood  353    1
default          perm  0              rjct   298    1
fe-0/1/0.0       dynm  0              flood  355    1
00:90:69:0c:20:1f/48 <<<<<Remote CE
                  dynm  0              indr   351    4
                  Push 800000, Push 100002(top)

so-0/0/0.0
00:90:69:85:b0:1f/48 <<<<<Local CE
                  dynm  0              ucst   354    2 fe-0/1/0.0

```

### show route forwarding-table family vpls extensive

```

user@host> show route forwarding-table family vpls extensive
Routing table: green.vpls [Index 2]
VPLS:

Destination: default
Route type: dynamic
Route reference: 0
Flags: sent to PFE
Next-hop type: flood
Next-hop type: unicast
Next-hop interface: fe-0/1/3.0
Next-hop type: unicast
Next-hop interface: fe-0/1/2.0
Route interface-index: 72
Index: 289
Index: 291
Index: 290
Reference: 1
Reference: 3
Reference: 3

Destination: default

```

```

Route type: permanent
Route reference: 0
Flags: none
Next-hop type: discard
Route interface-index: 0
Index: 341      Reference: 1

Destination: fe-0/1/2.0
Route type: dynamic
Route reference: 0
Flags: sent to PFE
Next-hop type: flood
Next-hop type: indirect
Next-hop type: Push 800016
Next-hop interface: at-1/0/1.0
Next-hop type: indirect
Next hop: 10.31.3.2
Next-hop type: Push 800000
Next-hop interface: fe-0/1/1.0
Next-hop type: unicast
Next-hop interface: fe-0/1/3.0
Route interface-index: 69
Index: 293      Reference: 1
Index: 363      Reference: 4
Index: 301      Reference: 5
Index: 291      Reference: 3

Destination: fe-0/1/3.0
Route type: dynamic
Route reference: 0
Flags: sent to PFE
Next-hop type: flood
Next-hop type: indirect
Next-hop type: Push 800016
Next-hop interface: at-1/0/1.0
Next-hop type: indirect
Next hop: 10.31.3.2
Next-hop type: Push 800000
Next-hop interface: fe-0/1/1.0
Next-hop type: unicast
Next-hop interface: fe-0/1/2.0
Route interface-index: 70
Index: 292      Reference: 1
Index: 363      Reference: 4
Index: 301      Reference: 5
Index: 290      Reference: 3

Destination: 10:00:00:01:01:01/48
Route type: dynamic
Route reference: 0
Flags: sent to PFE, prefix load balance
Next-hop type: unicast
Next-hop interface: fe-0/1/3.0
Route interface-index: 70
Index: 291      Reference: 3
Route used as destination:
  Packet count:      6640   Byte count:      675786
Route used as source:
  Packet count:      6894   Byte count:      696424

Destination: 10:00:00:01:01:04/48
Route type: dynamic
Route reference: 0
Flags: sent to PFE, prefix load balance
Next-hop type: unicast
Next-hop interface: fe-0/1/2.0
Route interface-index: 69
Index: 290      Reference: 3
Route used as destination:
  Packet count:      96     Byte count:      8079
Route used as source:
  Packet count:      296    Byte count:      24955

Destination: 10:00:00:01:03:05/48
Route type: dynamic
Route reference: 0
Flags: sent to PFE, prefix load balance
Route interface-index: 74

```

```

Next-hop type: indirect           Index: 301      Reference: 5
Next hop: 10.31.3.2
Next-hop type: Push 800000
Next-hop interface: fe-0/1/1.0

```

### show route forwarding-table table default

```
user@host> show route forwarding-table table default
```

```
Routing table: default.inet
```

```
Internet:
```

| Destination    | Type | RtRef | Next hop        | Type | Index | NhRef | Netif      |
|----------------|------|-------|-----------------|------|-------|-------|------------|
| default        | perm | 0     |                 | rjct | 36    | 2     |            |
| 0.0.0.0/32     | perm | 0     |                 | dscd | 34    | 1     |            |
| 10.0.60.0/30   | user | 0     | 10.0.60.13      | ucst | 713   | 5     | fe-0/1/3.0 |
| 10.0.60.12/30  | intf | 0     |                 | rslv | 688   | 1     | fe-0/1/3.0 |
| 10.0.60.12/32  | dest | 0     | 10.0.60.12      | recv | 686   | 1     | fe-0/1/3.0 |
| 10.0.60.13/32  | dest | 0     | 0:5:85:8b:bc:22 | ucst | 713   | 5     | fe-0/1/3.0 |
| 10.0.60.14/32  | intf | 0     | 10.0.60.14      | loc1 | 687   | 2     |            |
| 10.0.60.14/32  | dest | 0     | 10.0.60.14      | loc1 | 687   | 2     |            |
| 10.0.60.15/32  | dest | 0     | 10.0.60.15      | bcst | 685   | 1     | fe-0/1/3.0 |
| 10.0.67.12/30  | user | 0     | 10.0.60.13      | ucst | 713   | 5     | fe-0/1/3.0 |
| 10.0.80.0/30   | ifdn | 0     | ff.3.0.21       | ucst | 676   | 1     | so-0/0/1.0 |
| 10.0.80.0/32   | dest | 0     | 10.0.80.0       | recv | 678   | 1     | so-0/0/1.0 |
| 10.0.80.2/32   | user | 0     |                 | rjct | 36    | 2     |            |
| 10.0.80.2/32   | intf | 0     | 10.0.80.2       | loc1 | 675   | 1     |            |
| 10.0.80.3/32   | dest | 0     | 10.0.80.3       | bcst | 677   | 1     | so-0/0/1.0 |
| 10.0.90.12/30  | intf | 0     |                 | rslv | 684   | 1     | fe-0/1/0.0 |
| 10.0.90.12/32  | dest | 0     | 10.0.90.12      | recv | 682   | 1     | fe-0/1/0.0 |
| 10.0.90.14/32  | intf | 0     | 10.0.90.14      | loc1 | 683   | 2     |            |
| 10.0.90.14/32  | dest | 0     | 10.0.90.14      | loc1 | 683   | 2     |            |
| 10.0.90.15/32  | dest | 0     | 10.0.90.15      | bcst | 681   | 1     | fe-0/1/0.0 |
| 10.5.0.0/16    | user | 0     | 192.168.187.126 | ucst | 324   | 15    | fxp0.0     |
| 10.10.0.0/16   | user | 0     | 192.168.187.126 | ucst | 324   | 15    | fxp0.0     |
| 10.13.10.0/23  | user | 0     | 192.168.187.126 | ucst | 324   | 15    | fxp0.0     |
| 10.84.0.0/16   | user | 0     | 192.168.187.126 | ucst | 324   | 15    | fxp0.0     |
| 10.150.0.0/16  | user | 0     | 192.168.187.126 | ucst | 324   | 15    | fxp0.0     |
| 10.157.64.0/19 | user | 0     | 192.168.187.126 | ucst | 324   | 15    | fxp0.0     |
| 10.209.0.0/16  | user | 0     | 192.168.187.126 | ucst | 324   | 15    | fxp0.0     |

```
...
```

```
Routing table: default.iso
```

```
ISO:
```

| Destination | Type | RtRef | Next hop | Type | Index | NhRef | Netif |
|-------------|------|-------|----------|------|-------|-------|-------|
| default     | perm | 0     |          | rjct | 60    | 1     |       |

```
Routing table: default.inet6
```

```
Internet6:
```

| Destination | Type | RtRef | Next hop | Type | Index | NhRef | Netif |
|-------------|------|-------|----------|------|-------|-------|-------|
| default     | perm | 0     |          | rjct | 44    | 1     |       |
| ::/128      | perm | 0     |          | dscd | 42    | 1     |       |
| ff00::/8    | perm | 0     |          | mdsc | 43    | 1     |       |
| ff02::1/128 | perm | 0     | ff02::1  | mcst | 39    | 1     |       |

```
Routing table: default.mpls
```

```
MPLS:
```

| Destination | Type | RtRef | Next hop | Type | Index | NhRef | Netif |
|-------------|------|-------|----------|------|-------|-------|-------|
| default     | perm | 0     |          | dscd | 50    | 1     |       |

### show route forwarding-table table logical-system-name/routing-instance-name

```

user@host> show route forwarding-table table R4/vpn-red
Logical system: R4
Routing table: vpn-red.inet
Internet:
Destination      Type RtRef Next hop          Type Index NhRef Netif
default          perm  0                Type Index NhRef Netif
0.0.0.0/32       perm  0                dscd  561   2
1.0.0.1/32       user  0                dscd  561   2
2.0.2.0/24       intf  0                rslv  771   1 ge-1/2/0.3
2.0.2.0/32       dest  0 2.0.2.0         recv  769   1 ge-1/2/0.3
2.0.2.1/32       intf  0 2.0.2.1         locl  770   2
2.0.2.1/32       dest  0 2.0.2.1         locl  770   2
2.0.2.2/32       dest  0 0.4.80.3.0.1b.c0.d5.e4.bd.0.1b.c0.d5.e4.bc.8.0
   ucst  789   1 ge-1/2/0.3
2.0.2.255/32     dest  0 2.0.2.255       bcst  768   1 ge-1/2/0.3
224.0.0.0/4       perm  1                mdsc  562   1
224.0.0.1/32     perm  0 224.0.0.1       mcst  558   1
255.255.255.255/32 perm  0                bcst  559   1

Logical system: R4
Routing table: vpn-red.iso
ISO:
Destination      Type RtRef Next hop          Type Index NhRef Netif
default          perm  0                rjct  608   1

Logical system: R4
Routing table: vpn-red.inet6
Internet6:
Destination      Type RtRef Next hop          Type Index NhRef Netif
default          perm  0                rjct  708   1
::/128           perm  0                dscd  706   1
ff00::/8         perm  0                mdsc  707   1
ff02::1/128     perm  0 ff02::1          mcst  704   1

Logical system: R4
Routing table: vpn-red.mpls
MPLS:
Destination      Type RtRef Next hop          Type Index NhRef Netif
default          perm  0                dscd  638

```

### show route forwarding-table vpn

```

user@host> show route forwarding-table vpn VPN-A
Routing table:: VPN-A.inet
Internet:
Destination      Type RtRef Nexthop          Type Index NhRef Netif
default          perm  0                rjct  4     4
10.39.10.20/30   intf  0 ff.3.0.21             ucst  40    1
so-0/0/0.0       so-0/0/0.0
10.39.10.21/32   intf  0 10.39.10.21          locl  36    1
10.255.14.172/32 user  0                ucst  69    2
so-0/0/0.0       so-0/0/0.0
10.255.14.175/32 user  0                indr  81    3
   Push 100004, Push
100004(top) so-1/0/0.0
224.0.0.0/4       perm  2                mdsc  5     3
224.0.0.1/32     perm  0 224.0.0.1          mcst  1     8

```

|                    |      |   |           |      |   |   |
|--------------------|------|---|-----------|------|---|---|
| 224.0.0.5/32       | user | 1 | 224.0.0.5 | mcst | 1 | 8 |
| 255.255.255.255/32 | perm | 0 |           | bcst | 2 | 3 |

## show route hidden

|                                 |                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show route hidden<br><brief   detail   extensive   terse><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                            |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                              |
| <b>Description</b>              | Display only hidden route information. A hidden route is unusable, even if it is the best path.                                                                                                                                                                                                                                              |
| <b>Options</b>                  | <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output. If you do not specify a level of output, the system defaults to <b>brief</b>.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Understanding Hidden Routes</i></li> </ul>                                                                                                                                                                                                                                                       |
| <b>List of Sample Output</b>    | <a href="#">show route hidden on page 879</a><br><a href="#">show route hidden detail on page 880</a><br><a href="#">show route hidden extensive on page 880</a><br><a href="#">show route hidden terse on page 880</a>                                                                                                                      |
| <b>Output Fields</b>            | For information about output fields, see the output field table for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                                                                |

## Sample Output

### show route hidden

```

user@host> show route hidden
inet.0: 25 destinations, 26 routes (24 active, 0 holddown, 1 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both
127.0.0.1/32      [Direct/0] 04:26:38
                  > via lo0.0

private1__inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

red.inet.0: 6 destinations, 8 routes (4 active, 0 holddown, 3 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both
10.5.5.5/32      [BGP/170] 03:44:10, localpref 100, from 10.4.4.4
                  AS path: 100 I
                  Unusable
10.12.1.0/24     [BGP/170] 03:44:10, localpref 100, from 10.4.4.4
                  AS path: 100 I
                  Unusable

```

```

10.12.80.4/30      [BGP/170] 03:44:10, localpref 100, from 10.4.4.4
                  AS path: I
                  Unusable
...

```

### show route hidden detail

```

user@host> show route hidden detail

inet.0: 25 destinations, 26 routes (24 active, 0 holddown, 1 hidden)
Restart Complete
127.0.0.1/32 (1 entry, 0 announced)
    Direct Preference: 0
        Next hop type: Interface
        Next-hop reference count: 1
        Next hop: via lo0.0, selected
        State: <Hidden Martian Int>
        Local AS:      1
        Age: 4:27:37
        Task: IF
        AS path: I

private1__inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

red.inet.0: 6 destinations, 8 routes (4 active, 0 holddown, 3 hidden)
Restart Complete

10.5.5.5/32 (1 entry, 0 announced)
    BGP Preference: 170/-101
        Route Distinguisher: 10.4.4.4:4
        Next hop type: Unusable
        Next-hop reference count: 6
        State: <Secondary Hidden Int Ext>
        Local AS:      1 Peer AS:      1
        Age: 3:45:09
        Task: BGP_1.10.4.4.4+2493
        AS path: 100 I
        Communities: target:1:999
        VPN Label: 100064
        Localpref: 100
        Router ID: 10.4.4.4
        Primary Routing Table bgp.13vpn.0

...

```

### show route hidden extensive

The output for the **show route hidden extensive** command is identical to that of the **show route hidden detail** command. For sample output, see [show route hidden detail on page 880](#).

### show route hidden terse

```

user@host> show route hidden terse

inet.0: 25 destinations, 26 routes (24 active, 0 holddown, 1 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both

A Destination      P Prf  Metric 1  Metric 2  Next hop      AS path
127.0.0.1/32      D  0                >100.0

```



private1\_\_\_.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

red.inet.0: 6 destinations, 8 routes (4 active, 0 holddown, 3 hidden)

Restart Complete

+ = Active Route, - = Last Active, \* = Both

| A Destination | P Prf | Metric 1 | Metric 2 | Next hop | AS path |
|---------------|-------|----------|----------|----------|---------|
| 10.5.5.5/32   | B 170 | 100      |          | Unusable | 100 I   |
| 10.12.1.0/24  | B 170 | 100      |          | Unusable | 100 I   |
| 10.12.80.4/30 | B 170 | 100      |          | Unusable | I       |

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

Restart Complete

mpls.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)

Restart Complete

bgp.l3vpn.0: 3 destinations, 3 routes (0 active, 0 holddown, 3 hidden)

Restart Complete

+ = Active Route, - = Last Active, \* = Both

| A Destination            | P Prf | Metric 1 | Metric 2 | Next hop | AS path |
|--------------------------|-------|----------|----------|----------|---------|
| 10.4.4.4:4:10.5.5.5/32   | B 170 | 100      |          | Unusable | 100 I   |
| 10.4.4.4:4:10.12.1.0/24  | B 170 | 100      |          | Unusable | 100 I   |
| 10.4.4.4:4:10.12.80.4/30 | B 170 | 100      |          | Unusable | I       |

inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

Restart Complete

private1\_\_\_.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

## show route inactive-path

---

|                                    |                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                      | <code>show route inactive-path</code><br><code>&lt;brief   detail   extensive   terse&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                                                |
| <b>Syntax (EX Series Switches)</b> | <code>show route inactive-path</code><br><code>&lt;brief   detail   extensive   terse&gt;</code>                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                     |
| <b>Description</b>                 | Display routes for destinations that have no active route. An inactive route is a route that was not selected as the best path.                                                                                                                                                                                                                                                           |
| <b>Options</b>                     | <b>none</b> —Display all inactive routes.<br><br><b>brief   detail   extensive   terse</b> —(Optional) Display the specified level of output. If you do not specify a level of output, the system defaults to <b>brief</b> .<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>List of Sample Output</b>       | <a href="#">show route inactive-path on page 882</a><br><a href="#">show route inactive-path detail on page 883</a><br><a href="#">show route inactive-path extensive on page 884</a><br><a href="#">show route inactive-path terse on page 884</a>                                                                                                                                       |
| <b>Output Fields</b>               | For information about output fields, see the output field tables for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                                                                                                            |

## Sample Output

### show route inactive-path

```
user@host> show route inactive-path

inet.0: 25 destinations, 26 routes (24 active, 0 holddown, 1 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both

10.12.100.12/30      [OSPF/10] 03:57:28, metric 1
> via so-0/3/0.0

private1__inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

10.0.0.0/8          [Direct/0] 04:39:56
> via fxp1.0
```

```

red.inet.0: 6 destinations, 8 routes (4 active, 0 holddown, 3 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both

10.12.80.0/30      [BGP/170] 04:38:17, localpref 100
                  AS path: 100 I
                  > to 10.12.80.1 via ge-6/3/2.0

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Restart Complete

mpls.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
Restart Complete

bgp.l3vpn.0: 3 destinations, 3 routes (0 active, 0 holddown, 3 hidden)
Restart Complete

inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
Restart Complete

private1___.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

```

#### show route inactive-path detail

```

user@host> show route inactive-path detail

inet.0: 25 destinations, 26 routes (24 active, 0 holddown, 1 hidden)
Restart Complete

10.12.100.12/30 (2 entries, 1 announced)
  OSPF   Preference: 10
          Next-hop reference count: 1
          Next hop: via so-0/3/0.0, selected
          State: <Int>
          Inactive reason: Route Preference
          Local AS:      1
          Age: 3:58:24    Metric: 1
          Area: 0.0.0.0
          Task: OSPF
          AS path: I

private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

10.0.0.0/8 (2 entries, 0 announced)
  Direct Preference: 0
          Next hop type: Interface
          Next-hop reference count: 1
          Next hop: via fxp1.0, selected
          State: <NotBest Int>
          Inactive reason: No difference
          Age: 4:40:52
          Task: IF
          AS path: I

red.inet.0: 6 destinations, 8 routes (4 active, 0 holddown, 3 hidden)
Restart Complete

10.12.80.0/30 (2 entries, 1 announced)
  BGP   Preference: 170/-101
        Next-hop reference count: 6
        Source: 10.12.80.1

```

```
Next hop: 10.12.80.1 via ge-6/3/2.0, selected
State: <Ext>
Inactive reason: Route Preference
Peer AS: 100
Age: 4:39:13
Task: BGP_100.10.12.80.1+179
AS path: 100 I
Localpref: 100
Router ID: 10.0.0.0
```

### show route inactive-path extensive

The output for the **show route inactive-path extensive** command is identical to that of the **show route inactive-path detail** command. For sample output, see [show route inactive-path detail on page 883](#).

### show route inactive-path terse

```
user@host> show route inactive-path terse
```

```
inet.0: 25 destinations, 26 routes (24 active, 0 holddown, 1 hidden)
```

```
Restart Complete
```

```
+ = Active Route, - = Last Active, * = Both
```

| A Destination   | P Prf | Metric 1 | Metric 2 | Next hop    | AS path |
|-----------------|-------|----------|----------|-------------|---------|
| 10.12.100.12/30 | 0 10  | 1        |          | >so-0/3/0.0 |         |

```
private1__inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)
```

```
+ = Active Route, - = Last Active, * = Both
```

| A Destination | P Prf | Metric 1 | Metric 2 | Next hop | AS path |
|---------------|-------|----------|----------|----------|---------|
| 10.0.0.0/8    | D 0   |          |          | >fxp1.0  |         |

```
red.inet.0: 6 destinations, 8 routes (4 active, 0 holddown, 3 hidden)
```

```
Restart Complete
```

```
+ = Active Route, - = Last Active, * = Both
```

| A Destination | P Prf | Metric 1 | Metric 2 | Next hop    | AS path |
|---------------|-------|----------|----------|-------------|---------|
| 10.12.80.0/30 | B 170 | 100      |          | >10.12.80.1 | 100 I   |

```
iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
```

```
Restart Complete
```

```
mpls.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
```

```
Restart Complete
```

```
bgp.l3vpn.0: 3 destinations, 3 routes (0 active, 0 holddown, 3 hidden)
```

```
Restart Complete
```

```
inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
```

```
Restart Complete
```

```
private1__inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
```

## show route inactive-prefix

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                      | show route inactive-prefix<br><brief   detail   extensive   terse><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                                       |
| <b>Syntax (EX Series Switches)</b> | show route inactive-prefix<br><brief   detail   extensive   terse>                                                                                                                                                                                                                                                                                                                               |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                            |
| <b>Description</b>                 | Display inactive route destinations in each routing table.                                                                                                                                                                                                                                                                                                                                       |
| <b>Options</b>                     | <p><b>none</b>—Display all inactive route destination.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output. If you do not specify a level of output, the system defaults to brief.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>List of Sample Output</b>       | <a href="#">show route inactive-prefix on page 885</a><br><a href="#">show route inactive-prefix detail on page 885</a><br><a href="#">show route inactive-prefix extensive on page 886</a><br><a href="#">show route inactive-prefix terse on page 886</a>                                                                                                                                      |
| <b>Output Fields</b>               | For information about output fields, see the output field tables for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                                                                                                                   |

## Sample Output

### show route inactive-prefix

```
user@host> show route inactive-prefix

inet.0: 14 destinations, 14 routes (13 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

127.0.0.1/32          [Direct/0] 00:04:54
> via lo0.0
```

### show route inactive-prefix detail

```
user@host> show route inactive-prefix detail

inet.0: 14 destinations, 14 routes (13 active, 0 holddown, 1 hidden)
127.0.0.1/32 (1 entry, 0 announced)
    Direct Preference: 0
    Next hop type: Interface
```

```
Next-hop reference count: 1
Next hop: via 100.0, selected
State: <Hidden Martian Int>
Age: 4:51
Task: IF
AS path: I00:04:54
> via 100.0
```

### **show route inactive-prefix extensive**

The output for the **show route inactive-prefix extensive** command is identical to that of the **show route inactive-path detail** command. For sample output, see [show route inactive-prefix detail on page 885](#).

### **show route inactive-prefix terse**

```
user@host> show route inactive-prefix terse
```

```
inet.0: 18 destinations, 18 routes (17 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both
```

| A | Destination  | P | Prf | Metric 1 | Metric 2 | Next hop | AS path |
|---|--------------|---|-----|----------|----------|----------|---------|
|   | 127.0.0.1/32 | D | 0   |          |          | >100.0   |         |

## show route instance

|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                     | show route instance<br><brief   detail   summary><br><instance-name><br><logical-system (all   <i>logical-system-name</i> )><br><operational>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Syntax (EX Series Switches and QFX Series)</b> | show route instance<br><brief   detail   summary><br><instance-name><br><operational>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>                        | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Description</b>                                | Display routing instance information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Options</b>                                    | <p><b>none</b>—(Same as <b>brief</b>) Display standard information about all routing instances.</p> <p><b>brief   detail   summary</b>—(Optional) Display the specified level of output. If you do not specify a level of output, the system defaults to <b>brief</b>. (These options are not available with the <b>operational</b> keyword.)</p> <p><b>instance-name</b>—(Optional) Display information for all routing instances whose name begins with this string (for example, <b>cust1</b>, <b>cust11</b>, and <b>cust111</b> are all displayed when you run the <b>show route instance cust1</b> command).</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>operational</b>—(Optional) Display operational routing instances.</p> |
| <b>Required Privilege Level</b>                   | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>List of Sample Output</b>                      | <a href="#">show route instance on page 888</a><br><a href="#">show route instance detail (Graceful Restart Complete) on page 889</a><br><a href="#">show route instance detail (Graceful Restart Incomplete) on page 890</a><br><a href="#">show route instance detail (VPLS Routing Instance) on page 892</a><br><a href="#">show route instance operational on page 893</a><br><a href="#">show route instance summary on page 893</a>                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Output Fields</b>                              | <a href="#">Table 80 on page 887</a> lists the output fields for the <b>show route instance</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

**Table 80: show route instance Output Fields**

| Field Name                       | Field Description             | Level of Output |
|----------------------------------|-------------------------------|-----------------|
| Instance or <i>instance-name</i> | Name of the routing instance. | All levels      |

Table 80: show route instance Output Fields (*continued*)

| Field Name                    | Field Description                                                                                                                                                                                                                                                  | Level of Output                  |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| Operational Routing Instances | ( <b>operational</b> keyword only) Names of all operational routing instances.                                                                                                                                                                                     | —                                |
| Type                          | Type of routing instance: <b>forwarding</b> , <b>l2vpn</b> , <b>no-forwarding</b> , <b>vpls</b> , <b>virtual-router</b> , or <b>vrf</b> .                                                                                                                          | All levels                       |
| State                         | State of the routing instance: <b>active</b> or <b>inactive</b> .                                                                                                                                                                                                  | <b>brief detail</b> none         |
| Interfaces                    | Name of interfaces belonging to this routing instance.                                                                                                                                                                                                             | <b>brief detail</b> none         |
| Restart State                 | Status of graceful restart for this instance: <b>Pending</b> or <b>Complete</b> .                                                                                                                                                                                  | <b>detail</b>                    |
| Path selection timeout        | Maximum amount of time, in seconds, remaining until graceful restart is declared complete. The default is <b>300</b> .                                                                                                                                             | <b>detail</b>                    |
| Tables                        | Tables (and number of routes) associated with this routing instance.                                                                                                                                                                                               | <b>brief detail</b> none         |
| Route-distinguisher           | Unique route distinguisher associated with this routing instance.                                                                                                                                                                                                  | <b>detail</b>                    |
| Vrf-import                    | VPN routing and forwarding instance import policy name.                                                                                                                                                                                                            | <b>detail</b>                    |
| Vrf-export                    | VPN routing and forwarding instance export policy name.                                                                                                                                                                                                            | <b>detail</b>                    |
| Vrf-import-target             | VPN routing and forwarding instance import target community name.                                                                                                                                                                                                  | <b>detail</b>                    |
| Vrf-export-target             | VPN routing and forwarding instance export target community name.                                                                                                                                                                                                  | <b>detail</b>                    |
| Fast-reroute-priority         | Fast reroute priority setting for a VPLS routing instance: <b>high</b> , <b>medium</b> , or <b>low</b> . The default is <b>low</b> .                                                                                                                               | <b>detail</b>                    |
| Restart State                 | Restart state: <ul style="list-style-type: none"> <li><b>Pending;protocol-name</b>—List of protocols that have not yet completed graceful restart for this routing table.</li> <li><b>Complete</b>—All protocols have restarted for this routing table.</li> </ul> | <b>detail</b>                    |
| Primary rib                   | Primary table for this routing instance.                                                                                                                                                                                                                           | <b>brief</b> none <b>summary</b> |
| Active/holddown/hidden        | Number of active, hold-down, and hidden routes.                                                                                                                                                                                                                    | All levels                       |

## Sample Output

### show route instance

```

user@host> show route instance
Instance           Type
Primary RIB
master             forwarding
inet.0             16/0/1

```



```

iso.0                                1/0/0
mpls.0                              0/0/0
inet6.0                              2/0/0
l2circuit.0                          0/0/0
__juniper_private1__ forwarding
__juniper_private1__.inet.0          12/0/0
__juniper_private1__.inet6.0         1/0/0

```

### show route instance detail (Graceful Restart Complete)

```

user@host> show route instance detail
master:
  Router ID: 10.255.14.176
  Type: forwarding      State: Active
  Restart State: Complete Path selection timeout: 300
  Tables:
    inet.0                : 17 routes (15 active, 0 holddown, 1 hidden)
    Restart Complete
    inet.3                : 2 routes (2 active, 0 holddown, 0 hidden)
    Restart Complete
    iso.0                 : 1 routes (1 active, 0 holddown, 0 hidden)
    Restart Complete
    mpls.0                : 19 routes (19 active, 0 holddown, 0 hidden)
    Restart Complete
    bgp.l3vpn.0           : 10 routes (10 active, 0 holddown, 0 hidden)
    Restart Complete
    inet6.0               : 2 routes (2 active, 0 holddown, 0 hidden)
    Restart Complete
    bgp.l2vpn.0           : 1 routes (1 active, 0 holddown, 0 hidden)
    Restart Complete
  BGP-INET:
    Router ID: 10.69.103.1
    Type: vrf            State: Active
    Restart State: Complete Path selection timeout: 300
    Interfaces:
      t3-0/0/0.103
    Route-distinguisher: 10.255.14.176:103
    Vrf-import: [ BGP-INET-import ]
    Vrf-export: [ BGP-INET-export ]
    Tables:
      BGP-INET.inet.0      : 4 routes (4 active, 0 holddown, 0 hidden)
      Restart Complete
  BGP-L:
    Router ID: 10.69.104.1
    Type: vrf            State: Active
    Restart State: Complete Path selection timeout: 300
    Interfaces:
      t3-0/0/0.104
    Route-distinguisher: 10.255.14.176:104
    Vrf-import: [ BGP-L-import ]
    Vrf-export: [ BGP-L-export ]
    Tables:
      BGP-L.inet.0         : 4 routes (4 active, 0 holddown, 0 hidden)
      Restart Complete
      BGP-L.mpls.0         : 3 routes (3 active, 0 holddown, 0 hidden)
      Restart Complete
  L2VPN:
    Router ID: 0.0.0.0
    Type: l2vpn          State: Active
    Restart State: Complete Path selection timeout: 300
    Interfaces:

```

```
t3-0/0/0.512
Route-distinguisher: 10.255.14.176:512
Vrf-import: [ L2VPN-import ]
Vrf-export: [ L2VPN-export ]
Tables:
  L2VPN.l2vpn.0          : 2 routes (2 active, 0 holddown, 0 hidden)
Restart Complete

LDP:
Router ID: 10.69.105.1
Type: vrf                State: Active
Restart State: Complete Path selection timeout: 300
Interfaces:
  t3-0/0/0.105
Route-distinguisher: 10.255.14.176:105
Vrf-import: [ LDP-import ]
Vrf-export: [ LDP-export ]
Tables:
  LDP.inet.0             : 5 routes (4 active, 0 holddown, 0 hidden)
Restart Complete

OSPF:
Router ID: 10.69.101.1
Type: vrf                State: Active
Restart State: Complete Path selection timeout: 300
Interfaces:
  t3-0/0/0.101
Route-distinguisher: 10.255.14.176:101
Vrf-import: [ OSPF-import ]
Vrf-export: [ OSPF-export ]
Vrf-import-target: [ target:11111
Tables:
  OSPF.inet.0            : 8 routes (7 active, 0 holddown, 0 hidden)
Restart Complete

RIP:
Router ID: 10.69.102.1
Type: vrf                State: Active
Restart State: Complete Path selection timeout: 300
Interfaces:
  t3-0/0/0.102
Route-distinguisher: 10.255.14.176:102
Vrf-import: [ RIP-import ]
Vrf-export: [ RIP-export ]
Tables:
  RIP.inet.0             : 6 routes (6 active, 0 holddown, 0 hidden)
Restart Complete

STATIC:
Router ID: 10.69.100.1
Type: vrf                State: Active
Restart State: Complete Path selection timeout: 300
Interfaces:
  t3-0/0/0.100
Route-distinguisher: 10.255.14.176:100
Vrf-import: [ STATIC-import ]
Vrf-export: [ STATIC-export ]
Tables:
  STATIC.inet.0          : 4 routes (4 active, 0 holddown, 0 hidden)
Restart Complete
```

#### show route instance detail (Graceful Restart Incomplete)

```
user@host> show route instance detail
```

```

master:
  Router ID: 10.255.14.176
  Type: forwarding      State: Active
  Restart State: Pending Path selection timeout: 300
  Tables:
    inet.0                : 17 routes (15 active, 1 holddown, 1 hidden)
    Restart Pending: OSPF LDP
    inet.3                : 2 routes (2 active, 0 holddown, 0 hidden)
    Restart Pending: OSPF LDP
    iso.0                 : 1 routes (1 active, 0 holddown, 0 hidden)
    Restart Complete
    mpls.0                : 23 routes (23 active, 0 holddown, 0 hidden)
    Restart Pending: LDP VPN
    bgp.l3vpn.0           : 10 routes (10 active, 0 holddown, 0 hidden)
    Restart Pending: BGP VPN
    inet6.0               : 2 routes (2 active, 0 holddown, 0 hidden)
    Restart Complete
    bgp.l2vpn.0           : 1 routes (1 active, 0 holddown, 0 hidden)
    Restart Pending: BGP VPN
BGP-INET:
  Router ID: 10.69.103.1
  Type: vrf              State: Active
  Restart State: Pending Path selection timeout: 300
  Interfaces:
    t3-0/0/0.103
  Route-distinguisher: 10.255.14.176:103
  Vrf-import: [ BGP-INET-import ]
  Vrf-export: [ BGP-INET-export ]
  Tables:
    BGP-INET.inet.0       : 6 routes (5 active, 0 holddown, 0 hidden)
    Restart Pending: VPN
BGP-L:
  Router ID: 10.69.104.1
  Type: vrf              State: Active
  Restart State: Pending Path selection timeout: 300
  Interfaces:
    t3-0/0/0.104
  Route-distinguisher: 10.255.14.176:104
  Vrf-import: [ BGP-L-import ]
  Vrf-export: [ BGP-L-export ]
  Tables:
    BGP-L.inet.0          : 6 routes (5 active, 0 holddown, 0 hidden)
    Restart Pending: VPN
    BGP-L.mpls.0          : 2 routes (2 active, 0 holddown, 0 hidden)
    Restart Pending: VPN
L2VPN:
  Router ID: 0.0.0.0
  Type: l2vpn            State: Active
  Restart State: Pending Path selection timeout: 300
  Interfaces:
    t3-0/0/0.512
  Route-distinguisher: 10.255.14.176:512
  Vrf-import: [ L2VPN-import ]
  Vrf-export: [ L2VPN-export ]
  Tables:
    L2VPN.l2vpn.0         : 2 routes (2 active, 0 holddown, 0 hidden)
    Restart Pending: VPN L2VPN
LDP:
  Router ID: 10.69.105.1
  Type: vrf              State: Active
  Restart State: Pending Path selection timeout: 300

```

```
Interfaces:
  t3-0/0/0.105
Route-distinguisher: 10.255.14.176:105
Vrf-import: [ LDP-import ]
Vrf-export: [ LDP-export ]
Tables:
  LDP.inet.0          : 5 routes (4 active, 1 holddown, 0 hidden)
Restart Pending: OSPF LDP VPN
OSPF:
  Router ID: 10.69.101.1
  Type: vrf           State: Active
  Restart State: Pending Path selection timeout: 300
  Interfaces:
    t3-0/0/0.101
  Route-distinguisher: 10.255.14.176:101
  Vrf-import: [ OSPF-import ]
  Vrf-export: [ OSPF-export ]
  Tables:
    OSPF.inet.0       : 8 routes (7 active, 1 holddown, 0 hidden)
Restart Pending: OSPF VPN
RIP:
  Router ID: 10.69.102.1
  Type: vrf           State: Active
  Restart State: Pending Path selection timeout: 300
  Interfaces:
    t3-0/0/0.102
  Route-distinguisher: 10.255.14.176:102
  Vrf-import: [ RIP-import ]
  Vrf-export: [ RIP-export ]
  Tables:
    RIP.inet.0        : 8 routes (6 active, 2 holddown, 0 hidden)
Restart Pending: RIP VPN
STATIC:
  Router ID: 10.69.100.1
  Type: vrf           State: Active
  Restart State: Pending Path selection timeout: 300
  Interfaces:
    t3-0/0/0.100
  Route-distinguisher: 10.255.14.176:100
  Vrf-import: [ STATIC-import ]
  Vrf-export: [ STATIC-export ]
  Tables:
    STATIC.inet.0     : 4 routes (4 active, 0 holddown, 0 hidden)
Restart Pending: VPN
```

#### show route instance detail (VPLS Routing Instance)

```
user@host> show route instance detail test-vpls
test-vpls:
  Router ID: 0.0.0.0
  Type: vpls           State: Active
  Interfaces:
    lsi.1048833
    lsi.1048832
    fe-0/1/0.513
  Route-distinguisher: 10.255.37.65:1
  Vrf-import: [ __vrf-import-test-vpls-internal__ ]
  Vrf-export: [ __vrf-export-test-vpls-internal__ ]
  Vrf-import-target: [ target:300:1 ]
  Vrf-export-target: [ target:300:1 ]
  Fast-reroute-priority: high
```

Tables:  
 test-vpls.12vpn.0 : 3 routes (3 active, 0 holddown, 0 hidden)

### show route instance operational

```
user@host> show route instance operational
Operational Routing Instances:
```

```
master
default
```

### show route instance summary

```
user@host> show route instance summary
```

| Instance | Type       | Primary rib      | Active/holddown/hidden |
|----------|------------|------------------|------------------------|
| master   | forwarding |                  |                        |
|          |            | inet.0           | 15/0/1                 |
|          |            | iso.0            | 1/0/0                  |
|          |            | mpls.0           | 35/0/0                 |
|          |            | 13vpn.0          | 0/0/0                  |
|          |            | inet6.0          | 2/0/0                  |
|          |            | 12vpn.0          | 0/0/0                  |
|          |            | 12circuit.0      | 0/0/0                  |
| BGP-INET | vrf        |                  |                        |
|          |            | BGP-INET.inet.0  | 5/0/0                  |
|          |            | BGP-INET.iso.0   | 0/0/0                  |
|          |            | BGP-INET.inet6.0 | 0/0/0                  |
| BGP-L    | vrf        |                  |                        |
|          |            | BGP-L.inet.0     | 5/0/0                  |
|          |            | BGP-L.iso.0      | 0/0/0                  |
|          |            | BGP-L.mpls.0     | 4/0/0                  |
|          |            | BGP-L.inet6.0    | 0/0/0                  |
| L2VPN    | 12vpn      |                  |                        |
|          |            | L2VPN.inet.0     | 0/0/0                  |
|          |            | L2VPN.iso.0      | 0/0/0                  |
|          |            | L2VPN.inet6.0    | 0/0/0                  |
|          |            | L2VPN.12vpn.0    | 2/0/0                  |
| LDP      | vrf        |                  |                        |
|          |            | LDP.inet.0       | 4/0/0                  |
|          |            | LDP.iso.0        | 0/0/0                  |
|          |            | LDP.mpls.0       | 0/0/0                  |
|          |            | LDP.inet6.0      | 0/0/0                  |
|          |            | LDP.12circuit.0  | 0/0/0                  |
| OSPF     | vrf        |                  |                        |
|          |            | OSPF.inet.0      | 7/0/0                  |
|          |            | OSPF.iso.0       | 0/0/0                  |
|          |            | OSPF.inet6.0     | 0/0/0                  |
| RIP      | vrf        |                  |                        |
|          |            | RIP.inet.0       | 6/0/0                  |
|          |            | RIP.iso.0        | 0/0/0                  |
|          |            | RIP.inet6.0      | 0/0/0                  |
| STATIC   | vrf        |                  |                        |
|          |            | STATIC.inet.0    | 4/0/0                  |
|          |            | STATIC.iso.0     | 0/0/0                  |
|          |            | STATIC.inet6.0   | 0/0/0                  |

## show route next-hop

---

|                                    |                                                                                                                                                                                                                                                                                                            |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                      | <code>show route next-hop <i>next-hop</i></code><br><code>&lt;brief   detail   extensive   terse&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                      |
| <b>Syntax (EX Series Switches)</b> | <code>show route next-hop <i>next-hop</i></code><br><code>&lt;brief   detail   extensive   terse&gt;</code>                                                                                                                                                                                                |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                      |
| <b>Description</b>                 | Display the entries in the routing table that are being sent to the specified next-hop address.                                                                                                                                                                                                            |
| <b>Options</b>                     | <b>brief   detail   extensive   terse</b> —(Optional) Display the specified level of output.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.<br><br><b><i>next-hop</i></b> —Next-hop address. |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                       |
| <b>List of Sample Output</b>       | <a href="#">show route next-hop on page 894</a><br><a href="#">show route next-hop detail on page 895</a><br><a href="#">show route next-hop extensive on page 897</a><br><a href="#">show route next-hop terse on page 898</a>                                                                            |
| <b>Output Fields</b>               | For information about output fields, see the output field tables for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                             |

## Sample Output

### show route next-hop

```
user@host> show route next-hop 192.168.71.254

inet.0: 18 destinations, 18 routes (17 active, 0 holddown, 1 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both

10.10.0.0/16      *[Static/5] 06:26:25
                  > to 192.168.71.254 via fxp0.0
10.209.0.0/16    *[Static/5] 06:26:25
                  > to 192.168.71.254 via fxp0.0
172.16.0.0/12    *[Static/5] 06:26:25
                  > to 192.168.71.254 via fxp0.0
192.168.0.0/16   *[Static/5] 06:26:25
                  > to 192.168.71.254 via fxp0.0
192.168.102.0/23 *[Static/5] 06:26:25
                  > to 192.168.71.254 via fxp0.0
```

```

207.17.136.0/24    *[Static/5] 06:26:25
                  > to 192.168.71.254 via fxp0.0
207.17.136.192/32 *[Static/5] 06:26:25
                  > to 192.168.71.254 via fxp0.0

private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

red.inet.0: 4 destinations, 5 routes (4 active, 0 holddown, 0 hidden)
Restart Complete

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Restart Complete

mpls.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
Restart Complete

inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
Restart Complete

private1___.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

```

#### show route next-hop detail

```

user@host> show route next-hop 192.168.71.254 detail

inet.0: 18 destinations, 18 routes (17 active, 0 holddown, 1 hidden)
Restart Complete
10.10.0.0/16 (1 entry, 1 announced)
    *Static Preference: 5
        Next-hop reference count: 36
        Next hop: 192.168.71.254 via fxp0.0, selected
        State: <Active NoReadvrt Int Ext>
        Local AS: 1
        Age: 6:27:41
        Task: RT
        Announcement bits (3): 0-KRT 3-Resolve tree 1 5-Resolve tree 2
        AS path: I

10.209.0.0/16 (1 entry, 1 announced)
    *Static Preference: 5
        Next-hop reference count: 36
        Next hop: 192.168.71.254 via fxp0.0, selected
        State: <Active NoReadvrt Int Ext>
        Local AS: 1
        Age: 6:27:41
        Task: RT
        Announcement bits (3): 0-KRT 3-Resolve tree 1 5-Resolve tree 2
        AS path: I

172.16.0.0/12 (1 entry, 1 announced)
    *Static Preference: 5
        Next-hop reference count: 36
        Next hop: 192.168.71.254 via fxp0.0, selected
        State: <Active NoReadvrt Int Ext>
        Local AS: 1
        Age: 6:27:41
        Task: RT
        Announcement bits (3): 0-KRT 3-Resolve tree 1 5-Resolve tree 2
        AS path: I

192.168.0.0/16 (1 entry, 1 announced)

```

```
*Static Preference: 5
  Next-hop reference count: 36
  Next hop: 192.168.71.254 via fxp0.0, selected
  State: <Active NoReadvrt Int Ext>
  Local AS: 1
  Age: 6:27:41
  Task: RT
  Announcement bits (3): 0-KRT 3-Resolve tree 1 5-Resolve tree 2
  AS path: I

192.168.102.0/23 (1 entry, 1 announced)
  *Static Preference: 5
    Next-hop reference count: 36
    Next hop: 192.168.71.254 via fxp0.0, selected
    State: <Active NoReadvrt Int Ext>
    Local AS: 1
    Age: 6:27:41
    Task: RT
    Announcement bits (3): 0-KRT 3-Resolve tree 1 5-Resolve tree 2
    AS path: I

207.17.136.0/24 (1 entry, 1 announced)
  *Static Preference: 5
    Next-hop reference count: 36
    Next hop: 192.168.71.254 via fxp0.0, selected
    State: <Active NoReadvrt Int Ext>
    Local AS: 1
    Age: 6:27:41
    Task: RT
    Announcement bits (3): 0-KRT 3-Resolve tree 1 5-Resolve tree 2
    AS path: I

207.17.136.192/32 (1 entry, 1 announced)
  *Static Preference: 5
    Next-hop reference count: 36
    Next hop: 192.168.71.254 via fxp0.0, selected
    State: <Active NoReadvrt Int Ext>
    Local AS: 1
    Age: 6:27:41
    Task: RT
    Announcement bits (3): 0-KRT 3-Resolve tree 1 5-Resolve tree 2
    AS path: I

private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

red.inet.0: 4 destinations, 5 routes (4 active, 0 holddown, 0 hidden)
Restart Complete

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Restart Complete

mpls.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
Restart Complete

inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
Restart Complete

private1___.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
```



**show route next-hop extensive**

```
user@host> show route next-hop 192.168.71.254 extensive
```

```
inet.0: 18 destinations, 18 routes (17 active, 0 holddown, 1 hidden)
```

```
10.10.0.0/16 (1 entry, 1 announced)
```

```
TSI:
```

```
KRT in-kernel 10.10.0.0/16 -> {192.168.71.254}
```

```
*Static Preference: 5
```

```
Next-hop reference count: 22
```

```
Next hop: 192.168.71.254 via fxp0.0, selected
```

```
State: <Active NoReadvrt Int Ext>
```

```
Local AS: 69
```

```
Age: 2:02:28
```

```
Task: RT
```

```
Announcement bits (1): 0-KRT
```

```
AS path: I
```

```
10.209.0.0/16 (1 entry, 1 announced)
```

```
TSI:
```

```
KRT in-kernel 10.209.0.0/16 -> {192.168.71.254}
```

```
*Static Preference: 5
```

```
Next-hop reference count: 22
```

```
Next hop: 192.168.71.254 via fxp0.0, selected
```

```
State: <Active NoReadvrt Int Ext>
```

```
Local AS: 69
```

```
Age: 2:02:28
```

```
Task: RT
```

```
Announcement bits (1): 0-KRT
```

```
AS path: I
```

```
172.16.0.0/12 (1 entry, 1 announced)
```

```
TSI:
```

```
KRT in-kernel 172.16.0.0/12 -> {192.168.71.254}
```

```
*Static Preference: 5
```

```
Next-hop reference count: 22
```

```
Next hop: 192.168.71.254 via fxp0.0, selected
```

```
State: <Active NoReadvrt Int Ext>
```

```
Local AS: 69
```

```
Age: 2:02:28
```

```
Task: RT
```

```
Announcement bits (1): 0-KRT
```

```
AS path: I
```

```
192.168.0.0/16 (1 entry, 1 announced)
```

```
TSI:
```

```
KRT in-kernel 192.168.0.0/16 -> {192.168.71.254}
```

```
*Static Preference: 5
```

```
Next-hop reference count: 22
```

```
Next hop: 192.168.71.254 via fxp0.0, selected
```

```
State: <Active NoReadvrt Int Ext>
```

```
Local AS: 69
```

```
Age: 2:02:28
```

```
Task: RT
```

```
Announcement bits (1): 0-KRT
```

```
AS path: I
```

```
192.168.102.0/23 (1 entry, 1 announced)
```

```
TSI:
```

```
KRT in-kernel 192.168.102.0/23 -> {192.168.71.254}
```

```
*Static Preference: 5
```

```

Next-hop reference count: 22
Next hop: 192.168.71.254 via fxp0.0, selected
State: <Active NoReadvrt Int Ext>
Local AS: 69
Age: 2:02:28
Task: RT
Announcement bits (1): 0-KRT
AS path: I

207.17.136.0/24 (1 entry, 1 announced)
TSI:
KRT in-kernel 207.17.136.0/24 -> {192.168.71.254}
*Static Preference: 5
Next-hop reference count: 22
Next hop: 192.168.71.254 via fxp0.0, selected
State: <Active NoReadvrt Int Ext>
Local AS: 69
Age: 2:02:28
Task: RT
Announcement bits (1): 0-KRT
AS path: I

207.17.136.192/32 (1 entry, 1 announced)
TSI:
KRT in-kernel 207.17.136.192/32 -> {192.168.71.254}
*Static Preference: 5
Next-hop reference count: 22
Next hop: 192.168.71.254 via fxp0.0, selected
State: <Active NoReadvrt Int Ext>
Local AS: 69
Age: 2:02:28
Task: RT
Announcement bits (1): 0-KRT
AS path: I

private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

mpls.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)

inet6.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)

private1___.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

green.l2vpn.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

red.l2vpn.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

```

### show route next-hop terse

```

user@host> show route next-hop 192.168.71.254 terse

inet.0: 25 destinations, 26 routes (24 active, 0 holddown, 1 hidden)
Restart Complete
+ = Active Route, - = Last Active, * = Both

A Destination      P Prf  Metric 1  Metric 2  Next hop      AS path
* 10.10.0.0/16     S  5          5          >192.168.71.254
* 10.209.0.0/16    S  5          5          >192.168.71.254
* 172.16.0.0/12    S  5          5          >192.168.71.254

```

```
* 192.168.0.0/16      S   5                >192.168.71.254
* 192.168.102.0/23   S   5                >192.168.71.254
* 207.17.136.0/24    S   5                >192.168.71.254
* 207.17.136.192/32 S   5                >192.168.71.254

private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

red.inet.0: 4 destinations, 5 routes (4 active, 0 holddown, 0 hidden)
Restart Complete

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Restart Complete

mpls.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
Restart Complete

inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
Restart Complete
private1___.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
```

## show route no-community

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                      | show route no-community<br><brief   detail   extensive   terse><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                                              |
| <b>Syntax (EX Series Switches)</b> | show route no-community<br><brief   detail   extensive   terse>                                                                                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                                |
| <b>Description</b>                 | Display the route entries in each routing table that are not associated with any community.                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>                     | <p><b>none</b>—(Same as <b>brief</b>) Display the route entries in each routing table that are not associated with any community.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>List of Sample Output</b>       | <a href="#">show route no-community on page 900</a><br><a href="#">show route no-community detail on page 901</a><br><a href="#">show route no-community extensive on page 901</a><br><a href="#">show route no-community terse on page 902</a>                                                                                                                                                      |
| <b>Output Fields</b>               | For information about output fields, see the output field tables for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                                                                                                                       |

## Sample Output

### show route no-community

```

user@host> show route no-community
inet.0: 28 destinations, 30 routes (27 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

10.10.0.0/16      *[Static/5] 00:36:27
                  > to 192.168.71.254 via fxp0.0
10.209.0.0/16    *[Static/5] 00:36:27
                  > to 192.168.71.254 via fxp0.0
10.255.71.52/32  *[Direct/0] 00:36:27
                  > via lo0.0
10.255.71.63/32  *[OSPF/10] 00:04:39, metric 1
                  > to 35.1.1.2 via ge-3/1/0.0
10.255.71.64/32  *[OSPF/10] 00:00:08, metric 2
                  > to 35.1.1.2 via ge-3/1/0.0
10.255.71.240/32 *[OSPF/10] 00:05:04, metric 2
                  via so-0/1/2.0

```

```

> via so-0/3/2.0
10.255.71.241/32 * [OSPF/10] 00:05:14, metric 1
> via so-0/1/2.0
10.255.71.242/32 * [OSPF/10] 00:05:19, metric 1
> via so-0/3/2.0
12.1.1.0/24 * [OSPF/10] 00:05:14, metric 2
> via so-0/3/2.0
14.1.1.0/24 * [OSPF/10] 00:00:08, metric 3
> to 35.1.1.2 via ge-3/1/0.0
via so-0/1/2.0
via so-0/3/2.0
16.1.1.0/24 * [OSPF/10] 00:05:14, metric 2
> via so-0/1/2.0
.....

```

### show route no-community detail

```

user@host> show route no-community detail

inet.0: 28 destinations, 30 routes (27 active, 0 holddown, 1 hidden)
10.10.0.0/16 (1 entry, 1 announced)
  *Static Preference: 5
    Next-hop reference count: 22
    Next hop: 192.168.71.254 via fxp0.0, selected
    State: <Active NoReadvrt Int Ext>
    Age: 38:08
    Task: RT
    Announcement bits (1): 0-KRT
    AS path: I

10.209.0.0/16 (1 entry, 1 announced)
  *Static Preference: 5
    Next-hop reference count: 22
    Next hop: 192.168.71.254 via fxp0.0, selected
    State: <Active NoReadvrt Int Ext>
    Age: 38:08
    Task: RT
    Announcement bits (1): 0-KRT
    AS path: I

....

```

### show route no-community extensive

```

user@host> show route no-community extensive

inet.0: 18 destinations, 18 routes (17 active, 0 holddown, 1 hidden)
10.10.0.0/16 (1 entry, 1 announced)
TSI:
KRT in-kernel 10.10.0.0/16 -> {192.168.71.254}
  *Static Preference: 5
    Next-hop reference count: 22
    Next hop: 192.168.71.254 via fxp0.0, selected
    State: <Active NoReadvrt Int Ext>
    Local AS: 69
    Age: 2:03:33
    Task: RT
    Announcement bits (1): 0-KRT
    AS path: I

10.209.0.0/16 (1 entry, 1 announced)
TSI:

```

```

KRT in-kerne1 10.209.0.0/16 -> {192.168.71.254}
  *Static Preference: 5
    Next-hop reference count: 22
    Next hop: 192.168.71.254 via fxp0.0, selected
    State: <Active NoReadvrt Int Ext>
    Local AS: 69
    Age: 2:03:33
    Task: RT
    Announcement bits (1): 0-KRT
    AS path: I

```

### show route no-community terse

```
user@host> show route no-community terse
```

```

inet.0: 28 destinations, 30 routes (27 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

```

| A   | Destination      | P | Prf | Metric 1 | Metric 2 | Next hop        | AS path |
|-----|------------------|---|-----|----------|----------|-----------------|---------|
| *   | 10.10.0.0/16     | S | 5   |          |          | >192.168.71.254 |         |
| *   | 10.209.0.0/16    | S | 5   |          |          | >192.168.71.254 |         |
| *   | 10.255.71.52/32  | D | 0   |          |          | >100.0          |         |
| *   | 10.255.71.63/32  | 0 | 10  | 1        |          | >35.1.1.2       |         |
| *   | 10.255.71.64/32  | 0 | 10  | 2        |          | >35.1.1.2       |         |
| *   | 10.255.71.240/32 | 0 | 10  | 2        |          | so-0/1/2.0      |         |
|     |                  |   |     |          |          | >so-0/3/2.0     |         |
| *   | 10.255.71.241/32 | 0 | 10  | 1        |          | >so-0/1/2.0     |         |
| *   | 10.255.71.242/32 | 0 | 10  | 1        |          | >so-0/3/2.0     |         |
| *   | 12.1.1.0/24      | 0 | 10  | 2        |          | >so-0/3/2.0     |         |
| *   | 14.1.1.0/24      | 0 | 10  | 3        |          | >35.1.1.2       |         |
|     |                  |   |     |          |          | so-0/1/2.0      |         |
|     |                  |   |     |          |          | so-0/3/2.0      |         |
| *   | 16.1.1.0/24      | 0 | 10  | 2        |          | >so-0/1/2.0     |         |
| ... |                  |   |     |          |          |                 |         |

## show route output

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                      | show route output (address <i>ip-address</i>   interface <i>interface-name</i> )<br><brief   detail   extensive   terse><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Syntax (EX Series Switches)</b> | show route output (address <i>ip-address</i>   interface <i>interface-name</i> )<br><brief   detail   extensive   terse>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>                 | <p>Display the entries in the routing table learned through static routes and interior gateway protocols that are to be sent out the interface with either the specified IP address or specified name.</p> <p>To view routes advertised to a neighbor or received from a neighbor for the BGP protocol, use the <b>show route advertising-protocol bgp</b> and <b>show route receive-protocol bgp</b> commands instead.</p>                                                                                                                                                                                                                      |
| <b>Options</b>                     | <p><b>address <i>ip-address</i></b>—Display entries in the routing table that are to be sent out the interface with the specified IP address.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output. If you do not specify a level of output, the system defaults to <b>brief</b>.</p> <p><b>interface <i>interface-name</i></b>—Display entries in the routing table that are to be sent out the interface with the specified name.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>List of Sample Output</b>       | <a href="#">show route output address on page 904</a><br><a href="#">show route output address detail on page 904</a><br><a href="#">show route output address extensive on page 905</a><br><a href="#">show route output address terse on page 905</a><br><a href="#">show route output interface on page 905</a><br><a href="#">show route output interface detail on page 906</a><br><a href="#">show route output interface extensive on page 906</a><br><a href="#">show route output interface terse on page 906</a>                                                                                                                       |
| <b>Output Fields</b>               | For information about output fields, see the output field tables for the <a href="#">show route</a> command, the <a href="#">show route detail</a> command, the <a href="#">show route extensive</a> command, or the <a href="#">show route terse</a> command.                                                                                                                                                                                                                                                                                                                                                                                   |

## Sample Output

### show route output address

```
user@host> show route output address 36.1.1.1/24

inet.0: 28 destinations, 30 routes (27 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

36.1.1.0/24          *[Direct/0] 00:19:56
                    > via so-0/1/2.0
                    [OSPF/10] 00:19:55, metric 1
                    > via so-0/1/2.0

private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

mpls.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)

inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

private1___.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
```

### show route output address detail

```
user@host> show route output address 36.1.1.1 detail

inet.0: 28 destinations, 30 routes (27 active, 0 holddown, 1 hidden)
36.1.1.0/24 (2 entries, 0 announced)
  *Direct Preference: 0
    Next hop type: Interface
    Next-hop reference count: 1
    Next hop: via so-0/1/2.0, selected
    State: <Active Int>
    Age: 23:00
    Task: IF
    AS path: I
  OSPF Preference: 10
    Next-hop reference count: 1
    Next hop: via so-0/1/2.0, selected
    State: <Int>
    Inactive reason: Route Preference
    Age: 22:59      Metric: 1
    Area: 0.0.0.0
    Task: OSPF
    AS path: I

private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

mpls.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)

inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

private1___.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
```



### show route output address extensive

The output for the **show route output address extensive** command is identical to that of the **show route output address detail** command. For sample output, see [show route output address detail on page 904](#).

### show route output address terse

```
user@host> show route output address 36.1.1.1 terse

inet.0: 28 destinations, 30 routes (27 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

A Destination      P Prf  Metric 1   Metric 2  Next hop      AS path
* 36.1.1.0/24      D   0                >so-0/1/2.0
                   O  10             1         >so-0/1/2.0

private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

mpls.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)

inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

private1___.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
```

### show route output interface

```
user@host> show route output interface so-0/1/2.0

inet.0: 28 destinations, 30 routes (27 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

10.255.71.240/32  *[OSPF/10] 00:13:00, metric 2
                  via so-0/1/2.0
                  > via so-0/3/2.0
10.255.71.241/32  *[OSPF/10] 00:13:10, metric 1
                  > via so-0/1/2.0
14.1.1.0/24       *[OSPF/10] 00:05:11, metric 3
                  to 35.1.1.2 via ge-3/1/0.0
                  > via so-0/1/2.0
                  via so-0/3/2.0
16.1.1.0/24       *[OSPF/10] 00:13:10, metric 2
                  > via so-0/1/2.0
36.1.1.0/24       *[Direct/0] 00:13:21
                  > via so-0/1/2.0
                  [OSPF/10] 00:13:20, metric 1
                  > via so-0/1/2.0

private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

mpls.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)

inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
```

```
private1___.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
```

### show route output interface detail

```
user@host> show route output interface so-0/1/2.0 detail
```

```
inet.0: 28 destinations, 30 routes (27 active, 0 holddown, 1 hidden)
10.255.71.240/32 (1 entry, 1 announced)
```

```
*OSPF   Preference: 10
        Next-hop reference count: 2
        Next hop: via so-0/1/2.0
        Next hop: via so-0/3/2.0, selected
        State: <Active Int>
        Age: 14:52      Metric: 2
        Area: 0.0.0.0
        Task: OSPF
        Announcement bits (1): 0-KRT
        AS path: I
```

```
10.255.71.241/32 (1 entry, 1 announced)
```

```
*OSPF   Preference: 10
        Next-hop reference count: 4
        Next hop: via so-0/1/2.0, selected
        State: <Active Int>
        Age: 15:02      Metric: 1
        Area: 0.0.0.0
        Task: OSPF
        Announcement bits (1): 0-KRT
        AS path: I
```

```
...
```

### show route output interface extensive

The output for the **show route output interface extensive** command is identical to that of the **show route output interface detail** command. For sample output, see [show route output interface detail on page 906](#).

### show route output interface terse

```
user@host> show route output interface so-0/1/2.0 terse
```

```
inet.0: 28 destinations, 30 routes (27 active, 0 holddown, 1 hidden)
```

```
+ = Active Route, - = Last Active, * = Both
```

| A | Destination      | P | Prf | Metric 1 | Metric 2 | Next hop    | AS path |
|---|------------------|---|-----|----------|----------|-------------|---------|
| * | 10.255.71.240/32 | 0 | 10  | 2        |          | so-0/1/2.0  |         |
|   |                  |   |     |          |          | >so-0/3/2.0 |         |
| * | 10.255.71.241/32 | 0 | 10  | 1        |          | >so-0/1/2.0 |         |
| * | 14.1.1.0/24      | 0 | 10  | 3        |          | 35.1.1.2    |         |
|   |                  |   |     |          |          | >so-0/1/2.0 |         |
|   |                  |   |     |          |          | so-0/3/2.0  |         |
| * | 16.1.1.0/24      | 0 | 10  | 2        |          | >so-0/1/2.0 |         |
| * | 36.1.1.0/24      | D | 0   |          |          | >so-0/1/2.0 |         |
|   |                  | 0 | 10  | 1        |          | >so-0/1/2.0 |         |

```
private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)
```

```
iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
```

```
mpls.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)
```

```
inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
private1__inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
```

## show route protocol

---

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                      | <code>show route protocol <i>protocol</i></code><br><code>&lt;brief   detail   extensive   terse&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Syntax (EX Series Switches)</b> | <code>show route protocol <i>protocol</i></code><br><code>&lt;brief   detail   extensive   terse&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br><b>ospf2</b> and <b>ospf3</b> options introduced in Junos OS Release 9.2.<br><b>ospf2</b> and <b>ospf3</b> options introduced in Junos OS Release 9.2 for EX Series switches.<br><b>flow</b> option introduced in Junos OS Release 10.0.<br><b>flow</b> option introduced in Junos OS Release 10.0 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>                 | Display the route entries in the routing table that were learned from a particular protocol.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Options</b>                     | <b>brief   detail   extensive   terse</b> —(Optional) Display the specified level of output. If you do not specify a level of output, the system defaults to <b>brief</b> .<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.<br><br><b><i>protocol</i></b> —Protocol from which the route was learned: <ul style="list-style-type: none"><li>• <b>access</b>—Access route for use by DHCP application</li><li>• <b>access-internal</b>—Access-internal route for use by DHCP application</li><li>• <b>aggregate</b>—Locally generated aggregate route</li><li>• <b>arp</b>—Route learned through the Address Resolution Protocol</li><li>• <b>atmvpn</b>—Asynchronous Transfer Mode virtual private network</li><li>• <b>bgp</b>—Border Gateway Protocol</li><li>• <b>ccc</b>—Circuit cross-connect</li><li>• <b>direct</b>—Directly connected route</li><li>• <b>dvmrp</b>—Distance Vector Multicast Routing Protocol</li><li>• <b>esis</b>—End System-to-Intermediate System</li><li>• <b>flow</b>—Locally defined flow-specification route</li><li>• <b>frr</b>—Precomputed protection route or backup route used when a link goes down</li><li>• <b>isis</b>—Intermediate System-to-Intermediate System</li><li>• <b>ldp</b>—Label Distribution Protocol</li><li>• <b>l2circuit</b>—Layer 2 circuit</li><li>• <b>l2vpn</b>—Layer 2 virtual private network</li></ul> |

- **local**—Local address
- **mpls**—Multiprotocol Label Switching
- **msdp**—Multicast Source Discovery Protocol
- **ospf**—Open Shortest Path First versions 2 and 3
- **ospf2**—Open Shortest Path First versions 2 only
- **ospf3**—Open Shortest Path First version 3 only
- **pim**—Protocol Independent Multicast
- **rip**—Routing Information Protocol
- **ripng**—Routing Information Protocol next generation
- **rsvp**—Resource Reservation Protocol
- **rtarget**—Local route target virtual private network
- **static**—Statically defined route
- **tunnel**—Dynamic tunnel
- **vpn**—Virtual private network



**NOTE:** EX Series switches run a subset of these protocols. See the switch CLI for details.

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>List of Sample Output</b>    | <a href="#">show route protocol access on page 910</a><br><a href="#">show route protocol access-internal extensive on page 910</a><br><a href="#">show route protocol arp on page 910</a><br><a href="#">show route protocol bgp on page 911</a><br><a href="#">show route protocol bgp detail on page 911</a><br><a href="#">show route protocol bgp extensive on page 911</a><br><a href="#">show route protocol bgp terse on page 912</a><br><a href="#">show route protocol direct on page 912</a><br><a href="#">show route protocol frr on page 913</a><br><a href="#">show route protocol l2circuit detail on page 913</a><br><a href="#">show route protocol l2vpn extensive on page 914</a><br><a href="#">show route protocol ldp on page 915</a><br><a href="#">show route protocol ldp extensive on page 915</a><br><a href="#">show route protocol ospf (Layer 3 VPN) on page 916</a><br><a href="#">show route protocol ospf detail on page 917</a><br><a href="#">show route protocol rip on page 917</a><br><a href="#">show route protocol rip detail on page 917</a><br><a href="#">show route protocol ripng table inet6 on page 918</a><br><a href="#">show route protocol static detail on page 918</a> |

**Output Fields** For information about output fields, see the output field tables for the [show route](#) command, the [show route detail](#) command, the [show route extensive](#) command, or the [show route terse](#) command.

## Sample Output

### show route protocol access

```
user@host> show route protocol access
inet.0: 30380 destinations, 30382 routes (30379 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

13.160.0.3/32      *[Access/13] 00:00:09
                  > to 13.160.0.2 via fe-0/0/0.0
13.160.0.4/32      *[Access/13] 00:00:09
                  > to 13.160.0.2 via fe-0/0/0.0
13.160.0.5/32      *[Access/13] 00:00:09
                  > to 13.160.0.2 via fe-0/0/0.0
```

### show route protocol access-internal extensive

```
user@host> show route protocol access-internal 13.160.0.19 extensive
inet.0: 100020 destinations, 100022 routes (100019 active, 0 holddown, 1 hidden)
13.160.0.19/32 (1 entry, 1 announced)
TSI:
KRT in-kernel 13.160.0.19/32 -> {13.160.0.2}
    *Access-internal Preference: 12
        Next-hop reference count: 200000
        Next hop: 13.160.0.2 via fe-0/0/0.0, selected
        State: <Active Int>
    Age: 36
        Task: RPD Unix Domain Server./var/run/rpd_serv.local
        Announcement bits (1): 0-KRT
        AS path: I
```

### show route protocol arp

```
user@host> show route protocol arp
inet.0: 43 destinations, 43 routes (42 active, 0 holddown, 1 hidden)

inet.3: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)

cust1.inet.0: 1033 destinations, 2043 routes (1033 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

20.20.1.3/32      [ARP/4294967293] 00:04:35, from 20.20.1.1
                  Unusable
20.20.1.4/32      [ARP/4294967293] 00:04:35, from 20.20.1.1
                  Unusable
20.20.1.5/32      [ARP/4294967293] 00:04:32, from 20.20.1.1
                  Unusable
20.20.1.6/32      [ARP/4294967293] 00:04:34, from 20.20.1.1
                  Unusable
20.20.1.7/32      [ARP/4294967293] 00:04:35, from 20.20.1.1
                  Unusable
20.20.1.8/32      [ARP/4294967293] 00:04:35, from 20.20.1.1
                  Unusable
20.20.1.9/32      [ARP/4294967293] 00:04:35, from 20.20.1.1
                  Unusable
20.20.1.10/32     [ARP/4294967293] 00:04:35, from 20.20.1.1
```

```

Unusable
20.20.1.11/32      [ARP/4294967293] 00:04:33, from 20.20.1.1
Unusable
20.20.1.12/32      [ARP/4294967293] 00:04:33, from 20.20.1.1
Unusable
20.20.1.13/32      [ARP/4294967293] 00:04:33, from 20.20.1.1
Unusable
...

```

### show route protocol bgp

```

user@host> show route protocol bgp 192.168.64.0/21
inet.0: 335832 destinations, 335833 routes (335383 active, 0 holddown, 450 hidden)
+ = Active Route, - = Last Active, * = Both

192.168.64.0/21      *[BGP/170] 6d 10:41:16, localpref 100, from 192.168.69.71
AS path: 10458 14203 2914 4788 4788 I
> to 192.168.167.254 via fxp0.0

```

### show route protocol bgp detail

```

user@host> show route protocol bgp 66.117.63.0/24 detail
inet.0: 335805 destinations, 335806 routes (335356 active, 0 holddown, 450 hidden)
66.117.63.0/24      (1 entry, 1 announced)
    *BGP      Preference: 170/-101
                Next hop type: Indirect
                Next-hop reference count: 1006436
                Source: 192.168.69.71
                Next hop type: Router, Next hop index: 324
                Next hop: 192.168.167.254 via fxp0.0, selected
                Protocol next hop: 192.168.69.71
                Indirect next hop: 8e166c0 342
                State: <Active Ext>
                Local AS: 69 Peer AS: 10458
                Age: 6d 10:42:42 Metric2: 0
                Task: BGP_10458.192.168.69.71+179
                Announcement bits (3): 0-KRT 2-BGP RT Background 3-Resolve tree

1
    AS path: 10458 14203 2914 4788 4788 I
    Communities: 2914:410 2914:2403 2914:3400
    Accepted
    Localpref: 100
    Router ID: 207.17.136.192

```

### show route protocol bgp extensive

```

user@host> show route protocol bgp 192.168.64.0/21 extensive

inet.0: 335827 destinations, 335828 routes (335378 active, 0 holddown, 450 hidden)
192.168.64.0/21 (1 entry, 1 announced)
TSI:
KRT in-kernel 1.9.0.0/16 -> {indirect(342)}
Page 0 idx 1 Type 1 val db31a80
  Nexthop: Self
  AS path: [69] 10458 14203 2914 4788 4788 I
  Communities: 2914:410 2914:2403 2914:3400
Path 1.9.0.0 from 192.168.69.71 Vector len 4. Val: 1
    *BGP      Preference: 170/-101
                Next hop type: Indirect
                Next-hop reference count: 1006502
                Source: 192.168.69.71
                Next hop type: Router, Next hop index: 324

```

```

Next hop: 192.168.167.254 via fxp0.0, selected
Protocol next hop: 192.168.69.71
Indirect next hop: 8e166c0 342
State: <Active Ext>
Local AS: 69 Peer AS: 10458
Age: 6d 10:44:45 Metric2: 0
Task: BGP_10458.192.168.69.71+179
Announcement bits (3): 0-KRT 2-BGP RT Background 3-Resolve tree
1
AS path: 10458 14203 2914 4788 4788 I
Communities: 2914:410 2914:2403 2914:3400
Accepted
Localpref: 100
Router ID: 207.17.136.192
Indirect next hops: 1
  Protocol next hop: 192.168.69.71
  Indirect next hop: 8e166c0 342
  Indirect path forwarding next hops: 1
    Next hop type: Router
    Next hop: 192.168.167.254 via fxp0.0
  192.168.0.0/16 Originating RIB: inet.0
  Node path count: 1
  Forwarding nexthops: 1
    Nexthop: 192.168.167.254 via fxp0.0

```

### show route protocol bgp terse

```

user@host> show route protocol bgp 192.168.64.0/21 terse

inet.0: 24 destinations, 32 routes (23 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

A Destination      P Prf  Metric 1  Metric 2  Next hop      AS path
192.168.64.0/21    B 170      100          >100.1.3.2    10023 21 I

```

### show route protocol direct

```

user@host> show route protocol direct

inet.0: 335843 destinations, 335844 routes (335394 active, 0 holddown, 450 hidden)
+ = Active Route, - = Last Active, * = Both

8.8.8.0/24          *[Direct/0] 17w0d 10:31:49
> via fe-1/3/1.0
10.255.165.1/32     *[Direct/0] 25w4d 04:13:18
> via lo0.0
30.30.30.0/24       *[Direct/0] 17w0d 23:06:26
> via fe-1/3/2.0
192.168.164.0/22    *[Direct/0] 25w4d 04:13:20
> via fxp0.0

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

47.0005.80ff.f800.0000.0108.0001.0102.5516.5001/152
*[Direct/0] 25w4d 04:13:21
> via lo0.0

inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

```



```

abcd::10:255:165:1/128
    *[Direct/0] 25w4d 04:13:21
    > via lo0.0
fe80::2a0:a5ff:fe12:ad7/128
    *[Direct/0] 25w4d 04:13:21
    > via lo0.0

```

### show route protocol frr

```

user@host> show route protocol frr
inet.0: 43 destinations, 43 routes (42 active, 0 holddown, 1 hidden)

inet.3: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)

cust1.inet.0: 1033 destinations, 2043 routes (1033 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

20.20.1.3/32      *[FRR/200] 00:05:38, from 20.20.1.1
                  > to 20.20.1.3 via ge-4/1/0.0
                  to 10.10.15.1 via ge-0/2/4.0, Push 16, Push 299792(top)
20.20.1.4/32      *[FRR/200] 00:05:38, from 20.20.1.1
                  > to 20.20.1.4 via ge-4/1/0.0
                  to 10.10.15.1 via ge-0/2/4.0, Push 16, Push 299792(top)
20.20.1.5/32      *[FRR/200] 00:05:35, from 20.20.1.1
                  > to 20.20.1.5 via ge-4/1/0.0
                  to 10.10.15.1 via ge-0/2/4.0, Push 16, Push 299792(top)
20.20.1.6/32      *[FRR/200] 00:05:37, from 20.20.1.1
                  > to 20.20.1.6 via ge-4/1/0.0
                  to 10.10.15.1 via ge-0/2/4.0, Push 16, Push 299792(top)
20.20.1.7/32      *[FRR/200] 00:05:38, from 20.20.1.1
                  > to 20.20.1.7 via ge-4/1/0.0
                  to 10.10.15.1 via ge-0/2/4.0, Push 16, Push 299792(top)
20.20.1.8/32      *[FRR/200] 00:05:38, from 20.20.1.1
                  > to 20.20.1.8 via ge-4/1/0.0
                  to 10.10.15.1 via ge-0/2/4.0, Push 16, Push 299792(top)
20.20.1.9/32      *[FRR/200] 00:05:38, from 20.20.1.1
                  > to 20.20.1.9 via ge-4/1/0.0
                  to 10.10.15.1 via ge-0/2/4.0, Push 16, Push 299792(top)
20.20.1.10/32     *[FRR/200] 00:05:38, from 20.20.1.1
...

```

### show route protocol l2circuit detail

```

user@host> show route protocol l2circuit detail

mpls.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
100000 (1 entry, 1 announced)
    *L2CKT Preference: 7
        Next hop: via ge-2/0/0.0, selected
        Label operation: Pop      Offset: 4
        State: <Active Int>
        Local AS: 99
        Age: 9:52
        Task: Common L2 VC
        Announcement bits (1): 0-KRT
        AS path: I

ge-2/0/0.0 (1 entry, 1 announced)
    *L2CKT Preference: 7
        Next hop: via so-1/1/2.0 weight 1, selected
        Label-switched-path my-lsp

```

```

Label operation: Push 100000, Push 100000(top)[0] Offset: -4
Protocol next hop: 10.245.255.63
Push 100000 Offset: -4
  Indirect next hop: 86af0c0 298
State: <Active Int>
Local AS: 99
Age: 9:52
Task: Common L2 VC
Announcement bits (2): 0-KRT 1-Common L2 VC
AS path: I

l2circuit.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

10.245.255.63:CtrlWord:4:3:Local/96 (1 entry, 1 announced)
  *L2CKT Preference: 7
    Next hop: via so-1/1/2.0 weight 1, selected
    Label-switched-path my-lsp
    Label operation: Push 100000[0]
    Protocol next hop: 10.245.255.63 Indirect next hop: 86af000 296
    State: <Active Int>
    Local AS: 99
    Age: 10:21
    Task: l2 circuit
    Announcement bits (1): 0-LDP
    AS path: I
    VC Label 100000, MTU 1500, VLAN ID 512

```

### show route protocol l2vpn extensive

```

user@host> show route protocol l2vpn extensive

inet.0: 14 destinations, 15 routes (13 active, 0 holddown, 1 hidden)

inet.3: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

mpls.0: 7 destinations, 7 routes (7 active, 0 holddown, 0 hidden)
800001 (1 entry, 1 announced)
TSI:
KRT in-kernel 800001 /36 -> {so-0/0/0.0}
  *L2VPN Preference: 7
    Next hop: via so-0/0/0.0 weight 49087 balance 97%, selected
    Label operation: Pop Offset: 4
    State: <Active Int>
    Local AS: 69
    Age: 7:48
    Task: Common L2 VC
    Announcement bits (1): 0-KRT
    AS path: I

so-0/0/0.0 (1 entry, 1 announced)
TSI:
KRT in-kernel so-0/0/0.0 /16 -> {indirect(288)}
  *L2VPN Preference: 7
    Next hop: via so-0/0/1.0, selected
    Label operation: Push 800000 Offset: -4
    Protocol next hop: 10.255.14.220
    Push 800000 Offset: -4
    Indirect next hop: 85142a0 288
    State: <Active Int>

```

```

Local AS:    69
Age: 7:48
Task: Common L2 VC
Announcement bits (2): 0-KRT 1-Common L2 VC
AS path: I
Communities: target:69:1 Layer2-info: encaps:PPP,
control flags:2, mtu: 0

```

### show route protocol ldp

```

user@host> show route protocol ldp
inet.0: 12 destinations, 13 routes (12 active, 0 holddown, 0 hidden)

inet.3: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

192.168.16.1/32    *[LDP/9] 1d 23:03:35, metric 1
                  > via t1-4/0/0.0, Push 100000
192.168.17.1/32    *[LDP/9] 1d 23:03:35, metric 1
                  > via t1-4/0/0.0

private1___.inet.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

mpls.0: 6 destinations, 6 routes (6 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

100064            *[LDP/9] 1d 23:03:35, metric 1
                  > via t1-4/0/0.0, Pop
100064(S=0)        *[LDP/9] 1d 23:03:35, metric 1
                  > via t1-4/0/0.0, Pop
100080            *[LDP/9] 1d 23:03:35, metric 1
                  > via t1-4/0/0.0, Swap 100000

```

### show route protocol ldp extensive

```

user@host> show route protocol ldp extensive
192.168.16.1/32 (1 entry, 1 announced)
  State: <FlashAll>
  *LDP    Preference: 9
          Next-hop reference count: 3
          Next hop: via t1-4/0/0.0, selected
          Label operation: Push 100000
          State: <Active Int>
          Local AS: 65500
          Age: 1d 23:03:58      Metric: 1
          Task: LDP
          Announcement bits (2): 0-Resolve tree 1 2-Resolve tree 2
          AS path: I

192.168.17.1/32 (1 entry, 1 announced)
  State: <FlashAll>
  *LDP    Preference: 9
          Next-hop reference count: 3
          Next hop: via t1-4/0/0.0, selected
          State: <Active Int>
          Local AS: 65500
          Age: 1d 23:03:58      Metric: 1
          Task: LDP
          Announcement bits (2): 0-Resolve tree 1 2-Resolve tree 2
          AS path: I

```

```
private1__inet.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
```

```
mpls.0: 6 destinations, 6 routes (6 active, 0 holddown, 0 hidden)
```

```
100064 (1 entry, 1 announced)
```

```
TSI:
```

```
KRT in-kernel 100064 /36 -> {t1-4/0/0.0}
```

```
*LDP      Preference: 9
           Next-hop reference count: 2
           Next hop: via t1-4/0/0.0, selected
           State: <Active Int>
           Local AS: 65500
           Age: 1d 23:03:58      Metric: 1
           Task: LDP
           Announcement bits (1): 0-KRT
           AS path: I
           Prefixes bound to route: 192.168.17.1/32
```

```
100064(S=0) (1 entry, 1 announced)
```

```
TSI:
```

```
KRT in-kernel 100064 /40 -> {t1-4/0/0.0}
```

```
*LDP      Preference: 9
           Next-hop reference count: 2
           Next hop: via t1-4/0/0.0, selected
           Label operation: Pop
           State: <Active Int>
           Local AS: 65500
           Age: 1d 23:03:58      Metric: 1
           Task: LDP
           Announcement bits (1): 0-KRT
           AS path: I
```

```
100080 (1 entry, 1 announced)
```

```
TSI:
```

```
KRT in-kernel 100080 /36 -> {t1-4/0/0.0}
```

```
*LDP      Preference: 9
           Next-hop reference count: 2
           Next hop: via t1-4/0/0.0, selected
           Label operation: Swap 100000
           State: <Active Int>
           Local AS: 65500
           Age: 1d 23:03:58      Metric: 1
           Task: LDP
           Announcement bits (1): 0-KRT
           AS path: I
           Prefixes bound to route: 192.168.16.1/32
```

### show route protocol ospf (Layer 3 VPN)

```
user@host> show route protocol ospf
```

```
inet.0: 40 destinations, 40 routes (39 active, 0 holddown, 1 hidden)
```

```
+ = Active Route, - = Last Active, * = Both
```

```
10.39.1.4/30      *[OSPF/10] 00:05:18, metric 4
                  > via t3-3/2/0.0
10.39.1.8/30      [OSPF/10] 00:05:18, metric 2
                  > via t3-3/2/0.0
10.255.14.171/32  *[OSPF/10] 00:05:18, metric 4
                  > via t3-3/2/0.0
10.255.14.179/32  *[OSPF/10] 00:05:18, metric 2
                  > via t3-3/2/0.0
```

```

224.0.0.5/32      *[OSPF/10] 20:25:55, metric 1

VPN-AB.inet.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

10.39.1.16/30     [OSPF/10] 00:05:43, metric 1
                  > via so-0/2/2.0
10.255.14.173/32  *[OSPF/10] 00:05:43, metric 1
                  > via so-0/2/2.0
224.0.0.5/32      *[OSPF/10] 20:26:20, metric 1

```

### show route protocol ospf detail

```

user@host> show route protocol ospf detail
VPN-AB.inet.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

10.39.1.16/30 (2 entries, 0 announced)
    OSPF    Preference: 10
            Nexthop: via so-0/2/2.0, selected
            State: <Int>
            Inactive reason: Route Preference
            Age: 6:25      Metric: 1
            Area: 0.0.0.0
            Task: VPN-AB-OSPF
            AS path: I
            Communities: Route-Type:0.0.0.0:1:0

...

```

### show route protocol rip

```

user@host> show route protocol rip
inet.0: 26 destinations, 27 routes (25 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

VPN-AB.inet.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both
10.255.14.177/32  *[RIP/100] 20:24:34, metric 2
                  > to 10.39.1.22 via t3-0/2/2.0
224.0.0.9/32      *[RIP/100] 00:03:59, metric 1

```

### show route protocol rip detail

```

user@host> show route protocol rip detail
inet.0: 26 destinations, 27 routes (25 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

VPN-AB.inet.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both
10.255.14.177/32 (1 entry, 1 announced)
    *RIP    Preference: 100
            Nexthop: 10.39.1.22 via t3-0/2/2.0, selected
            State: <Active Int>
            Age: 20:25:02  Metric: 2
            Task: VPN-AB-RIPv2
            Announcement bits (2): 0-KRT 2-BGP.0.0.0.0+179
            AS path: I
            Route learned from 10.39.1.22 expires in 96 seconds

```

### show route protocol ripng table inet6

```
user@host> show route protocol ripng table inet6
inet6.0: 4215 destinations, 4215 routes (4214 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

1111::1/128      *[RIPng/100] 02:13:33, metric 2
                  > to fe80::2a0:a5ff:fe3d:56 via t3-0/2/0.0
1111::2/128      *[RIPng/100] 02:13:33, metric 2
                  > to fe80::2a0:a5ff:fe3d:56 via t3-0/2/0.0
1111::3/128      *[RIPng/100] 02:13:33, metric 2
                  > to fe80::2a0:a5ff:fe3d:56 via t3-0/2/0.0
1111::4/128      *[RIPng/100] 02:13:33, metric 2
                  > to fe80::2a0:a5ff:fe3d:56 via t3-0/2/0.0
1111::5/128      *[RIPng/100] 02:13:33, metric 2
                  > to fe80::2a0:a5ff:fe3d:56 via t3-0/2/0.0
1111::6/128      *[RIPng/100] 02:13:33, metric 2
                  > to fe80::2a0:a5ff:fe3d:56 via t3-0/2/0.0
```

### show route protocol static detail

```
user@host> show route protocol static detail
inet.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)
10.5.0.0/16 (1 entry, 1 announced)
    *Static Preference: 5
        Next hop type: Router, Next hop index: 324
        Address: 0x9274010
        Next-hop reference count: 27
        Next hop: 192.168.187.126 via fxp0.0, selected
        Session Id: 0x0
        State: <Active NoReadvrt Int Ext>
        Age: 7w3d 21:24:25
        Validation State: unverified
        Task: RT
        Announcement bits (1): 0-KRT
        AS path: I

10.10.0.0/16 (1 entry, 1 announced)
    *Static Preference: 5
        Next hop type: Router, Next hop index: 324
        Address: 0x9274010
        Next-hop reference count: 27
        Next hop: 192.168.187.126 via fxp0.0, selected
        Session Id: 0x0
        State: <Active NoReadvrt Int Ext>
        Age: 7w3d 21:24:25
        Validation State: unverified
        Task: RT
        Announcement bits (1): 0-KRT
        AS path: I

10.13.10.0/23 (1 entry, 1 announced)
    *Static Preference: 5
        Next hop type: Router, Next hop index: 324
        Address: 0x9274010
        Next-hop reference count: 27
        Next hop: 192.168.187.126 via fxp0.0, selected
        Session Id: 0x0
        State: <Active NoReadvrt Int Ext>
        Age: 7w3d 21:24:25
        Validation State: unverified
```

Task: RT  
Announcement bits (1): 0-KRT  
AS path: I

## show route receive-protocol

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Syntax</b>                      | show route receive-protocol <i>protocol neighbor-address</i><br><brief   detail   extensive   terse><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
| <b>Syntax (EX Series Switches)</b> | show route receive-protocol <i>protocol neighbor-address</i><br><brief   detail   extensive   terse>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Description</b>                 | Display the routing information as it was received through a particular neighbor using a particular dynamic routing protocol.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Options</b>                     | <b>brief   detail   extensive   terse</b> —(Optional) Display the specified level of output.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.<br><br><b><i>protocol neighbor-address</i></b> —Protocol transmitting the route ( <b>bgp</b> , <b>dvmrp</b> , <b>msdp</b> , <b>pim</b> , <b>rip</b> , or <b>ripng</b> ) and address of the neighboring router from which the route entry was received.                                                                                                                                                                                                                               |  |
| <b>Additional Information</b>      | The output displays the selected routes and the attributes with which they were received, but does not show the effects of import policy on the routing attributes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| <b>List of Sample Output</b>       | <a href="#">show route receive-protocol bgp on page 923</a><br><a href="#">show route receive-protocol bgp extensive on page 923</a><br><a href="#">show route receive-protocol bgp table extensive on page 923</a><br><a href="#">show route receive-protocol bgp logical-system extensive on page 924</a><br><a href="#">show route receive-protocol bgp detail (Layer 2 VPN) on page 925</a><br><a href="#">show route receive-protocol bgp extensive (Layer 2 VPN) on page 925</a><br><a href="#">show route receive-protocol bgp (Layer 3 VPN) on page 926</a><br><a href="#">show route receive-protocol bgp detail (Layer 3 VPN) on page 926</a><br><a href="#">show route receive-protocol bgp extensive (Layer 3 VPN) on page 927</a> |  |
| <b>Output Fields</b>               | Table 81 on page 920 describes the output fields for the <b>show route receive-protocol</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |

Table 81: show route receive-protocol Output Fields

| Field Name                 | Field Description                                                       | Level of Output |
|----------------------------|-------------------------------------------------------------------------|-----------------|
| <i>routing-table-name</i>  | Name of the routing table—for example, inet.0.                          | All levels      |
| <i>number destinations</i> | Number of destinations for which there are routes in the routing table. | All levels      |



Table 81: show route receive-protocol Output Fields (*continued*)

| Field Name                                      | Field Description                                                                                                                                                                                                                                                                                                                        | Level of Output         |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <i>number routes</i>                            | Number of routes in the routing table and total number of routes in the following states: <ul style="list-style-type: none"> <li>• <b>active</b></li> <li>• <b>holddown</b> (routes that are in pending state before being declared inactive)</li> <li>• <b>hidden</b> (routes that are not used because of a routing policy)</li> </ul> | All levels              |
| Prefix                                          | Destination prefix.                                                                                                                                                                                                                                                                                                                      | none <b>brief</b>       |
| MED                                             | Multiple exit discriminator value included in the route.                                                                                                                                                                                                                                                                                 | none <b>brief</b>       |
| <i>destination-prefix</i><br>(entry, announced) | Destination prefix. The <b>entry</b> value is the number of routes for this destination, and the <b>announced</b> value is the number of routes being announced for this destination.                                                                                                                                                    | <b>detail extensive</b> |
| Route Distinguisher                             | 64-bit prefix added to IP subnets to make them unique.                                                                                                                                                                                                                                                                                   | <b>detail extensive</b> |
| Label-Base, range                               | First label in a block of labels and label block size. A remote PE routing device uses this first label when sending traffic toward the advertising PE routing device.                                                                                                                                                                   | <b>detail extensive</b> |
| VPN Label                                       | Virtual private network (VPN) label. Packets are sent between CE and PE routing devices by advertising VPN labels. VPN labels transit over either an RSVP or an LDP label-switched path (LSP) tunnel.                                                                                                                                    | <b>detail extensive</b> |
| Next hop                                        | Next hop to the destination. An angle bracket ( > ) indicates that the route is the selected route.                                                                                                                                                                                                                                      | All levels              |
| Localpref or Lclpref                            | Local preference value included in the route.                                                                                                                                                                                                                                                                                            | All levels              |

Table 81: show route receive-protocol Output Fields (*continued*)

| Field Name          | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Level of Output         |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| AS path             | <p>Autonomous system (AS) path through which the route was learned. The letters at the end of the AS path indicate the path origin, providing an indication of the state of the route at the point at which the AS path originated:</p> <ul style="list-style-type: none"> <li>• <b>I</b>—IGP.</li> <li>• <b>E</b>—EGP.</li> <li>• <b>?</b>—Incomplete; typically, the AS path was aggregated.</li> </ul> <p>When AS path numbers are included in the route, the format is as follows:</p> <ul style="list-style-type: none"> <li>• <b>[ ]</b>—Brackets enclose the number that precedes the AS path. This number represents the number of ASs present in the AS path, when calculated as defined in RFC 4271. This value is used the AS-path merge process, as defined in RFC 4893.</li> <li>• <b>[ ]</b>—If more than one AS number is configured on the router, or if AS path prepending is configured, brackets enclose the local AS number associated with the AS path.</li> <li>• <b>{ }</b>—Braces enclose AS sets, which are groups of AS numbers in which the order does not matter. A set commonly results from route aggregation. The numbers in each AS set are displayed in ascending order.</li> <li>• <b>( )</b>—Parentheses enclose a confederation.</li> <li>• <b>( [ ] )</b>—Parentheses and brackets enclose a confederation set.</li> </ul> <p><b>NOTE:</b> In Junos OS Release 10.3 and later, the AS path field displays an unrecognized attribute and associated hexadecimal value if BGP receives attribute 128 (attribute set) and you have not configured an independent domain in any routing instance.</p> | All levels              |
| Cluster list        | (For route reflected output only) Cluster ID sent by the route reflector.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive</b> |
| Originator ID       | (For route reflected output only) Address of routing device that originally sent the route to the route reflector.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive</b> |
| Communities         | Community path attribute for the route. See the Output Field table in the <a href="#">show route detail</a> command for all possible values for this field.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive</b> |
| AIGP                | Accumulated interior gateway protocol (AIGP) BGP attribute.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>detail extensive</b> |
| Attrset AS          | Number, local preference, and path of the AS that originated the route. These values are stored in the <b>Attrset</b> attribute at the originating routing device.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive</b> |
| Layer2-info: encaps | Layer 2 encapsulation (for example, VPLS).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive</b> |
| control flags       | Control flags: <b>none</b> or <b>Site Down</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive</b> |
| mtu                 | Maximum transmission unit (MTU) of the Layer 2 circuit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive</b> |

## Sample Output

### show route receive-protocol bgp

```
user@host> show route receive-protocol bgp 10.255.245.215

inet.0: 28 destinations, 33 routes (27 active, 0 holddown, 1 hidden)
Prefix          Next hop          MED      Lclpref  AS path
10.22.1.0/24     10.255.245.215    0        100      I
10.22.2.0/24     10.255.245.215    0        100      I
```

### show route receive-protocol bgp extensive

```
user@host> show route receive-protocol bgp 10.255.245.63 extensive
inet.0: 244 destinations, 244 routes (243 active, 0 holddown, 1 hidden)
Prefix          Next hop          MED      Lclpref  AS path
1.1.1.0/24 (1 entry, 1 announced)
  Next hop: 10.0.50.3
  Localpref: 100
  AS path: I <Originator>
  Cluster list: 10.2.3.1
  Originator ID: 10.255.245.45
165.3.0.0/16 (1 entry, 1 announced)
  Next hop: 111.222.5.254
  Localpref: 100
  AS path: I <Originator>
  Cluster list: 10.2.3.1
  Originator ID: 10.255.245.68
165.4.0.0/16 (1 entry, 1 announced)
  Next hop: 111.222.5.254
  Localpref: 100
  AS path: I <Originator>
  Cluster list: 10.2.3.1
  Originator ID: 10.255.245.45
195.1.2.0/24 (1 entry, 1 announced)
  Next hop: 111.222.5.254
  Localpref: 100
  AS path: I <Originator>
  Cluster list: 10.2.3.1
  Originator ID: 10.255.245.68
inet.2: 63 destinations, 63 routes (63 active, 0 holddown, 0 hidden)
Prefix          Next hop          MED      Lclpref  AS path
inet.3: 10 destinations, 10 routes (10 active, 0 holddown, 0 hidden)
Prefix          Next hop          MED      Lclpref  AS path
iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Prefix          Next hop          MED      Lclpref  AS path
mpls.0: 48 destinations, 48 routes (48 active, 0 holddown, 0 hidden)
```

### show route receive-protocol bgp table extensive

```
user@host> show route receive-protocol bgp 207.17.136.192 table inet.0 66.117.68.0/24 extensive
inet.0: 227315 destinations, 227316 routes (227302 active, 0 holddown, 13 hidden)
* 66.117.63.0/24 (1 entry, 1 announced)
  Nexthop: 207.17.136.29
  Localpref: 100
  AS path: AS2 PA[6]: 14203 2914 3356 29748 33437 AS_TRANS
  AS path: AS4 PA[2]: 33437 393219
  AS path: Merged[6]: 14203 2914 3356 29748 33437 393219 I
  Communities: 2914:420
```

**show route receive-protocol bgp logical-system extensive**

```
user@host> show route receive-protocol bgp 10.0.0.9 logical-system PE4 extensive
inet.0: 12 destinations, 13 routes (12 active, 0 holddown, 0 hidden)
* 10.0.0.0/30 (1 entry, 1 announced)
  Accepted
  Route Label: 3
  Nexthop: 10.0.0.9
  AS path: 13979 I

* 10.0.0.4/30 (1 entry, 1 announced)
  Accepted
  Route Label: 3
  Nexthop: 10.0.0.9
  AS path: 13979 I

10.0.0.8/30 (2 entries, 1 announced)
  Accepted
  Route Label: 3
  Nexthop: 10.0.0.9
  AS path: 13979 I

* 10.9.9.1/32 (1 entry, 1 announced)
  Accepted
  Route Label: 3
  Nexthop: 10.0.0.9
  AS path: 13979 I

* 10.100.1.1/32 (1 entry, 1 announced)
  Accepted
  Route Label: 3
  Nexthop: 10.0.0.9
  AS path: 13979 I

* 44.0.0.0/24 (1 entry, 1 announced)
  Accepted
  Route Label: 300096
  Nexthop: 10.0.0.9
  AS path: 13979 I
  AIGP: 203

* 55.0.0.0/24 (1 entry, 1 announced)
  Accepted
  Route Label: 300112
  Nexthop: 10.0.0.9
  AS path: 13979 7018 I
  AIGP: 25

* 66.0.0.0/24 (1 entry, 1 announced)
  Accepted
  Route Label: 300144
  Nexthop: 10.0.0.9
  AS path: 13979 7018 I

* 99.0.0.0/24 (1 entry, 1 announced)
  Accepted
  Route Label: 300160
  Nexthop: 10.0.0.9
  AS path: 13979 7018 I
```

**show route receive-protocol bgp detail (Layer 2 VPN)**

```

user@host> show route receive-protocol bgp 10.255.14.171 detail
inet.0: 68 destinations, 68 routes (67 active, 0 holddown, 1 hidden)
Prefix          Nexthop          MED      Lc1pref AS path
inet.3: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
Prefix          Nexthop          MED      Lc1pref AS path
iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Prefix          Nexthop          MED      Lc1pref AS path
mpls.0: 10 destinations, 10 routes (10 active, 0 holddown, 0 hidden)
Prefix          Nexthop          MED      Lc1pref AS path
frame-vpn.l2vpn.0: 2 destinations, 2 routes (2 active, 0 holddown, 0
hidden)
Prefix          Nexthop          MED      Lc1pref AS path
10.255.245.35:1:5:1/96 (1 entry, 1 announced)
  Route Distinguisher: 10.255.245.35:1
  Label-base : 800000, range : 4, status-vector : 0x0
  Nexthop: 10.255.245.35
  Localpref: 100
  AS path: I
  Communities: target:65299:100 Layer2-info: encaps:FRAME RELAY,
control flags: 0, mtu: 0
bgp.l2vpn.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Prefix          Nexthop          MED      Lc1pref AS path
10.255.245.35:1:5:1/96 (1 entry, 0 announced)
  Route Distinguisher: 10.255.245.35:1
  Label-base : 800000, range : 4, status-vector : 0x0
  Nexthop: 10.255.245.35
  Localpref: 100
  AS path: I
  Communities: target:65299:100 Layer2-info: encaps:FRAME RELAY,
control flags:0, mtu: 0

```

**show route receive-protocol bgp extensive (Layer 2 VPN)**

```

user@host> show route receive-protocol bgp 10.255.14.171 extensive
inet.0: 68 destinations, 68 routes (67 active, 0 holddown, 1 hidden)
Prefix          Nexthop          MED      Lc1pref AS path
inet.3: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
Prefix          Nexthop          MED      Lc1pref AS path
iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Prefix          Nexthop          MED      Lc1pref AS path
mpls.0: 10 destinations, 10 routes (10 active, 0 holddown, 0 hidden)
Prefix          Nexthop          MED      Lc1pref AS path
frame-vpn.l2vpn.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
Prefix          Nexthop          MED      Lc1pref AS path
10.255.245.35:1:5:1/96 (1 entry, 1 announced)
  Route Distinguisher: 10.255.245.35:1
  Label-base : 800000, range : 4, status-vector : 0x0
  Nexthop: 10.255.245.35
  Localpref: 100
  AS path: I
  Communities: target:65299:100 Layer2-info: encaps:FRAME RELAY,
control flags:0, mtu: 0
bgp.l2vpn.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Prefix          Nexthop          MED      Lc1pref AS path
10.255.245.35:1:5:1/96 (1 entry, 0 announced)
  Route Distinguisher: 10.255.245.35:1
  Label-base : 800000, range : 4, status-vector : 0x0
  Nexthop: 10.255.245.35
  Localpref: 100

```

```

AS path: I
Communities: target:65299:100 Layer2-info: encaps:FRAME RELAY,
control flags:0, mtu: 0

```

### show route receive-protocol bgp (Layer 3 VPN)

```

user@host> show route receive-protocol bgp 10.255.14.171
inet.0: 33 destinations, 33 routes (32 active, 0 holddown, 1 hidden)
Prefix          Nexthop          MED    Lclpref AS path
inet.3: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
Prefix          Nexthop          MED    Lclpref AS path
VPN-A.inet.0: 6 destinations, 6 routes (6 active, 0 holddown, 0 hidden)
Prefix          Nexthop          MED    Lclpref AS path
10.255.14.175/32 10.255.14.171          100 2 I
10.255.14.179/32 10.255.14.171          2    100 I
VPN-B.inet.0: 6 destinations, 6 routes (6 active, 0 holddown, 0 hidden)
Prefix          Nexthop          MED    Lclpref AS path
10.255.14.175/32 10.255.14.171          100 2 I
10.255.14.177/32 10.255.14.171          100 I
iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Prefix          Nexthop          MED    Lclpref AS path
mpls.0: 9 destinations, 9 routes (9 active, 0 holddown, 0 hidden)
Prefix          Nexthop          MED    Lclpref AS path
bgp.l3vpn.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)
Prefix          Nexthop          MED    Lclpref AS path
10.255.14.171:300:10.255.14.177/32
                  10.255.14.171          100 I
10.255.14.171:100:10.255.14.179/32
                  10.255.14.171          2    100 I
10.255.14.171:200:10.255.14.175/32
                  10.255.14.171          100 2 I

```

### show route receive-protocol bgp detail (Layer 3 VPN)

```

user@host> show route receive-protocol bgp 10.255.14.174 detail
inet.0: 16 destinations, 17 routes (15 active, 0 holddown, 1 hidden)
inet.3: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
vpna.inet.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
* 10.49.0.0/30 (1 entry, 1 announced)
  Route Distinguisher: 10.255.14.176:2
  VPN Label: 101264
  Nexthop: 10.255.14.174
  Localpref: 100
  AS path: I
  Communities: target:200:100
  AttrSet AS: 100
    Localpref: 100
    AS path: I
* 10.255.14.172/32 (1 entry, 1 announced)
  Route Distinguisher: 10.255.14.176:2
  VPN Label: 101280
  Nexthop: 10.255.14.174
  Localpref: 100
  AS path: I
  Communities: target:200:100
  AttrSet AS: 100
    Localpref: 100
    AS path: I
iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
mpls.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
bgp.l3vpn.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

```

```

* 10.255.14.174:2:10.49.0.0/30 (1 entry, 0 announced)
  Route Distinguisher: 10.255.14.174:2
  VPN Label: 101264
  Nexthop: 10.255.14.174
  Localpref: 100
  AS path: I
  Communities: target:200:100
  AttrSet AS: 100
    Localpref: 100
    AS path: I
* 10.255.14.174:2:10.255.14.172/32 (1 entry, 0 announced)
  Route Distinguisher: 10.255.14.174:2
  VPN Label: 101280
  Nexthop: 10.255.14.174
  Localpref: 100
  AS path: I
  Communities: target:200:100
  AttrSet AS: 100
    Localpref: 100
    AS path: I
inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

```

#### show route receive-protocol bgp extensive (Layer 3 VPN)

```

user@host> show route receive-protocol bgp 10.255.245.63 extensive
inet.0: 244 destinations, 244 routes (243 active, 0 holddown, 1 hidden)
  Prefix          Nexthop          MED      Lclpref AS path
  1.1.1.0/24 (1 entry, 1 announced)
    Nexthop: 10.0.50.3
    Localpref: 100
    AS path: I <Originator>
    Cluster list: 10.2.3.1
    Originator ID: 10.255.245.45
  165.3.0.0/16 (1 entry, 1 announced)
    Nexthop: 111.222.5.254
    Localpref: 100
    AS path: I <Originator>
    Cluster list: 10.2.3.1
    Originator ID: 10.255.245.68
  165.4.0.0/16 (1 entry, 1 announced)
    Nexthop: 111.222.5.254
    Localpref: 100
    AS path: I <Originator>
    Cluster list: 10.2.3.1
    Originator ID: 10.255.245.45
  195.1.2.0/24 (1 entry, 1 announced)
    Nexthop: 111.222.5.254
    Localpref: 100
    AS path: I <Originator>
    Cluster list: 10.2.3.1
    Originator ID: 10.255.245.68
inet.2: 63 destinations, 63 routes (63 active, 0 holddown, 0 hidden)
  Prefix          Nexthop          MED      Lclpref AS path
inet.3: 10 destinations, 10 routes (10 active, 0 holddown, 0 hidden)
  Prefix          Nexthop          MED      Lclpref AS path
iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
  Prefix          Nexthop          MED      Lclpref AS path
mpls.0: 48 destinations, 48 routes (48 active, 0 holddown, 0 hidden)

```

## show route table

---

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                      | <code>show route table <i>routing-table-name</i></code><br><brief   detail   extensive   terse><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Syntax (EX Series Switches)</b> | <code>show route table <i>routing-table-name</i></code><br><brief   detail   extensive   terse>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>                 | Display the route entries in a particular routing table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Options</b>                     | <b>brief   detail   extensive   terse</b> —(Optional) Display the specified level of output.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.<br><br><b><i>routing-table-name</i></b> —Display route entries for all routing tables whose name begins with this string (for example, inet.0 and inet6.0 are both displayed when you run the <b>show route table inet</b> command).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Required Privilege Level</b>    | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Related Documentation</b>       | <ul style="list-style-type: none"><li>• <a href="#">show route summary</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>List of Sample Output</b>       | <a href="#">show route table bgp.l2.vpn on page 929</a><br><a href="#">show route table bgp.l3vpn.0 on page 929</a><br><a href="#">show route table bgp.l3vpn.0 detail on page 929</a><br><a href="#">show route table bgp.rtarget.0 (When Proxy BGP Route Target Filtering Is Configured) on page 931</a><br><a href="#">show route table inet.0 on page 931</a><br><a href="#">show route table inet6.0 on page 931</a><br><a href="#">show route table inet6.3 on page 932</a><br><a href="#">show route table inetflow detail on page 932</a><br><a href="#">show route table l2circuit.0 on page 932</a><br><a href="#">show route table mpls on page 933</a><br><a href="#">show route table mpls extensive on page 933</a><br><a href="#">show route table mpls.0 on page 933</a><br><a href="#">show route table mpls.0 (RSVP Route—Transit LSP) on page 934</a><br><a href="#">show route table vpls_1 detail on page 934</a><br><a href="#">show route table vpn-a on page 934</a><br><a href="#">show route table vpn-a.mdt.0 on page 935</a><br><a href="#">show route table VPN-A detail on page 935</a><br><a href="#">show route table VPN-AB.inet.0 on page 935</a><br><a href="#">show route table VPN_blue.mvpn-inet6.0 on page 936</a><br><a href="#">show route table VPN-A detail on page 936</a> |



[show route table inetflow detail on page 937](#)

**Output Fields** For information about output fields, see the output field tables for the [show route](#) command, the [show route detail](#) command, the [show route extensive](#) command, or the [show route terse](#) command.

## Sample Output

### show route table bgp.l2vpn

```
user@host> show route table bgp.l2vpn
bgp.l2vpn.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

192.168.24.1:1:4:1/96
    *[BGP/170] 01:08:58, localpref 100, from 192.168.24.1
    AS path: I
    > to 10.0.16.2 via fe-0/0/1.0, label-switched-path am
```

### show route table bgp.l3vpn.0

```
user@host> show route table bgp.l3vpn.0
bgp.l3vpn.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

10.255.71.15:100:10.255.71.17/32
    *[BGP/170] 00:03:59, MED 1, localpref 100, from
10.255.71.15
    AS path: I
    > via so-2/1/0.0, Push 100020, Push 100011(top)
10.255.71.15:200:10.255.71.18/32
    *[BGP/170] 00:03:59, MED 1, localpref 100, from
10.255.71.15
    AS path: I
    > via so-2/1/0.0, Push 100021, Push 100011(top)
```

### show route table bgp.l3vpn.0 detail

```
user@host> show route table bgp.l3vpn.0 detail
bgp.l3vpn.0: 8 destinations, 8 routes (8 active, 0 holddown, 0 hidden)

10.255.245.12:1:4.0.0.0/8 (1 entry, 1 announced)
  *BGP Preference: 170/-101
    Route Distinguisher: 10.255.245.12:1
    Source: 10.255.245.12
    Next hop: 192.168.208.66 via fe-0/0/0.0, selected
    Label operation: Push 182449
    Protocol next hop: 10.255.245.12
    Push 182449
    Indirect next hop: 863a630 297
    State: <Active Int Ext>
    Local AS: 35 Peer AS: 35
    Age: 12:19 Metric2: 1
    Task: BGP_35.10.255.245.12+179
    Announcement bits (1): 0-BGP.0.0.0.0+179
    AS path: 30 10458 14203 2914 3356 I (Atomic) Aggregator: 3356 4.68.0.11

    Communities: 2914:420 target:11111:1 origin:56:78
    VPN Label: 182449
    Localpref: 100
```

```
Router ID: 10.255.245.12

10.255.245.12:1:4.17.225.0/24 (1 entry, 1 announced)
  *BGP Preference: 170/-101
    Route Distinguisher: 10.255.245.12:1
    Source: 10.255.245.12
    Next hop: 192.168.208.66 via fe-0/0/0.0, selected
    Label operation: Push 182465
    Protocol next hop: 10.255.245.12
    Push 182465
    Indirect next hop: 863a8f0 305
    State: <Active Int Ext>
    Local AS: 35 Peer AS: 35
    Age: 12:19 Metric2: 1
    Task: BGP_35.10.255.245.12+179
    Announcement bits (1): 0-BGP.0.0.0.0+179
AS path: 30 10458 14203 2914 11853 11853 11853 6496 6496 6496 6496 6496 6496 I
  Communities: 2914:410 target:12:34 target:11111:1 origin:12:34
  VPN Label: 182465
  Localpref: 100
  Router ID: 10.255.245.12

10.255.245.12:1:4.17.226.0/23 (1 entry, 1 announced)
  *BGP Preference: 170/-101
    Route Distinguisher: 10.255.245.12:1
    Source: 10.255.245.12
    Next hop: 192.168.208.66 via fe-0/0/0.0, selected
    Label operation: Push 182465
    Protocol next hop: 10.255.245.12
    Push 182465
    Indirect next hop: 86bd210 330
    State: <Active Int Ext>
    Local AS: 35 Peer AS: 35
    Age: 12:19 Metric2: 1
    Task: BGP_35.10.255.245.12+179
    Announcement bits (1): 0-BGP.0.0.0.0+179
AS path: 30 10458 14203 2914 11853 11853 11853 11853 6496 6496 6496 6496 6496
6496 I
  Communities: 2914:410 target:12:34 target:11111:1 origin:12:34
  VPN Label: 182465
  Localpref: 100
  Router ID: 10.255.245.12

10.255.245.12:1:4.17.251.0/24 (1 entry, 1 announced)
  *BGP Preference: 170/-101
    Route Distinguisher: 10.255.245.12:1
    Source: 10.255.245.12
    Next hop: 192.168.208.66 via fe-0/0/0.0, selected
    Label operation: Push 182465
    Protocol next hop: 10.255.245.12
    Push 182465
    Indirect next hop: 86bd210 330
    State: <Active Int Ext>
    Local AS: 35 Peer AS: 35
    Age: 12:19 Metric2: 1
    Task: BGP_35.10.255.245.12+179
    Announcement bits (1): 0-BGP.0.0.0.0+179
AS path: 30 10458 14203 2914 11853 11853 11853 11853 6496 6496 6496 6496 6496
6496 I
```

```

Communities: 2914:410 target:12:34 target:11111:1 origin:12:34
VPN Label: 182465
Localpref: 100

```

### show route table bgp.rtarget.0 (When Proxy BGP Route Target Filtering Is Configured)

```

user@host> show route table bgp.rtarget.0
bgp.rtarget.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

100:100:100/96
                *[RTarget/5] 00:03:14
                  Type Proxy
                    for 10.255.165.103
                    for 10.255.166.124
                  Local

```

### show route table inet.0

```

user@host> show route table inet.0
inet.0: 12 destinations, 12 routes (11 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

0.0.0.0/0        *[Static/5] 00:51:57
                  > to 111.222.5.254 via fxp0.0
1.0.0.1/32       *[Direct/0] 00:51:58
                  > via at-5/3/0.0
1.0.0.2/32       *[Local/0] 00:51:58
                  Local
12.12.12.21/32   *[Local/0] 00:51:57
                  Reject
13.13.13.13/32   *[Direct/0] 00:51:58
                  > via t3-5/2/1.0
13.13.13.14/32   *[Local/0] 00:51:58
                  Local
13.13.13.21/32   *[Local/0] 00:51:58
                  Local
13.13.13.22/32   *[Direct/0] 00:33:59
                  > via t3-5/2/0.0
127.0.0.1/32     [Direct/0] 00:51:58
                  > via lo0.0
111.222.5.0/24   *[Direct/0] 00:51:58
                  > via fxp0.0
111.222.5.81/32  *[Local/0] 00:51:58
                  Local

```

### show route table inet6.0

```

user@host> show route table inet6.0
inet6.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Route, * = Both

fec0:0:0:3::/64 *[Direct/0] 00:01:34
>via fe-0/1/0.0

fec0:0:0:3::/128 *[Local/0] 00:01:34
>Local

fec0:0:0:4::/64 *[Static/5] 00:01:34
>to fec0:0:0:3::ffff via fe-0/1/0.0

```

### show route table inet6.3

```
user@router> show route table inet6.3
inet6.3: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

::10.255.245.195/128
    *[LDP/9] 00:00:22, metric 1
    > via so-1/0/0.0
::10.255.245.196/128
    *[LDP/9] 00:00:08, metric 1
    > via so-1/0/0.0, Push 100008
```

### show route table inetflow detail

```
user@host> show route table inetflow detail
inetflow.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
10.12.44.1,*/48 (1 entry, 1 announced)
    *BGP Preference: 170/-101
        Next-hop reference count: 2
        State: <Active Ext>
        Local AS: 65002 Peer AS: 65000
        Age: 4
        Task: BGP_65000.10.12.99.5+3792
        Announcement bits (1): 0-Flow
        AS path: 65000 I
        Communities: traffic-rate:0:0
        Validation state: Accept, Originator: 10.12.99.5
        Via: 10.12.44.0/24, Active
        Localpref: 100
        Router ID: 10.255.71.161

10.12.56.1,*/48 (1 entry, 1 announced)
    *Flow Preference: 5
        Next-hop reference count: 2
        State: <Active>
        Local AS: 65002
        Age: 6:30
        Task: RT Flow
        Announcement bits (2): 0-Flow 1-BGP.0.0.0.0+179
        AS path: I
        Communities: 1:1
```

### show route table l2circuit.0

```
user@host> show route table l2circuit.0
l2circuit.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

10.1.1.195:NoCtrlWord:1:1:Local/96
    *[L2CKT/7] 00:50:47
    > via so-0/1/2.0, Push 100049
    > via so-0/1/3.0, Push 100049
10.1.1.195:NoCtrlWord:1:1:Remote/96
    *[LDP/9] 00:50:14
    Discard
10.1.1.195:CtrlWord:1:2:Local/96
    *[L2CKT/7] 00:50:47
    > via so-0/1/2.0, Push 100049
    > via so-0/1/3.0, Push 100049
10.1.1.195:CtrlWord:1:2:Remote/96
```

```
*[LDP/9] 00:50:14
Discard
```

### show route table mpls

```
user@host> show route table mpls
mpls.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

0          *[MPLS/0] 00:13:55, metric 1
           Receive
1          *[MPLS/0] 00:13:55, metric 1
           Receive
2          *[MPLS/0] 00:13:55, metric 1
           Receive
1024       *[VPN/0] 00:04:18
           to table red.inet.0, Pop
```

### show route table mpls extensive

```
user@host> show route table mpls extensive
100000 (1 entry, 1 announced)
TSI:
KRT in-kernel 100000 /36 -> {so-1/0/0.0}
    *LDP      Preference: 9
              Next hop: via so-1/0/0.0, selected
              Pop
              State: <Active Int>
              Age: 29:50      Metric: 1
              Task: LDP
              Announcement bits (1): 0-KRT
              AS path: I
              Prefixes bound to route: 10.0.0.194/32
```

### show route table mpls.0

```
user@host> show route table mpls.0
mpls.0: 11 destinations, 11 routes (11 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

0          *[MPLS/0] 00:45:09, metric 1
           Receive
1          *[MPLS/0] 00:45:09, metric 1
           Receive
2          *[MPLS/0] 00:45:09, metric 1
           Receive
100000     *[L2VPN/7] 00:43:04
           > via so-0/1/0.1, Pop
100001     *[L2VPN/7] 00:43:03
           > via so-0/1/0.2, Pop      Offset: 4
100002     *[LDP/9] 00:43:22, metric 1
           via so-0/1/2.0, Pop
           > via so-0/1/3.0, Pop
100002(S=0) *[LDP/9] 00:43:22, metric 1
           via so-0/1/2.0, Pop
           > via so-0/1/3.0, Pop
100003     *[LDP/9] 00:43:22, metric 1
           > via so-0/1/2.0, Swap 100002
           via so-0/1/3.0, Swap 100002
100004     *[LDP/9] 00:43:16, metric 1
           via so-0/1/2.0, Swap 100049
           > via so-0/1/3.0, Swap 100049
```

```

so-0/1/0.1      *[L2VPN/7] 00:43:04
                 > via so-0/1/2.0, Push 100001, Push 100049(top)
                 via so-0/1/3.0, Push 100001, Push 100049(top)
so-0/1/0.2      *[L2VPN/7] 00:43:03
                 > via so-0/1/2.0, Push 100000, Push 100049(top) Offset: -4
                 > via so-0/1/3.0, Push 100000, Push 100049(top) Offset: -4

```

### show route table mpls.0 (RSVP Route—Transit LSP)

```
user@host> show route table mpls.0
```

```

mpls.0: 8 destinations, 8 routes (8 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

```

```

0          *[MPLS/0] 00:37:31, metric 1
           Receive
1          *[MPLS/0] 00:37:31, metric 1
           Receive
2          *[MPLS/0] 00:37:31, metric 1
           Receive
13         *[MPLS/0] 00:37:31, metric 1
           Receive
300352     *[RSVP/7/1] 00:08:00, metric 1
           > to 8.64.0.106 via ge-1/0/1.0, label-switched-path lsp1_p2p
300352(S=0) *[RSVP/7/1] 00:08:00, metric 1
           > to 8.64.0.106 via ge-1/0/1.0, label-switched-path lsp1_p2p
300384     *[RSVP/7/2] 00:05:20, metric 1
           > to 8.64.1.106 via ge-1/0/0.0, Pop
300384(S=0) *[RSVP/7/2] 00:05:20, metric 1
           > to 8.64.1.106 via ge-1/0/0.0, Pop

```

### show route table vpls\_1 detail

```
user@host> show route table vpls_1 detail
```

```

vpls_1.l2vpn.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
Restart Complete

```

```

1.1.1.11:1000:1:1/96 (1 entry, 1 announced)
*L2VPN Preference: 170/-1
Receive table: vpls_1.l2vpn.0
Next-hop reference count: 2
State: <Active Int Ext>
Age: 4:29:47 Metric2: 1
Task: vpls_1-l2vpn
Announcement bits (1): 1-BGP.0.0.0+179
AS path: I
Communities: Layer2-info: encaps:VPLS, control flags:Site-Down
Label-base: 800000, range: 8, status-vector: 0xFF

```

### show route table vpn-a

```
user@host> show route table vpn-a
```

```
vpn-a.l2vpn.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)
```

```
+ = Active Route, - = Last Active, * = Both
```

```

192.168.16.1:1:1/96
          *[VPN/7] 05:48:27
          Discard
192.168.24.1:1:2:1/96
          *[BGP/170] 00:02:53, localpref 100, from 192.168.24.1
          AS path: I
          > to 10.0.16.2 via fe-0/0/1.0, label-switched-path am

```

```

192.168.24.1:1:3:1/96
    *[BGP/170] 00:02:53, localpref 100, from 192.168.24.1
    AS path: I
    > to 10.0.16.2 via fe-0/0/1.0, label-switched-path am

```

#### show route table vpn-a.mdt.0

```

user@host> show route table vpn-a.mdt.0
vpn-a.mdt.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

1:1:0:10.255.14.216:232.1.1.1/144
    *[MVPN/70] 01:23:05, metric2 1
    Indirect
1:1:1:10.255.14.218:232.1.1.1/144
    *[BGP/170] 00:57:49, localpref 100, from 10.255.14.218
    AS path: I
    > via so-0/0/0.0, label-switched-path r0e-to-r1
1:1:2:10.255.14.217:232.1.1.1/144
    *[BGP/170] 00:57:49, localpref 100, from 10.255.14.217
    AS path: I
    > via so-0/0/1.0, label-switched-path r0-to-r2

```

#### show route table VPN-A detail

```

user@host> show route table VPN-A detail
VPN-AB.inet.0: 8 destinations, 8 routes (8 active, 0 holddown, 0 hidden)
10.255.179.9/32 (1 entry, 1 announced)
    *BGP Preference: 170/-101
    Route Distinguisher: 10.255.179.13:200
    Next hop type: Indirect
    Next-hop reference count: 5
    Source: 10.255.179.13
    Next hop type: Router, Next hop index: 732
    Next hop: 10.39.1.14 via fe-0/3/0.0, selected
    Label operation: Push 299824, Push 299824(top)
    Protocol next hop: 10.255.179.13
    Push 299824
    Indirect next hop: 8f275a0 1048574
    State: (Secondary Active Int Ext)
    Local AS: 1 Peer AS: 1
    Age: 3:41:06 Metric: 1 Metric2: 1
    Task: BGP_1.10.255.179.13+64309
    Announcement bits (2): 0-KRT 1-BGP RT Background
    AS path: I
    Communities: target:1:200 rte-type:0.0.0.0:1:0
    Import Accepted
    VPN Label: 299824 TTL Action: vrf-ttl-propagate
    Localpref: 100
    Router ID: 10.255.179.13
    Primary Routing Table bgp.13vpn.0

```

#### show route table VPN-AB.inet.0

```

user@host> show route table VPN-AB.inet.0
VPN-AB.inet.0: 8 destinations, 8 routes (8 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

10.39.1.0/30      *[OSPF/10] 00:07:24, metric 1
                  > via so-7/3/1.0
10.39.1.4/30     *[Direct/0] 00:08:42
                  > via so-5/1/0.0

```

```

10.39.1.6/32      *[Local/0] 00:08:46
                  Local
10.255.71.16/32   *[Static/5] 00:07:24
                  > via so-2/0/0.0
10.255.71.17/32   *[BGP/170] 00:07:24, MED 1, localpref 100, from
10.255.71.15
                  AS path: I
                  > via so-2/1/0.0, Push 100020, Push 100011(top)
10.255.71.18/32   *[BGP/170] 00:07:24, MED 1, localpref 100, from
10.255.71.15
                  AS path: I
                  > via so-2/1/0.0, Push 100021, Push 100011(top)
10.255.245.245/32 *[BGP/170] 00:08:35, localpref 100
                  AS path: 2 I
                  > to 10.39.1.5 via so-5/1/0.0
10.255.245.246/32 *[OSPF/10] 00:07:24, metric 1
                  > via so-7/3/1.0

```

#### show route table VPN\_blue.mvpn-inet6.0

```

user@host> show route table VPN_blue.mvpn-inet6.0
vpn_blue.mvpn-inet6.0: 6 destinations, 6 routes (6 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

1::10.255.2.202:65535:10.255.2.202/432
    *[BGP/170] 00:02:37, localpref 100, from 10.255.2.202
    AS path: I
    > via so-0/1/3.0
1::10.255.2.203:65535:10.255.2.203/432
    *[BGP/170] 00:02:37, localpref 100, from 10.255.2.203
    AS path: I
    > via so-0/1/0.0
1::10.255.2.204:65535:10.255.2.204/432
    *[MVPN/70] 00:57:23, metric2 1
    Indirect
5::10.255.2.202:65535:128::192.168.90.2:128:ffff::1/432
    *[BGP/170] 00:02:37, localpref 100, from 10.255.2.202
    AS path: I
    > via so-0/1/3.0
6::10.255.2.203:65535:65000:128::10.12.53.12:128:ffff::1/432
    *[PIM/105] 00:02:37
    Multicast (IPv6)
7::10.255.2.202:65535:65000:128::192.168.90.2:128:ffff::1/432
    *[MVPN/70] 00:02:37, metric2 1
    Indirect

```

#### show route table VPN-A detail

```

user@host> show route table VPN-A detail
VPN-AB.inet.0: 8 destinations, 8 routes (8 active, 0 holddown, 0 hidden)
10.255.179.9/32 (1 entry, 1 announced)
    *BGP Preference: 170/-101
    Route Distinguisher: 10.255.179.13:200
    Next hop type: Indirect
    Next-hop reference count: 5
    Source: 10.255.179.13
    Next hop type: Router, Next hop index: 732
    Next hop: 10.39.1.14 via fe-0/3/0.0, selected
    Label operation: Push 299824, Push 299824(top)
    Protocol next hop: 10.255.179.13
    Push 299824

```



```

Indirect next hop: 8f275a0 1048574
State: (Secondary Active Int Ext)
Local AS: 1 Peer AS: 1
Age: 3:41:06 Metric: 1 Metric2: 1
Task: BGP_1.10.255.179.13+64309
Announcement bits (2): 0-KRT 1-BGP RT Background
AS path: I
Communities: target:1:200 rte-type:0.0.0.0:1:0
Import Accepted
VPN Label: 299824 TTL Action: vrf-ttl-propagate
Localpref: 100
Router ID: 10.255.179.13
Primary Routing Table bgp.13vpn.0

```

### show route table inetflow detail

```

user@host> show route table inetflow detail
inetflow.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
10.12.44.1,*/48 (1 entry, 1 announced)
    *BGP    Preference: 170/-101
            Next-hop reference count: 2
            State: <Active Ext>
            Local AS: 65002 Peer AS: 65000
            Age: 4
            Task: BGP_65000.10.12.99.5+3792
            Announcement bits (1): 0-Flow
            AS path: 65000 I
            Communities: traffic-rate:0:0
            Validation state: Accept, Originator: 10.12.99.5
            Via: 10.12.44.0/24, Active
            Localpref: 100
            Router ID: 10.255.71.161

10.12.56.1,*/48 (1 entry, 1 announced)
    *Flow    Preference: 5
            Next-hop reference count: 2
            State: <Active>
            Local AS: 65002
            Age: 6:30
            Task: RT Flow
            Announcement bits (2): 0-Flow 1-BGP.0.0.0.0+179
            AS path: I
            Communities: 1:1

user@PE1> show route table green.l2vpn.0 (VPLS Multihoming with FEC 129)
green.l2vpn.0: 6 destinations, 6 routes (6 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

1.1.1.2:100:1.1.1.2/96 AD
    *[VPLS/170] 1d 03:11:03, metric2 1
    Indirect
1.1.1.4:100:1.1.1.4/96 AD
    *[BGP/170] 1d 03:11:02, localpref 100, from 1.1.1.4
    AS path: I, validation-state: unverified
    > via ge-1/2/1.5
1.1.1.2:100:1:0/96 MH
    *[VPLS/170] 1d 03:11:03, metric2 1
    Indirect
1.1.1.4:100:1:0/96 MH
    *[BGP/170] 1d 03:11:02, localpref 100, from 1.1.1.4
    AS path: I, validation-state: unverified

```

```

        > via ge-1/2/1.5
1.1.1.4:NoCtrlWord:5:100:100:1.1.1.2:1.1.1.4/176
    *[VPLS/7] 1d 03:11:02, metric2 1
        > via ge-1/2/1.5
1.1.1.4:NoCtrlWord:5:100:100:1.1.1.4:1.1.1.2/176
    *[LDP/9] 1d 03:11:02
        Discard

user@host> show route table red extensive
red.inet.0: 364481 destinations, 714087 routes (364480 active, 48448 holddown, 1
hidden)
22.0.0.0/32 (3 entries, 1 announced)
    State: <OnList CalcForwarding>
TSI:
KRT in-kernel 22.0.0.0/32 -> {composite(1048575)} Page 0 idx 1 Type 1 val 0x934342c

    Nexthop: Self
    AS path: [2] I
    Communities: target:2:1
Path 22.0.0.0 from 2.3.0.0 Vector len 4. Val: 1
    @BGP Preference: 170/-1
        Route Distinguisher: 2:1
        Next hop type: Indirect
        Address: 0x258059e4
        Next-hop reference count: 2
        Source: 2.2.0.0
        Next hop type: Router
        Next hop: 10.1.1.1 via ge-1/1/9.0, selected
        Label operation: Push 707633
        Label TTL action: prop-ttl
        Session Id: 0x17d8
        Protocol next hop: 2.2.0.0
        Push 16
        Composite next hop: 0x25805988 - INH Session ID: 0x193c
        Indirect next hop: 0x23eea900 - INH Session ID: 0x193c
        State: <Secondary Active Int Ext ProtectionPath ProtectionCand>
        Local AS: 2 Peer AS: 2
        Age: 23 Metric2: 35
        Validation State: unverified
        Task: BGP_2.2.2.0.0+34549
        AS path: I
        Communities: target:2:1
        Import Accepted
        VPN Label: 16
        Localpref: 0
        Router ID: 2.2.0.0
        Primary Routing Table bgp.13vpn.0
        Composite next hops: 1
            Protocol next hop: 2.2.0.0 Metric: 35
            Push 16
            Composite next hop: 0x25805988 - INH Session ID: 0x193c
            Indirect next hop: 0x23eea900 - INH Session ID: 0x193c
            Indirect path forwarding next hops: 1
                Next hop type: Router
                Next hop: 10.1.1.1 via ge-1/1/9.0
                Session Id: 0x17d8
            2.2.0.0/32 Originating RIB: inet.3
                Metric: 35 Node path count: 1
                Forwarding nexthops: 1
                Nexthop: 10.1.1.1 via ge-1/1/9.0
        BGP Preference: 170/-1

```

```

Route Distinguisher: 2:1
Next hop type: Indirect
Address: 0x9347028
Next-hop reference count: 3
Source: 2.3.0.0
Next hop type: Router, Next hop index: 702
Next hop: 10.1.4.2 via ge-1/0/0.0, selected
Label operation: Push 634278
Label TTL action: prop-ttl
Session Id: 0x17d9
Protocol next hop: 2.3.0.0
Push 16
Composite next hop: 0x93463a0 1048575 INH Session ID: 0x17da
Indirect next hop: 0x91e8800 1048574 INH Session ID: 0x17da
State: <Secondary NotBest Int Ext ProtectionPath ProtectionCand>

Inactive reason: Not Best in its group - IGP metric
Local AS:      2 Peer AS:      2
Age: 3:34      Metric2: 70
Validation State: unverified
Task: BGP_2.2.3.0.0+32805
Announcement bits (2): 0-KRT 1-BGP_RT_Background
AS path: I
Communities: target:2:1
Import Accepted
VPN Label: 16
Localpref: 0
Router ID: 2.3.0.0
Primary Routing Table bgp.13vpn.0
Composite next hops: 1
    Protocol next hop: 2.3.0.0 Metric: 70
    Push 16
    Composite next hop: 0x93463a0 1048575 INH Session ID:
0x17da
    Indirect next hop: 0x91e8800 1048574 INH Session ID:
0x17da
    Indirect path forwarding next hops: 1
        Next hop type: Router
        Next hop: 10.1.4.2 via ge-1/0/0.0
        Session Id: 0x17d9
    2.3.0.0/32 Originating RIB: inet.3
        Metric: 70
        Node path count: 1
    Forwarding nexthops: 1
        Nexthop: 10.1.4.2 via ge-1/0/0.0
#Multipath Preference: 255
Next hop type: Indirect
Address: 0x24afca30
Next-hop reference count: 1
Next hop type: Router
Next hop: 10.1.1.1 via ge-1/1/9.0, selected
Label operation: Push 707633
Label TTL action: prop-ttl
Session Id: 0x17d8
Next hop type: Router, Next hop index: 702
Next hop: 10.1.4.2 via ge-1/0/0.0
Label operation: Push 634278
Label TTL action: prop-ttl
Session Id: 0x17d9
Protocol next hop: 2.2.0.0
Push 16
Composite next hop: 0x25805988 - INH Session ID: 0x193c

```


Indirect next hop: 0x23eea900 - INH Session ID: 0x193c Weight 0x1

Protocol next hop: 2.3.0.0  
Push 16  
Composite next hop: 0x93463a0 1048575 INH Session ID: 0x17da  
Indirect next hop: 0x91e8800 1048574 INH Session ID: 0x17da Weight

0x4000

State: <ForwardingOnly Int Ext>  
Inactive reason: Forwarding use only  
Age: 23 Metric2: 35  
Validation State: unverified  
Task: RT  
AS path: I  
Communities: target:2:1

## show route terse

|                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                                                                                                                                                                                                                                                                                                                                                                                                     | show route terse<br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                        |
| <b>Syntax (EX Series Switches)</b>                                                                                                                                                                                                                                                                                                                                                                                                | show route terse                                                                                                                                                                                                                                |
| <b>Release Information</b>                                                                                                                                                                                                                                                                                                                                                                                                        | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                           |
| <b>Description</b>                                                                                                                                                                                                                                                                                                                                                                                                                | Display a high-level summary of the routes in the routing table.                                                                                                                                                                                |
| <div>  <p><b>NOTE:</b> For BGP routes, the <b>show route terse</b> command displays the local preference attribute and MED instead of the metric1 and metric2 values. This is mostly due to historical reasons.</p> <p>To display the metric1 and metric2 value of a BGP route, use the <a href="#">show route extensive</a> command.</p> </div> |                                                                                                                                                                                                                                                 |
| <b>Options</b>                                                                                                                                                                                                                                                                                                                                                                                                                    | <p><b>none</b>—Display a high-level summary of the routes in the routing table.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                                                                                                                                                                                                                                                                                                                                                                                                   | view                                                                                                                                                                                                                                            |
| <b>List of Sample Output</b>                                                                                                                                                                                                                                                                                                                                                                                                      | <a href="#">show route terse on page 943</a>                                                                                                                                                                                                    |
| <b>Output Fields</b>                                                                                                                                                                                                                                                                                                                                                                                                              | <p><a href="#">Table 82 on page 941</a> describes the output fields for the <b>show route terse</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                        |

**Table 82: show route terse Output Fields**

| Field Name                 | Field Description                                                                                                                                                                                                                                                                                                                                               |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>routing-table-name</i>  | Name of the routing table (for example, inet.0).                                                                                                                                                                                                                                                                                                                |
| <i>number destinations</i> | Number of destinations for which there are routes in the routing table.                                                                                                                                                                                                                                                                                         |
| <i>number routes</i>       | Number of routes in the routing table and total number of routes in the following states: <ul style="list-style-type: none"> <li><b>active</b> (routes that are active)</li> <li><b>holddown</b> (routes that are in the pending state before being declared inactive)</li> <li><b>hidden</b> (routes that are not used because of a routing policy)</li> </ul> |

Table 82: show route terse Output Fields (*continued*)

| Field Name       | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>route key</i> | <p>Key for the state of the route:</p> <ul style="list-style-type: none"> <li>• <b>+</b>—A plus sign indicates the active route, which is the route installed from the routing table into the forwarding table.</li> <li>• <b>-</b>—A hyphen indicates the last active route.</li> <li>• <b>*</b>—An asterisk indicates that the route is both the active and the last active route. An asterisk before a <b>to</b> line indicates the best subpath to the route.</li> </ul>                                                                                                                                                                                                                |
| <b>A</b>         | Active route. An asterisk (*) indicates this is the active route.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>V</b>         | <p>Validation status of the route:</p> <ul style="list-style-type: none"> <li>• <b>?</b>—Not evaluated. Indicates that the route was not learned through BGP.</li> <li>• <b>I</b>—Invalid. Indicates that the prefix is found, but either the corresponding AS received from the EBGP peer is not the AS that appears in the database, or the prefix length in the BGP update message is longer than the maximum length permitted in the database.</li> <li>• <b>N</b>—Unknown. Indicates that the prefix is not among the prefixes or prefix ranges in the database.</li> <li>• <b>V</b>—Valid. Indicates that the prefix and autonomous system pair are found in the database.</li> </ul> |
| Destination      | Destination of the route.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>P</b>         | <p>Protocol through which the route was learned:</p> <ul style="list-style-type: none"> <li>• <b>A</b>—Aggregate</li> <li>• <b>B</b>—BGP</li> <li>• <b>C</b>—CCC</li> <li>• <b>D</b>—Direct</li> <li>• <b>G</b>—GMPLS</li> <li>• <b>I</b>—IS-IS</li> <li>• <b>L</b>—L2CKT, L2VPN, LDP, Local</li> <li>• <b>K</b>—Kernel</li> <li>• <b>M</b>—MPLS, MSDP</li> <li>• <b>O</b>—OSPF</li> <li>• <b>P</b>—PIM</li> <li>• <b>R</b>—RIP, RIPng</li> <li>• <b>S</b>—Static</li> <li>• <b>T</b>—Tunnel</li> </ul>                                                                                                                                                                                     |
| <b>Prf</b>       | <p>Preference value of the route. In every routing metric except for the BGP <b>LocalPref</b> attribute, a lesser value is preferred. In order to use common comparison routines, Junos OS stores the 1's complement of the <b>LocalPref</b> value in the <b>Preference2</b> field. For example, if the <b>LocalPref</b> value for Route 1 is 100, the <b>Preference2</b> value is -101. If the <b>LocalPref</b> value for Route 2 is 155, the <b>Preference2</b> value is -156. Route 2 is preferred because it has a higher <b>LocalPref</b> value and a lower <b>Preference2</b> value.</p>                                                                                              |
| Metric 1         | First metric value in the route. For routes learned from BGP, this is the MED metric.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Metric 2         | Second metric value in the route. For routes learned from BGP, this is the IGP metric.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

Table 82: show route terse Output Fields (*continued*)

| Field Name | Field Description                                                                                                                                                                                                                                                                                                                                          |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Next hop   | Next hop to the destination. An angle bracket (>) indicates that the route is the selected route.                                                                                                                                                                                                                                                          |
| AS path    | <p>AS path through which the route was learned. The letters at the end of the AS path indicate the path origin, providing an indication of the state of the route at the point at which the AS path originated:</p> <ul style="list-style-type: none"> <li>I—IGP.</li> <li>E—EGP.</li> <li>?—Incomplete; typically, the AS path was aggregated.</li> </ul> |

## Sample Output

### show route terse

```

user@host> show route terse
inet.0: 10 destinations, 12 routes (10 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

A V Destination      P Prf  Metric 1  Metric 2  Next hop      AS path
* ? 1.0.1.1/32       0 10      1           >10.0.0.2      I
?                               B 170      100           I
  unverified                               >10.0.0.2
* ? 1.1.1.1/32       D 0           >10.0.2
* V 2.2.0.2/32       B 170      110           200 I
  valid                               >10.0.0.2
* ? 10.0.0.0/30      D 0           >1t-1/2/0.1
?                               B 170      100           I
  unverified                               >10.0.0.2
* ? 10.0.0.1/32      L 0           Local
* ? 10.0.0.4/30      B 170      100           I
  unverified                               >10.0.0.2
* ? 10.0.0.8/30      B 170      100           I
  unverified                               >10.0.0.2
* I 172.16.1.1/32    B 170      90           200 I
  invalid                               >10.0.0.2
* N 192.168.2.3/32   B 170      100           200 I
  unknown                               >10.0.0.2
* ? 224.0.0.5/32     O 10      1           MultiRecv

```

## show system autoinstallation status

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show system autoinstallation status                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command supported in Junos OS Release 12.2 for ACX Series Universal Access Routers.                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>              | (ACX Series routers, J Series routers, and EX Series switches only) Display autoinstallation status information.                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Options</b>                  | This command has no options.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">ACX Series Autoinstallation Overview on page 45</a></li> <li>• <a href="#">Before You Begin Autoinstallation on an ACX Series Universal Access Router on page 47</a></li> <li>• <a href="#">Autoinstallation Configuration of ACX Series Universal Access Routers on page 48</a></li> <li>• <a href="#">USB Autoinstallation on ACX Series Routers on page 50</a></li> <li>• <a href="#">Verifying Autoinstallation on ACX Series Universal Access Routers on page 49</a></li> <li>• <i>autoinstallation</i></li> </ul> |
| <b>List of Sample Output</b>    | <a href="#">show system autoinstallation status on page 945</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Output Fields</b>            | <a href="#">Table 83 on page 944</a> describes the output fields for the <b>show system autoinstallation status</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                         |

**Table 83: show system autoinstallation status Output Fields**

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



## Sample Output

### show system autoinstallation status

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

## show validation database

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>show validation database</code><br><code>&lt;brief   detail&gt;</code><br><code>&lt;instance <i>instance-name</i>&gt;</code><br><code>&lt;logical-system <i>logical-system-name</i>&gt;</code><br><code>&lt;mismatch&gt;</code><br><code>&lt;origin-autonomous-system <i>as-number</i>&gt;</code><br><code>&lt;record <i>ip-prefix</i>&gt;</code><br><code>&lt;session <i>ip-address</i>&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>      | Command introduced in Junos OS Release 12.2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Description</b>              | Display information about the route validation database when resource public key infrastructure (RPKI) BGP route validation is configured. You can query all route validation records that match a given prefix or origin-autonomous-system. In addition, you can filter the output by a specific RPKI cache session.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Options</b>                  | <p><b>none</b>—Display all route validation database entries.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display information about route validation database entries for the specified routing instance. The instance name can be master for the main instance, or any valid configured instance name or its prefix.</p> <p><b>logical-system <i>logical-system-name</i></b>—(Optional) Perform this operation on a particular logical system.</p> <p><b>mismatch</b>—(Optional) Filter the output by mismatched origin autonomous systems.</p> <p><b>origin-autonomous-system <i>as-number</i></b>—(Optional) Filter the output by mismatched origin autonomous systems. The <b>mismatch</b> qualifier is useful for finding conflicting origin-autonomous-system information between RPKI caches. Mismatches might occur during cache reconfiguration.</p> <p><b>record <i>ip-prefix</i></b>—(Optional) Filter the output by route validation records that match a given prefix.</p> <p><b>session <i>ip-address</i></b>—(Optional) Filter the output by a specific RPKI cache session.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Example: Configuring Origin Validation for BGP</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>List of Sample Output</b>    | <a href="#">show validation database on page 947</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Output Fields</b>            | <a href="#">Table 84 on page 947</a> describes the output fields for the <b>show validation database</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

Table 84: show validation database Output Fields

| Field Name   | Field Description                                                                                                                                                                                        | Level of Output |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Prefix       | Route validation (RV) record prefix.<br><br>RV records are received from the cache server and can also be configured statically at the <b>[edit routing-options validation static]</b> hierarchy level . | All levels      |
| Origin-AS    | Legitimate originator autonomous system (AS).                                                                                                                                                            | All levels      |
| Session      | IP address of the RPKI cache server.                                                                                                                                                                     | All levels      |
| State        | State of the route validation records. The state can be <b>valid</b> , <b>invalid</b> or <b>unknown</b> .                                                                                                | All levels      |
| Mismatch     | Conflicting origin-autonomous-system information between RPKI caches when nonstop active routing (NSR) is configured.                                                                                    | All levels      |
| IPv4 records | Number of IPv4 route validation records.                                                                                                                                                                 | All levels      |
| IPv6 records | Number of IPv6 route validation records.                                                                                                                                                                 | All levels      |

## Sample Output

### show validation database

```

user@host> show validation database
RV database for instance master

    Prefix                Origin-AS  Session      State  Mismatch
    1.0.1.0/24-32          1 10.0.77.1    valid
    1.0.2.0/24-32          2 10.0.77.1    valid
    1.0.3.0/24-32          3 10.0.77.1    valid
    1.0.4.0/24-32          4 10.0.77.1    valid
    1.0.5.0/24-32          5 10.0.77.1    valid
    1.0.6.0/24-32          6 10.0.77.1    valid
    1.0.7.0/24-32          7 10.0.77.1    valid
    1.0.8.0/24-32          8 10.0.77.1    valid
    72.9.224.0/19-24       26234 192.168.1.100 valid  *
    72.9.224.0/19-24       3320 192.168.1.200 invalid *
    10.0.0.0/8-32          0 internal    valid

IPv4 records: 14
IPv6 records: 0

```

## show validation group

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show validation group<br><instance <i>instance-name</i> ><br><logical-system <i>logical-system-name</i> >                                                                                                                                                                                                                                                                                                                                                    |
| <b>Release Information</b>      | Command introduced in Junos OS Release 12.2.                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>              | Display information about route validation redundancy groups.                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Options</b>                  | <p><b>none</b>—Display information about all route validation groups.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display information about route validation groups for the specified routing instance. The instance name can be master for the main instance, or any valid configured instance name or its prefix.</p> <p><b>logical-system <i>logical-system-name</i></b>—(Optional) Perform this operation on a particular logical system.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Example: Configuring Origin Validation for BGP</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                    |
| <b>List of Sample Output</b>    | <a href="#">show validation group on page 949</a>                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Output Fields</b>            | <p><a href="#">Table 85 on page 948</a> describes the output fields for the <b>show validation group</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                |

**Table 85: show validation group Output Fields**

| Field Name       | Field Description                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Group            | Group name.                                                                                                                                                                                                                                                                                                                                                                                                             |
| Maximum sessions | Number of concurrent sessions for each group. The default is 2. The number is configurable with the <b>max-sessions</b> statement.                                                                                                                                                                                                                                                                                      |
| Session          | Resource public key infrastructure (RPKI) cache session IP address.                                                                                                                                                                                                                                                                                                                                                     |
| State            | State of the connection between the routing device and the cache server. <b>Up</b> means that the connection is established. <b>Connect</b> means that the connection is not established.                                                                                                                                                                                                                               |
| Preference       | <p>Each cache server has a preference. Higher preferences are preferred. During a session start or restart, the routing device attempts to start a session with the cache server that has the numerically highest preference. The routing device connects to multiple cache servers in preference order.</p> <p>The default preference is 100. The preference is configurable with the <b>preference</b> statement.</p> |

## Sample Output

### show validation group

```
user@host> show validation group
master
  Group: test, Maximum sessions: 3
    Session 10.255.255.11, State: Up, Preference: 100
    Session 10.255.255.12, State: Up, Preference: 100
  Group: test2, Maximum sessions: 2
    Session 10.255.255.13, State: Connect, Preference: 100
```

## show validation replication database

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show validation replication database &lt;brief   detail&gt; &lt;instance <i>instance-name</i>&gt; &lt;logical-system <i>logical-system-name</i>&gt; &lt;origin-autonomous-system <i>as-number</i>&gt; &lt;record <i>ip-prefix</i>&gt; &lt;session <i>ip-address</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Release Information</b>      | Command introduced in Junos OS Release 12.2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Description</b>              | Display the state of the nonstop active routing (NSR) records. The output is the same as the output of the <a href="#">show validation database</a> command, except for the <b>Mismatch</b> column.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                  | <p><b>none</b>—Display all route validation database entries.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display information about route validation database entries for the specified routing instance. The instance name can be master for the main instance, or any valid configured instance name or its prefix.</p> <p><b>logical-system <i>logical-system-name</i></b>—(Optional) Perform this operation on a particular logical system.</p> <p><b>origin-autonomous-system <i>as-number</i></b>—(Optional) Filter the output by mismatched origin autonomous systems. The <b>mismatch</b> qualifier is useful for finding conflicting origin-autonomous-system information between resource public key infrastructure (RPKI) caches. Mismatches might occur during cache reconfiguration.</p> <p><b>record <i>ip-prefix</i></b>—(Optional) Filter the output by route validation records that match a given prefix.</p> <p><b>session <i>ip-address</i></b>—(Optional) Filter the output by a specific RPKI cache session.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Example: Configuring Origin Validation for BGP</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>List of Sample Output</b>    | <a href="#">show validation replication database on page 951</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Output Fields</b>            | <a href="#">Table 86 on page 951</a> describes the output fields for the <b>show validation replication database</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

Table 86: show validation replication database Output Fields

| Field Name   | Field Description                                                                                                                                                                                       | Level of Output |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Prefix       | Route validation (RV) record prefix.<br><br>RV records are received from the cache server and can also be configured statically at the <b>[edit routing-options validation static]</b> hierarchy level. | All levels      |
| Origin-AS    | Legitimate originator autonomous system (AS).                                                                                                                                                           | All levels      |
| Session      | IP address of the RPKI cache server.                                                                                                                                                                    | All levels      |
| State        | State of the route validation records. The state can be <b>valid</b> or <b>invalid</b> .                                                                                                                | All levels      |
| IPv4 records | Number of IPv4 route validation records.                                                                                                                                                                | All levels      |
| IPv6 records | Number of IPv6 route validation records.                                                                                                                                                                | All levels      |

## Sample Output

### show validation replication database

```

user@host> show validation replication database
RV database for instance master

    Prefix                Origin-AS Session      State
1.0.1.0/24-32             1 10.0.77.1    valid
1.0.2.0/24-32             2 10.0.77.1    valid
1.0.3.0/24-32             3 10.0.77.1    valid
1.0.4.0/24-32             4 10.0.77.1    valid
1.0.5.0/24-32             5 10.0.77.1    valid
1.0.6.0/24-32             6 10.0.77.1    valid
1.0.7.0/24-32             7 10.0.77.1    valid
1.0.8.0/24-32             8 10.0.77.1    valid
72.9.224.0/19-24          26234 192.168.1.100 valid
72.9.224.0/19-24          3320 192.168.1.200 invalid
10.0.0.0/8-32             0 internal    valid

IPv4 records: 14
IPv6 records: 0

```

## show validation session

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show validation session &lt;brief   detail&gt; &lt;destination&gt; &lt;instance instance-name&gt; &lt;logical-system logical-system-name&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Release Information</b>      | Command introduced in Junos OS Release 12.2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Description</b>              | Display information about all sessions or a specific session with a resource public key infrastructure (RPKI) cache server.                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Options</b>                  | <p><b>none</b>—Display information about all sessions.</p> <p><b>destination</b>—(Optional) Display information about a specific session.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>instance instance-name</b>—(Optional) Display information about sessions for the specified routing instance. The instance name can be master for the main instance, or any valid configured instance name or its prefix.</p> <p><b>logical-system logical-system-name</b>—(Optional) Perform this operation on a particular logical system.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Example: Configuring Origin Validation for BGP</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>List of Sample Output</b>    | <a href="#">show validation session brief on page 954</a><br><a href="#">show validation session detail on page 954</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Output Fields</b>            | <p><a href="#">Table 87 on page 952</a> describes the output fields for the <b>show validation session</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                                                                    |

**Table 87: show validation session Output Fields**

| Field Name | Field Description                                                                                                                                                                         | Level of Output       |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Session    | IP address of the RPKI cache server.                                                                                                                                                      | All levels            |
| State      | State of the connection between the routing device and the cache server. <b>Up</b> means that the connection is established. <b>Connect</b> means that the connection is not established. | All levels            |
| Flaps      | Number of attempts to establish a session.                                                                                                                                                | None and <b>brief</b> |



Table 87: show validation session Output Fields (*continued*)

| Field Name                  | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Level of Output |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Uptime                      | Length of time that the session has remained established.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | None and brief  |
| #IPv4/IPv6 records          | Number of IPv4 and IPv6 route validation records.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | None and brief  |
| Session index               | Every session has an index number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | detail          |
| Group                       | Name of the group to which the session belongs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | detail          |
| Preference                  | <p>Each cache server has a preference. Higher preferences are preferred. During a session start or restart, the routing device attempts to start a session with the cache server that has the numerically highest preference. The routing device connects to multiple cache servers in preference order.</p> <p>The default preference is 100. The preference is configurable with the <b>preference</b> statement.</p>                                                                                                                                                                                                                             | detail          |
| Port                        | TCP port number for the outgoing connection with the cache server. The well-known RPKI port is TCP port 2222. For a given deployment, an RPKI cache server might listen on some other TCP port number. If so, you can configure the alternative port number with the <b>port</b> statement.                                                                                                                                                                                                                                                                                                                                                         | detail          |
| Refresh time                | Liveliness check interval for an RPKI cache server. Every <b>refresh-time</b> (seconds), a serial query protocol data unit (PDU) with the last known serial number is transmitted. The <b>hold-time</b> must be at least 2 x the <b>refresh-time</b> .                                                                                                                                                                                                                                                                                                                                                                                              | detail          |
| Hold time                   | <p>Length of time in seconds that the session between the routing device and the cache server is considered operational without any activity. After the hold time expires, the session is dropped.</p> <p>Reception of any PDU from the cache server resets the hold timer. The <b>hold-time</b> is 600 seconds, by default, and must be least 2 x the <b>refresh-time</b>. If the hold time expires, the session is considered to be down. This, in turn, triggers a session restart event. During a session restart, the routing device attempts to start a session with the cache server that has the numerically highest <b>preference</b>.</p> | detail          |
| Record Life time            | Amount of time that route validation (RV) records learned from a cache server are valid. RV records expire if the session to the cache server goes down and remains down for the <b>record-lifetime</b> (seconds).                                                                                                                                                                                                                                                                                                                                                                                                                                  | detail          |
| Serial (Full Update)        | Number of full serial updates.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | detail          |
| Serial (Incremental Update) | Number of incremental serial updates.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | detail          |
| Session flaps               | Number of attempts to establish a session.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | detail          |

Table 87: show validation session Output Fields (*continued*)

| Field Name        | Field Description                                         | Level of Output |
|-------------------|-----------------------------------------------------------|-----------------|
| Session uptime    | Length of time that the session has remained established. | <b>detail</b>   |
| Last PDU received | Time when the most recent PDU was received.               | <b>detail</b>   |
| IPv4 prefix count | Number of IPv4 sessions.                                  | <b>detail</b>   |
| IPv6 prefix count | Number of IPv6 sessions.                                  | <b>detail</b>   |

## Sample Output

### show validation session brief

```

user@host> show validation session brief
Session                               State   Flaps    Uptime  #IPv4/IPv6
records
  1.3.0.2                             up      2      00:01:37 13/0
  10.255.255.11                       up      3      00:00:01 1/0
  10.255.255.12                       connect 2             64/68

```

### show validation session detail

```

user@host> show validation session detail
Session 10.0.77.1, State: up
  Group: test, Preference: 100
  Local IPv4 address: 10.0.77.2, Port: 2222
  Refresh time: 300s
  Session flaps: 14, Last Session flap: 5h13m18s ago
  Hold time: 900s
  Record Life time: 3600s
  Serial (Full Update): 0
  Serial (Incremental Update): 0
    Session flaps 2
    Session uptime: 00:48:35
    Last PDU received: 00:03:35
    IPv4 prefix count: 71234
    IPv6 prefix count: 345

```

## show validation statistics

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show validation statistics<br><instance <i>instance-name</i> ><br><logical-system <i>logical-system-name</i> >                                                                                                                                                                                                                                                                                                        |
| <b>Release Information</b>      | Command introduced in Junos OS Release 12.2.                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b>              | Display route validation statistics.                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Options</b>                  | <p><b>none</b>—Display statistics for all routing instances.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display information for the specified routing instance. The instance name can be master for the main instance, or any valid configured instance name or its prefix.</p> <p><b>logical-system <i>logical-system-name</i></b>—(Optional) Perform this operation on a particular logical system.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Example: Configuring Origin Validation for BGP</i></li> </ul>                                                                                                                                                                                                                                                                                                             |
| <b>List of Sample Output</b>    | <a href="#">show validation statistics on page 956</a>                                                                                                                                                                                                                                                                                                                                                                |
| <b>Output Fields</b>            | <a href="#">Table 88 on page 955</a> describes the output fields for the <b>show validation statistics</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                           |

**Table 88: show validation statistics Output Fields**

| Field Name                   | Field Description                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Total RV records             | Group name.                                                                                                                                                                                                                                                                                                                                                                                                             |
| Total Replication RV records | Number of concurrent sessions for each group. The default is 2. The number is configurable with the <b>max-sessions</b> statement.                                                                                                                                                                                                                                                                                      |
| Prefix entries               | Resource public key infrastructure (RPKI) cache session IP address.                                                                                                                                                                                                                                                                                                                                                     |
| Origin-AS entries            | State of the connection between the routing device and the cache server. <b>Up</b> means that the connection is up. <b>Connect</b> means that the connection is not up.                                                                                                                                                                                                                                                 |
| Memory utilization           | <p>Each cache server has a preference. Higher preferences are preferred. During a session start or restart, the routing device attempts to start a session with the cache server that has the numerically highest preference. The routing device connects to multiple cache servers in preference order.</p> <p>The default preference is 100. The preference is configurable with the <b>preference</b> statement.</p> |

Table 88: show validation statistics Output Fields (*continued*)

| Field Name                                   | Field Description                                                                                                                                  |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Policy origin-validation requests            | Number of queries for validation state of a given instance and prefix.                                                                             |
| Valid                                        | Number of valid prefixes reported by the validation query.                                                                                         |
| Invalid                                      | Number of invalid prefixes reported by the validation query.                                                                                       |
| Unknown                                      | Number of unknown prefixes reported by the validation query. This means that the prefix is not found in the database.                              |
| BGP import policy reevaluation notifications | A change, addition, or deletion of a route validation record triggers a BGP import reevaluation for all exact matching and more specific prefixes. |
| inet.0                                       | Number of IPv4 route validation records that have been added, deleted, or changed.                                                                 |
| inet6.0                                      | Number of IPv6 route validation records that have been added, deleted, or changed.                                                                 |

## Sample Output


### show validation statistics

```

user@host> show validation statistics
Total RV records:          453455
Total Replication RV records: 453455
  Prefix entries:          35432
  Origin-AS entries:       124400
Memory utilization: 16.31MB
Policy origin-validation requests: 234995
  valid:                    23445
  invalid:                  14666
  unknown:                  34567
BGP import policy reevaluation notifications: 460268
  inet.0:                   435345
  inet6.0:                   3454

```

## test interface e1-bert-start

|                                 |                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | test interface e1-bert-start <i>interface-name</i>                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | Start a bit error rate test (BERT) on an E1 interface.                                                                                                                                                                                                                                                                                     |
| <b>Options</b>                  | <i>interface-name</i> —Interface name: <i>e1-fpc/pic/port</i> or <i>ce1-fpc/pic/port &lt;:channel&gt;</i>                                                                                                                                                                                                                                  |
| <b>Additional Information</b>   | Before starting a BERT, you must disable the interface. To do this, include the <b>disable</b> statement at the [ <b>edit interfaces</b> <i>interface-name</i> ] hierarchy level. You can run a BERT on only one interface per PIC at a time.                                                                                              |
|                                 | <div>  <p><b>NOTE:</b> Due to hardware limitations of the framer used in IQ PICs, BERT is not supported in unframed mode on the interface and may return false positive results. BERT in unframed mode is supported on Enhanced IQ (IQE) PICs.</p> </div> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">test interface e1-bert-stop on page 958</a></li> <li>• <a href="#">test interface t1-bert-start on page 959</a></li> <li>• <a href="#">test interface t1-bert-stop on page 960</a></li> </ul>                                                                                         |
| <b>List of Sample Output</b>    | <a href="#">test interface e1-bert-start on page 957</a>                                                                                                                                                                                                                                                                                   |
| <b>Output Fields</b>            | To display the results of the BERT, use the <b>show interfaces extensive</b> command.                                                                                                                                                                                                                                                      |

## Sample Output

### test interface e1-bert-start

```
user@host> test interface e1-bert-start e1-1/0/0
```

## test interface e1-bert-stop

---


|                                 |                                                                                                                                                                                                                                                 |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>test interface e1-bert-stop <i>interface-name</i></code>                                                                                                                                                                                  |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                 |
| <b>Description</b>              | Stop a bit error rate test (BERT) on an E1 interface.                                                                                                                                                                                           |
| <b>Options</b>                  | <i>interface-name</i> —Interface name: <code>e1-fpc/pic/port</code> or <code>ce1-fpc/pic/port &lt;:channel&gt;</code> .                                                                                                                         |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">test interface e1-bert-start on page 957</a></li><li>• <a href="#">test interface t1-bert-start on page 959</a></li><li>• <a href="#">test interface t1-bert-stop on page 960</a></li></ul> |
| <b>List of Sample Output</b>    | <a href="#">test interface e1-bert-stop on page 958</a>                                                                                                                                                                                         |
| <b>Output Fields</b>            | To display the results of the BERT, use the <code>show interfaces extensive</code> command.                                                                                                                                                     |

## Sample Output

### test interface e1-bert-stop

```
user@host> test interface e1-bert-stop e1-1/0/0
```

## test interface t1-bert-start

|                                 |                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | test interface t1-bert-start <i>interface-name</i>                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | Start a bit error rate test (BERT) on a T1 interface.                                                                                                                                                                                                                                                                                      |
| <b>Options</b>                  | <i>interface-name</i> —Interface name: <i>t1-fpc/pic/port</i> or <i>ct1-fpc/pic/port &lt;:channel&gt;</i> .                                                                                                                                                                                                                                |
| <b>Additional Information</b>   | Before starting a BERT, you must disable the interface. To do so, include the <b>disable</b> statement at the [ <b>edit interfaces <i>interface-name</i></b> ] hierarchy level. You can run a BERT on only one interface per PIC at a time.                                                                                                |
|                                 | <div>  <p><b>NOTE:</b> Due to hardware limitations of the framer used in IQ PICs, BERT is not supported in unframed mode on the interface and may return false positive results. BERT in unframed mode is supported on Enhanced IQ (IQE) PICs.</p> </div> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">test interface t1-bert-stop on page 960</a></li> <li>• <a href="#">test interface e1-bert-start on page 957</a></li> <li>• <a href="#">test interface e1-bert-stop on page 958</a></li> </ul>                                                                                         |
| <b>List of Sample Output</b>    | <a href="#">test interface t1-bert-start on page 959</a>                                                                                                                                                                                                                                                                                   |
| <b>Output Fields</b>            | To display the results of the BERT, use the <b>show interfaces extensive</b> command.                                                                                                                                                                                                                                                      |

## Sample Output

### test interface t1-bert-start

```
user@host> test interface t1-bert-start t1-1/0/0
```

## test interface t1-bert-stop

---

|                          |                                                                                                                                                                                                                                                 |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax                   | test interface t1-bert-stop <i>interface-name</i>                                                                                                                                                                                               |
| Release Information      | Command introduced before Junos OS Release 7.4.                                                                                                                                                                                                 |
| Description              | Stop a bit error rate test (BERT) on a T1 interface.                                                                                                                                                                                            |
| Options                  | <i>interface-name</i> —Interface name: <i>t1-interface-name fpc/pic/port</i> or <i>ct1-fpc/pic/port &lt;:channel&gt;</i>                                                                                                                        |
| Required Privilege Level | view                                                                                                                                                                                                                                            |
| Related Documentation    | <ul style="list-style-type: none"><li>• <a href="#">test interface t1-bert-start on page 959</a></li><li>• <a href="#">test interface e1-bert-start on page 957</a></li><li>• <a href="#">test interface e1-bert-stop on page 958</a></li></ul> |
| List of Sample Output    | <a href="#">test interface t1-bert-stop on page 960</a>                                                                                                                                                                                         |
| Output Fields            | To display the results of the BERT, use the <b>show interfaces extensive</b> command.                                                                                                                                                           |

### Sample Output

#### test interface t1-bert-stop

```
user@host> test interface t1-bert-stop t1-1/0/0
```



## PART 4

# Troubleshooting

- [Troubleshooting Procedures on page 963](#)



# Troubleshooting Procedures

- [CTI and CEI Interfaces Alarms, Errors, and Defects on page 963](#)
- [Troubleshooting PoE Interfaces on ACX2000 Universal Access Routers on page 964](#)

## CTI and CEI Interfaces Alarms, Errors, and Defects

[Table 89 on page 963](#) lists the **ct1** and **ce1** media-specific alarms or defects that can render the interface on ACX Series routers unable to pass packets.

**Table 89: CTI and CEI Interface Alarms and Error Definitions**

| Alarm or Error   | Definitions                          | Structure-Agnostic Interface Type    | Structure-Aware                      |
|------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| <b>AIS</b>       | Alarm indication signal (blue alarm) | <b>ct1</b> and <b>ce1</b> interfaces | <b>ct1</b> and <b>ce1</b> interfaces |
| <b>BEE</b>       | Block error event                    | N/A                                  | <b>ct1</b> and <b>ce1</b> interfaces |
| <b>BES</b>       | Bursty errored seconds               | N/A                                  | <b>ct1</b> and <b>ce1</b> interfaces |
| <b>BPV</b>       | Bipolar violation                    | N/A                                  | N/A                                  |
| <b>CRC</b>       | Cyclic redundancy check (CRC)        | N/A                                  | <b>ce1</b> interfaces                |
| <b>CRC Major</b> | Major alarm error threshold          | N/A                                  | <b>ce1</b> interfaces                |
| <b>CRC Minor</b> | Minor alarm error threshold          | N/A                                  | <b>ce1</b> interfaces                |
| <b>CS</b>        | Controlled slip                      | N/A                                  | N/A                                  |
| <b>ES</b>        | Errored seconds                      | <b>ct1</b> and <b>ce1</b> interfaces | <b>ct1</b> and <b>ce1</b> interfaces |
| <b>EXZ</b>       | Excessive zeros                      | N/A                                  | N/A                                  |
| <b>FEBE</b>      | Far-end block error                  | N/A                                  | <b>ct1</b> and <b>ce1</b> interfaces |
| <b>LCV</b>       | Line code violation                  | <b>ct1</b> and <b>ce1</b> interfaces | <b>ct1</b> and <b>ce1</b> interfaces |
| <b>LES</b>       | Line errored seconds                 | <b>ct1</b> and <b>ce1</b> interfaces | <b>ct1</b> and <b>ce1</b> interfaces |

Table 89: CT1 and CE1 Interface Alarms and Error Definitions (*continued*)

| Alarm or Error | Definitions                    | Structure-Agnostic Interface Type | Structure-Aware        |
|----------------|--------------------------------|-----------------------------------|------------------------|
| LOF            | Loss of frame                  | ce1 interfaces                    | ct1 and ce1 interfaces |
| LOS            | Loss of signal                 | ct1 and ce1 interfaces            | ct1 and ce1 interfaces |
| PCV            | Path code violation            | N/A                               | ct1 and ce1 interfaces |
| SEF            | Severely errored frame         | N/A                               | ct1 and ce1 interfaces |
| SEFS           | Severely errored frame seconds | N/A                               | ct1 and ce1 interfaces |
| SES            | Severely errored seconds       | ct1 and ce1 interfaces            | ct1 and ce1 interfaces |
| UAS            | Unavailable seconds            | ct1 and ce1 interfaces            | ct1 and ce1 interfaces |
| YLW            | Yellow alarm                   | N/A                               | ct1 and ce1 interfaces |

## Troubleshooting PoE Interfaces on ACX2000 Universal Access Routers

**Problem** A Power over Ethernet (PoE) interface is not supplying power to the powered device.

**Solution** Check for the items shown in [Table 90 on page 964](#).

Table 90: Troubleshooting a PoE Interface

| Items to Check                                                                                               | Explanation                                                                                     |
|--------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Is interface PoE enabled?                                                                                    | Only interfaces <b>ge-0/1/3</b> and <b>ge-0/1/7</b> can function as PoE ports.                  |
| Has PoE capability been disabled for that interface?                                                         | Use the <b>show poe interface</b> command to check PoE interface status.                        |
| Is the cable properly seated in the port socket?                                                             | Check the hardware.                                                                             |
| Does the powered device require more power than is available on the interface?                               | Use the <b>show poe interface</b> command to check the maximum power provided by the interface. |
| If the <b>telemetries</b> option has been enabled for the interface, check the history of power consumption. | Use the <b>show poe telemetries</b> command to display the history of power consumption.        |

### Related Documentation

- [Understanding PoE on ACX Series Universal Access Routers on page 42](#)
- [Example: Configuring PoE on ACX2000 Routers on page 245](#)

## PART 5

# Index

- [Index on page 967](#)



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