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# Junos Fusion Provider Edge Feature Guide



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Modified: 2019-06-18



Juniper Networks, Inc.  
1133 Innovation Way  
Sunnyvale, California 94089  
USA  
408-745-2000  
[www.juniper.net](http://www.juniper.net)

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*Junos Fusion Provider Edge Feature Guide*

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## 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 <https://www.juniper.net/documentation/>.

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 <https://www.juniper.net/books>.

## Using the Examples in This Manual

---

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

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

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

## Merging a Full Example

To merge a full example, follow these steps:

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

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

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

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

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

## Merging a Snippet

To merge a snippet, follow these steps:

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

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

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



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

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

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

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

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

## Documentation Conventions

Table 1 on page xvii defines notice icons used in this guide.

Table 1: Notice Icons

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

Table 2 on page xviii 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:<br><br>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><br><br>No alarms currently active  |
| <i>Italic text like this</i>   | <ul style="list-style-type: none"> <li>Introduces or emphasizes important new terms.</li> <li>Identifies guide names.</li> <li>Identifies RFC and Internet draft titles.</li> </ul> | <ul style="list-style-type: none"> <li>A policy <i>term</i> is a named structure that defines match conditions and actions.</li> <li><i>Junos OS CLI User Guide</i></li> <li>RFC 1997, <i>BGP Communities Attribute</i></li> </ul>   |
| <i>Italic text like this</i>   | Represents variables (options for which you substitute a value) in commands or configuration statements.  | Configure the machine's domain name:<br><br>[edit]<br>root@# <b>set system domain-name</b> <i>domain-name</i>  |
| Text like this                 | Represents names of configuration statements, commands, files, and directories; configuration hierarchy levels; or labels on routing platform components.                           | <ul style="list-style-type: none"> <li>To configure a stub area, include the <b>stub</b> statement at the [edit protocols <b>ospf area area-id</b>] hierarchy level.</li> <li>The console port is labeled <b>CONSOLE</b>.</li> </ul> |
| < > (angle brackets)           | Encloses optional keywords or variables.  | <b>stub</b> <default-metric <i>metric</i> >;   |
| (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</b>   <b>multicast</b><br><br>( <i>string1</i>   <i>string2</i>   <i>string3</i> )  |
| # (pound sign)                 | Indicates a comment specified on the same line as the configuration statement to which it applies.  | <b>rsvp { # Required for dynamic MPLS only</b>   |
| [ ] (square brackets)          | Encloses a variable for which you can substitute one or more values.  | <b>community name members</b> [ <b>community-ids</b> ]   |
| Indentation and braces ( { } ) | Identifies a level in the configuration hierarchy.  | [edit]<br>routing-options {<br>static {<br>route default {<br>nexthop <i>address</i> ;<br>retain;<br>}<br>}<br>}   |
| ;(semicolon)                   | Identifies a leaf statement at a configuration hierarchy level.   |  |

## GUI Conventions

Table 2: Text and Syntax Conventions (continued)

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

## Documentation Feedback

We encourage you to provide feedback so that we can improve our documentation. You can use either of the following methods:

- Online feedback system—Click TechLibrary Feedback, on the lower right of any page on the [Juniper Networks TechLibrary](#) site, and do one of the following:



- Click the thumbs-up icon if the information on the page was helpful to you.
- Click the thumbs-down icon if the information on the page was not helpful to you or if you have suggestions for improvement, and use the pop-up form to provide feedback.
- E-mail—Send your comments to [techpubs-comments@juniper.net](mailto:techpubs-comments@juniper.net). Include the document or topic name, URL or page number, and software version (if applicable).

## Requesting Technical Support

Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active Juniper Care or Partner Support Services 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 <https://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf>.
- Product warranties—For product warranty information, visit <https://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: <https://www.juniper.net/customers/support/>
- Search for known bugs: <https://prsearch.juniper.net/>
- Find product documentation: <https://www.juniper.net/documentation/>
- Find solutions and answer questions using our Knowledge Base: <https://kb.juniper.net/>
- Download the latest versions of software and review release notes: <https://www.juniper.net/customers/csc/software/>
- Search technical bulletins for relevant hardware and software notifications: <https://kb.juniper.net/InfoCenter/>
- Join and participate in the Juniper Networks Community Forum: <https://www.juniper.net/company/communities/>
- Create a service request online: <https://myjuniper.juniper.net>

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

## Creating a Service Request with JTAC

You can create a service request with JTAC on the Web or by telephone.

- Visit <https://myjuniper.juniper.net>.
- 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 <https://support.juniper.net/support/requesting-support/>.

## PART 1

# Junos Fusion Provider Edge

- [Junos Fusion Provider Edge Overview on page 3](#)
- [Junos Fusion Provider Edge Configuration on page 41](#)
- [Junos Fusion Provider Edge Configuration Statements on page 59](#)
- [Junos Fusion Provider Edge Administration on page 85](#)
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- [Power over Ethernet, LLDP, and LLDP-MED on a Junos Fusion Provider Edge on page 579](#)
- [Configuration Statements for Power over Ethernet and Power Supply Management on a Junos Fusion Provider Edge on page 591](#)
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- [Multicast Replication on Junos Fusion Provider Edge on page 665](#)
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- [Class of Service on Junos Fusion Provider Edge on page 713](#)



## CHAPTER 1

# Junos Fusion Provider Edge Overview

- [Junos Fusion Provider Edge Overview on page 3](#)
- [Understanding Junos Fusion Provider Edge Components on page 5](#)
- [Understanding Satellite Device Clustering in a Junos Fusion on page 9](#)
- [Understanding Junos Fusion Ports on page 13](#)
- [Understanding Port-Based Authentication in a Junos Fusion Provider Edge on page 18](#)
- [Understanding Software in a Junos Fusion Provider Edge on page 18](#)
- [Understanding Junos Fusion Provider Edge Software and Hardware Requirements on page 21](#)
- [Understanding the Flow of Data Packets in a Junos Fusion Topology on page 26](#)
- [Understanding Satellite Policies in a Junos Fusion on page 30](#)
- [Junos Fusion Provider Edge Supported Protocols on page 32](#)
- [Local Switching on Junos Fusion Provider Edge on page 35](#)
- [Broadband Subscription Services on Junos Fusion on page 38](#)

## Junos Fusion Provider Edge Overview

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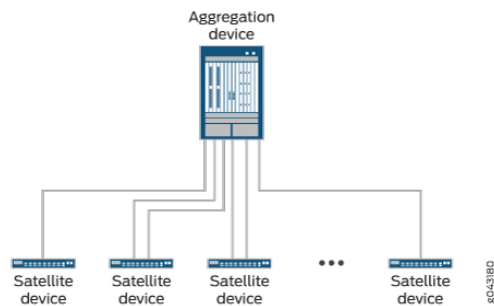
Junos Fusion provides a method of significantly expanding the number of available network interfaces on a device—an *aggregation device*—by allowing the aggregation device to add interfaces through interconnections with *satellite devices*. The entire system—the interconnected aggregation device and satellite devices—is called a *Junos Fusion*. Junos Fusion simplifies network administration because it appears to the larger network as a single, port-dense device that is managed using one IP address.

Junos Fusion Provider Edge brings the Junos Fusion technology to the service provider edge. In a Junos Fusion Provider Edge, MX Series 5G Universal Routing Platforms act as aggregation devices while EX4300 Series and QFX5100, QFX 5110, or QFX5200 Series switches act as satellite devices.

In a Junos Fusion Provider Edge topology, each satellite device has at least one connection to the aggregation device. The aggregation device acts as the single point of management for all devices in the Junos Fusion Provider Edge. The satellite devices provide network interfaces that send and receive network traffic.

[Figure 1 on page 4](#) provides an illustration of a basic Junos Fusion Provider Edge topology.

Figure 1: Basic Junos Fusion Provider Edge Topology



The MX Series 5G Universal Routing Platform acting as the aggregation device in Junos Fusion Provider Edge is responsible for almost all management tasks, including interface configuration for every satellite device interface in the topology. The aggregation device runs Junos OS software for the entire Junos Fusion Provider Edge, and the network-facing interfaces on the satellite devices—*extended ports*—are configured from the aggregation device and support features that are supported by the version of Junos OS running on the aggregation device.

The satellite devices and the aggregation device maintain the control plane for the Junos Fusion Provider Edge using multiple internal satellite management protocols. Network traffic can be forwarded between satellite devices through the aggregation device. Junos Fusion Provider Edge supports the IEEE 802.1BR standard.

Junos Fusion Provider Edge provides the following benefits:

- **Simplified network topology**—You can combine multiple devices into a topology that appears to the larger network as a single device, and then manage the device from a single IP address.
- **Port density**—You can configure a large number of network-facing interfaces into a topology that operates as a single network device.
- **Manageability**—You can manage a Junos Fusion Provider Edge that supports a large number of network-facing interfaces from a single point. The single point of management, the aggregation device, runs Junos OS software for the entire Junos Fusion Provider Edge.
- **Flexibility**—You can easily expand the size of your Junos Fusion Provider Edge by adding satellite devices to it as your networking needs grow.
- **Investment protection**—In environments that need to expand because the capabilities of the aggregation device are maximized, a Junos Fusion Provider Edge can be a logical upgrade option because it enables the system to evolve with minimal disruption to the existing network and without having to remove the existing, previously purchased devices from the network.

#### Related Documentation

- [Understanding Junos Fusion Provider Edge Components on page 5](#)
- [Understanding Junos Fusion Ports on page 13](#)



- [Understanding the Flow of Data Packets in a Junos Fusion Topology on page 26](#)
- [Configuring Junos Fusion Provider Edge on page 41](#)

## Understanding Junos Fusion Provider Edge Components

This topic describes the components of a Junos Fusion Provider Edge.

This topic covers:

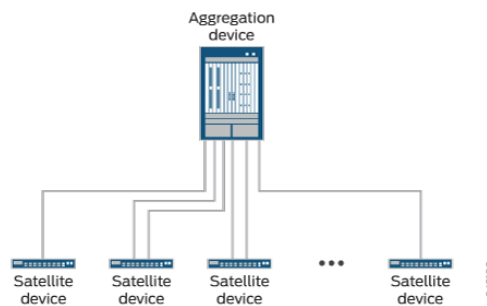
- [Junos Fusion Topology on page 5](#)
- [Aggregation Devices on page 6](#)
- [Satellite Devices on page 6](#)
- [Cascade Ports on page 6](#)
- [Uplink Ports on page 7](#)
- [Extended Ports on page 8](#)
- [Understanding FPC Identifiers and Assignment in a Junos Fusion Fabric on page 8](#)
- [Understanding Software in a Junos Fusion on page 9](#)
- [Understanding Interface Naming in a Junos Fusion on page 9](#)

### Junos Fusion Topology

The Junos Fusion topology is composed of an aggregation device and multiple satellite devices. Each satellite device has at least one connection to the aggregation device. The satellite devices provide interfaces that send and receive network traffic. Network traffic can be forwarded over the aggregation device within the Junos Fusion.

See [Figure 2 on page 5](#) for an illustration of the Junos Fusion topology.

*Figure 2: Junos Fusion Topology*



The satellite devices and the aggregation device maintain the control plane for the Junos Fusion using multiple internal satellite management protocols. Junos Fusion supports the IEEE 802.1BR standard.

The aggregation device acts as the single point of management for all devices in the Junos Fusion. All Junos Fusion management responsibilities, including interface

configuration for every satellite device interface in the Junos Fusion, are handled by the aggregation device. The aggregation device runs Junos OS software for the entire Junos Fusion, and the interfaces on the satellite devices are configured from the aggregation device and support features that are supported by the version of Junos OS running on the aggregation device.

## Aggregation Devices

An aggregation device:

- is an MX5, MX10, MX40, MX80, MX104, MX204, MX240, MX480, MX960, MX2010, MX2020, or MX10003 Universal Routing Platform in a Junos Fusion Provider Edge.
- Has at least one connection to each satellite device.
- Runs Junos OS software for the entire Junos Fusion.
- Manages the entire Junos Fusion. All Junos Fusion configuration management is handled on the aggregation device, including interface configuration of the satellite device interfaces.

The hardware specifications for aggregation devices in a Junos Fusion Provider Edge are discussed in greater detail in [Understanding Junos Fusion Provider Edge Software and Hardware Requirements](#).

## Satellite Devices

A satellite device:

- Is an EX4300, QFX 5100, QFX5110, or QFX5200 switch in a Junos Fusion Provider Edge.
- Runs a version of satellite software after being converted into a satellite device.
- Has at least one direct connection to the aggregation device.
- Provides network interfaces to send and receive traffic for the Junos Fusion.
- Is managed and configured by the aggregation device.

The hardware specifications for satellite devices in a Junos Fusion Provider Edge are discussed in greater detail in [Understanding Junos Fusion Provider Edge Software and Hardware Requirements](#).

## Cascade Ports

A *cascade port* is a port on an aggregation device that sends and receives control and network traffic from an attached satellite device. All traffic passed between a satellite device and the aggregation device in a Junos Fusion traverses the cascade port.

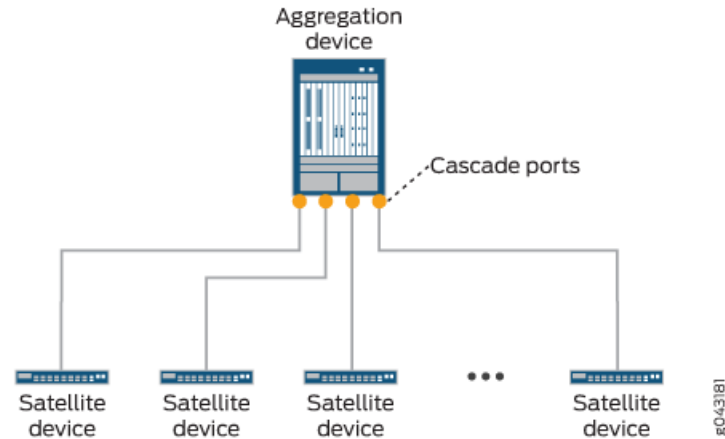
The link that connects an aggregation device to a satellite device has an interface on each end of the link. The interface on the aggregation device end of the link is a cascade port. The interface on the satellite device end of the link is an uplink port.

Satellite devices are added to a Junos Fusion by configuring the interface on the aggregation device end of a link into a satellite device.

A cascade port is typically a 10-Gbps SFP+ interface or a 40-Gbps QSFP+ interface, but any interface on the aggregation device that connects to the satellite device can be converted into a cascade port.

The location of the cascade ports in a Junos Fusion are illustrated in [Figure 3 on page 7](#).

*Figure 3: Cascade Ports*



The hardware specifications for cascade ports in a Junos Fusion Provider Edge are discussed in greater detail in [Understanding Junos Fusion Provider Edge Software and Hardware Requirements](#).

## Uplink Ports

An *uplink port* is a physical interface on a satellite device that provides a connection to an aggregation device. All network and control traffic on a satellite device that is transported to an aggregation device is sent or received on the satellite device's uplink port.

The link that connects an aggregation device to a satellite device has an interface on each end of the link. The interface on the aggregation device end of the link is a cascade port. The interface on the satellite device end of the link is an uplink port.

Uplink ports are automatically created when a cascade port is configured on the aggregation device end of the link.

A single satellite device supports multiple uplink port connections to an aggregation device. The multiple uplink ports connections to a single aggregation device provide redundancy and additional bandwidth for satellite device to aggregation device connections.

An uplink port is typically a 10-Gbps SFP+ interface or a 40-Gbps QSFP+ interface, but any 1-Gbps interface on the aggregation device that connects to the satellite device can also be converted into a cascade port.

## Extended Ports

An *extended port* is a network-facing port on a satellite device that transmits and receives network traffic for the Junos Fusion.

Network traffic received on an extended port is passed, when appropriate, to the aggregation device over the uplink port to cascade port link.

Each network-facing port on a satellite device in a Junos Fusion is also an extended port. A single cascade port is associated with multiple extended ports.

## Understanding FPC Identifiers and Assignment in a Junos Fusion Fabric

In a Junos Fusion, each satellite device must have an FPC identifier (FPC ID).

The FPC ID is used for Junos Fusion configuration, monitoring, and maintenance. Interface names—which are identified using the *type-fpc / pic / port* format—use the FPC ID as the *fpc* variable when the satellite device is participating in a Junos Fusion. For instance, built-in port 2 on PIC 0 of a satellite device—a gigabit Ethernet interface on a satellite device that is using 101 as its FPC ID—uses **ge-101/0/2** as its interface name. The valid range for the FPC ID is 100–255 in Junos OS Release 14.2 and 65 to 254 in Junos OS Release 16.1 and later.

A Junos Fusion provides two methods of assigning an FPC identifier:

- Unique-ID based FPC identification
- Connectivity-based FPC identification

In unique-ID based FPC identification, the FPC ID is mapped to the serial number or MAC address of the satellite device. For instance, if a satellite device whose serial number was **ABCDEFGHIJKL** was assigned to FPC ID 110 using unique-ID based FPC identification, the satellite device with the serial number **ABCDEFGHIJKL** will always be associated with FPC ID 110 in the Junos Fusion. If the satellite device with the serial number **ABCDEFGHIJKL** connects to the aggregation device using a different cascade port, the FPC ID for the satellite device remains 110.

In connectivity-based FPC identification, the FPC ID is mapped to the cascade port. For instance, connectivity-based FPC identification can be used to assign FPC ID 120 to the satellite device that connects to the aggregation device using cascade port **xe-0/0/2**. If the existing satellite device that connects to cascade port **xe-0/0/2** is replaced by a new satellite device, the new satellite device connected to the cascade port assumes FPC ID 120.

Unique-ID based FPC identification is configured using the **serial-number** or **system-id** statement in the [edit *chassis satellite-management fpc slot-id*] hierarchy.

Connectivity-based FPC identification is configured using the **cascade-ports** statement in the [edit *chassis satellite-management fpc slot-id*] hierarchy.

If a prospective satellite device is connected to a Junos Fusion without having a configured FPC slot ID, the prospective satellite device does not participate in the Junos Fusion until

an FPC ID is associated with it. The **show chassis satellite unprovision** output includes a list of satellite devices that are not participating in a Junos Fusion due to an FPC ID association issue.

## Understanding Software in a Junos Fusion

In a Junos Fusion, the aggregation device is responsible for all configuration and management within the Junos Fusion and runs Junos OS software.

The satellite devices, meanwhile, run satellite software that has the built-in intelligence to extend the feature set on the Junos OS software onto the satellite device.

The role of Junos OS and satellite software is discussed in greater detail in [“Understanding Software in a Junos Fusion Provider Edge” on page 18](#).

The software specifications for a Junos Fusion Provider Edge are discussed in greater detail in [Understanding Junos Fusion Provider Edge Software and Hardware Requirements](#).

## Understanding Interface Naming in a Junos Fusion

Network interfaces in Junos OS are specified as follows:

- *type-fpc / pic / port*

In a Junos Fusion, the interface names on the satellite devices follow this naming convention, where:

- The *type* does not change for the interface when it becomes part of a Junos Fusion. The *type* for an **xe** interface, for instance, remains **xe** regardless of whether the interface is or isn't in a Junos Fusion.

You will see internally created **sd** interfaces in a Junos Fusion. The **sd** interfaces map to uplink ports, and are used internally by the Junos Fusion to process some types of traffic.

- The *fpc* identifier in a Junos Fusion, which is user-configurable, is the FPC slot identifier. See [“Understanding FPC Identifiers and Assignment in a Junos Fusion Fabric” on page 8](#).

For instance, built-in port 2 on PIC 0—a gigabit Ethernet interface that is acting as an extended port—on an EX4300 switch that is acting as FPC slot 101 would be identified as:

**ge-101/0/2**

### Related Documentation

- [Configuring Junos Fusion Provider Edge on page 41](#)

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## Understanding Satellite Device Clustering in a Junos Fusion

This topic describes satellite device clustering in a Junos Fusion. It covers:

- [Satellite Device Clustering Overview on page 10](#)
- [Satellite Device Cluster Topology on page 10](#)

- [Satellite Device Cluster Names and Identifiers on page 10](#)
- [Satellite Device Cluster Uplink Interfaces on page 11](#)
- [Cluster Interfaces on page 11](#)
- [Satellite Device Cluster Software Management on page 11](#)
- [FPC Identifiers and Extended Port Interfaces in a Satellite Device Cluster on page 12](#)
- [Understanding 40-Gbps Interfaces with QSFP+ Transceiver Roles for Satellite Devices in a Satellite Device Cluster on page 12](#)

## Satellite Device Clustering Overview

Satellite device clustering allows you to connect up to ten satellite devices into a single cluster, then connect the satellite device cluster to the aggregation device as a single group instead of as individual satellite devices.

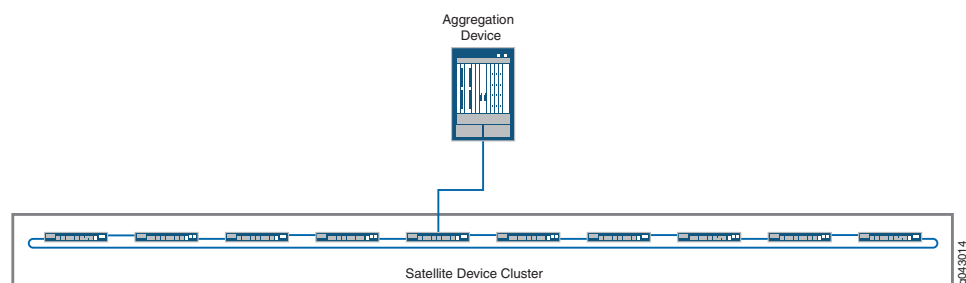
Satellite device clustering is particularly useful in scenarios where optical cabling options between buildings are limited and in scenarios where you want to preserve optical interfaces for other purposes. If you have, for instance, two buildings that have limited optical interfaces between each other and you want to put an aggregation device in one building and ten satellite devices in the other building, you can group the ten satellite devices into a cluster and connect the cluster to the aggregation device with a single cable.

## Satellite Device Cluster Topology

A satellite device cluster must be cabled into a ring topology. No other cabling topologies are supported for a satellite device cluster.

[Figure 4 on page 10](#) shows a picture of a sample satellite device cluster connected to a single aggregation device.

*Figure 4: Satellite Device Cluster Topology*



## Satellite Device Cluster Names and Identifiers

In a Junos Fusion, each satellite device cluster is named and assigned a number. The number is called the *cluster identifier*, or *cluster ID*.

The cluster name and ID are used by the aggregation device to identify a cluster for configuration, monitoring, and troubleshooting purposes.

The cluster name and ID are set using the **set chassis satellite-management cluster *cluster-name* cluster-id *cluster-id-number*** statement.

## Satellite Device Cluster Uplink Interfaces

A satellite device cluster must have at least one member with an uplink interface connection to the aggregation device.

In a dual aggregation device topology using satellite device clustering, each satellite device cluster must have at least one uplink interface connection to both aggregation devices. The uplink interfaces to the aggregation devices can be on any member satellite devices in each satellite device cluster.



**NOTE:** Junos Fusion Provider Edge supports only one aggregation device.

A satellite device cluster supports multiple uplink interfaces. The uplink interfaces can be on any satellite devices that are members of the satellite device cluster. The advantages of configuring multiple uplink interfaces for a satellite device cluster is resiliency—all traffic can be forwarded to another uplink interface if an uplink interface fails—and efficiency—multiple uplink interfaces can reduce the number of hops that traffic takes across a cluster before it is forwarded to an aggregation device.

## Cluster Interfaces

Clustering ports are interfaces that interconnect satellite devices in the same satellite device cluster.

Traffic originating from an access device connected to an extended port travels over cluster interfaces to get to an uplink port. Traffic from an aggregation device travels to a satellite device uplink port then over cluster interfaces before it is delivered to an access device connected to an extended port.

Cluster interfaces are typically 10-Gbps SFP+ interfaces. 10-Gbps SFP+ and 40-Gbps QSFP+ interfaces can be used as cluster interfaces. Other interfaces cannot be used as cluster interfaces by default. To use other interfaces as cluster interfaces, you must configure a candidate uplink port policy.

See *Configuring Uplink Port Policies on a Junos Fusion* for additional information on candidate uplink port policies.

## Satellite Device Cluster Software Management

All satellite devices in a satellite device cluster are associated with a single satellite software upgrade group, which is automatically created when a satellite device cluster is configured as part of a Junos Fusion. The satellite software upgrade group is named after the satellite device cluster name, and ensures that all satellite devices in the cluster run the same version of satellite software.

See *Understanding Software in a Junos Fusion Enterprise* for additional information on software management for a satellite device cluster.

See [Understanding Junos Fusion Enterprise Software and Hardware Requirements](#) for information on software requirements for satellite devices in a satellite device cluster.

## FPC Identifiers and Extended Port Interfaces in a Satellite Device Cluster

Each satellite device in a satellite device cluster has a unique FPC identifier (FPC ID), in the same way that a satellite device that is not part of a cluster has a unique FPC ID.

For this reason, all interface naming for satellite device cluster member switches is not impacted by cluster membership. If a switch is assigned FPC ID 103, for instance, the aggregation device views the satellite device as FPC 103 regardless of whether it is or is not part of a satellite device cluster.

The FPC ID is used in the FPC slot name for an extended port interface; for instance, ge-103/0/2. An extended port is any network-facing interface on a satellite device. As with FPC ID naming, extended port interface names are not impacted by satellite device cluster membership status.



**NOTE:** Satellite devices in a cluster are configured using the unique ID-based FPC identification method of FPC identifier assignment. For more information, see [Understanding FPC Identifiers and Assignment in a Junos Fusion](#) in [Understanding Junos Fusion Enterprise Components](#).

## Understanding 40-Gbps Interfaces with QSFP+ Transceiver Roles for Satellite Devices in a Satellite Device Cluster

40-Gbps QSFP+ interfaces on satellite devices in a satellite device cluster can be used as clustering ports to cable to other satellite devices in the cluster or as uplink ports to cable the satellite device cluster to the aggregation device.

40-Gbps QSFP+ interfaces on EX2300, EX3400, EX4300 and QFX5100 satellite devices are default uplink ports. Please see [Table 3 on page 12](#) for the default uplink ports for satellite devices. When these devices are part of a satellite device cluster, the default uplink ports cannot be configured as extended ports to pass network traffic unless they have a direct connection to the aggregation device or if there is an uplink port policy configured that excludes them from acting as uplink ports.

**Table 3: Default Uplink Interfaces for Junos Fusion Enterprise Satellite Devices**

| Device Type                                | Default Uplink Interfaces           |
|--|-------------------------------------|
| EX2300 (4 ports on PIC1)                   | 1/0 through 1/3                     |
| EX3400 (4 ports each on PIC1 and PIC2)     | 1/0 through 1/3 and 2/0 through 2/3 |
| EX4300-24T (4 ports each on PIC1 and PIC2) | 1/0 through 1/3 and 2/0 through 2/3 |



**Table 3: Default Uplink Interfaces for Junos Fusion Enterprise Satellite Devices (continued)**

| Device Type  | Default Uplink Interfaces                               |
|--|---|
| EX4300-32F (4 ports on PIC 0, 2 ports on PIC 1 and 8 ports on PIC 2) | 0/32 through 0/35<br>1/0 through 1/1<br>2/0 through 2/7 |
| EX4300-48T (4 ports each on PIC1 and PIC2)                           | 1/0 through 1/3 and 2/0 through 2/3                     |
| EX4300-48T-BF (4 ports each on PIC1 and PIC2)                        | 1/0 through 1/3 and 2/0 through 2/3                     |
| EX4300-48T-DC (4 ports each on PIC1 and PIC2)                        | 1/0 through 1/3 and 2/0 through 2/3                     |
| EX4300-48T-DC-BF (4 ports each on PIC1 and PIC2)                     | 1/0 through 1/3 and 2/0 through 2/3                     |
| QFX5100-48S-6Q (6 QSFP+ ports)                                       | 0/48 through 0/53                                       |
| QFX5100-48T-6Q (6 QSFP+ ports)                                       | 0/48 through 0/53                                       |

**Related Documentation**

- [Configuring or Expanding a Junos Fusion Enterprise](#)
- [Understanding Junos Fusion Enterprise Components](#)
- [Configuring Uplink Port Policies on a Junos Fusion](#)

## Understanding Junos Fusion Ports

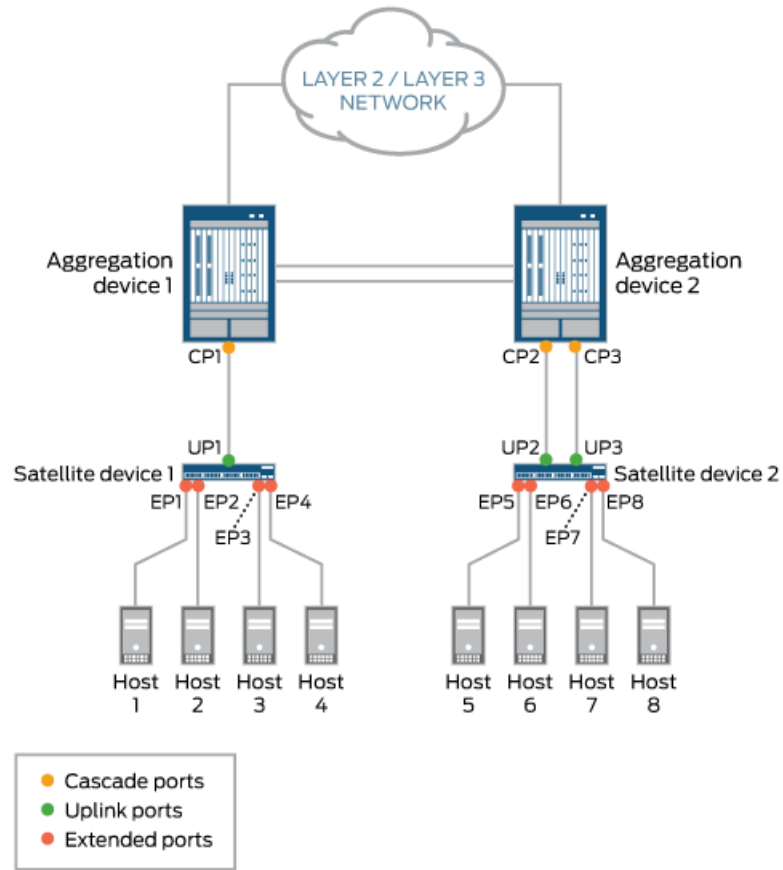
In a Junos Fusion topology, cascade, uplink, and extended ports are components that play key roles. [Figure 5 on page 14](#) and [Figure 6 on page 15](#) show sample Junos Fusion topologies, which serve as points of reference for this discussion of cascade, uplink, and extended ports.

In the Junos Fusion topology shown in [Figure 5 on page 14](#), two aggregation devices and two satellite devices are deployed. The aggregation devices are connected to each other through a multichassis link aggregation group (MC-LAG). Each satellite device is connected to its respective aggregation device through one or two links.

In the Junos Fusion Data Center topology shown in [Figure 6 on page 15](#), four aggregation devices and four satellite devices are deployed. The four aggregation devices form an EVPN core fabric wherein each satellite device is multihomed to each aggregation device. Also, in this topology, some hosts are single-homed to a satellite device, and other hosts are multihomed to two satellite devices.

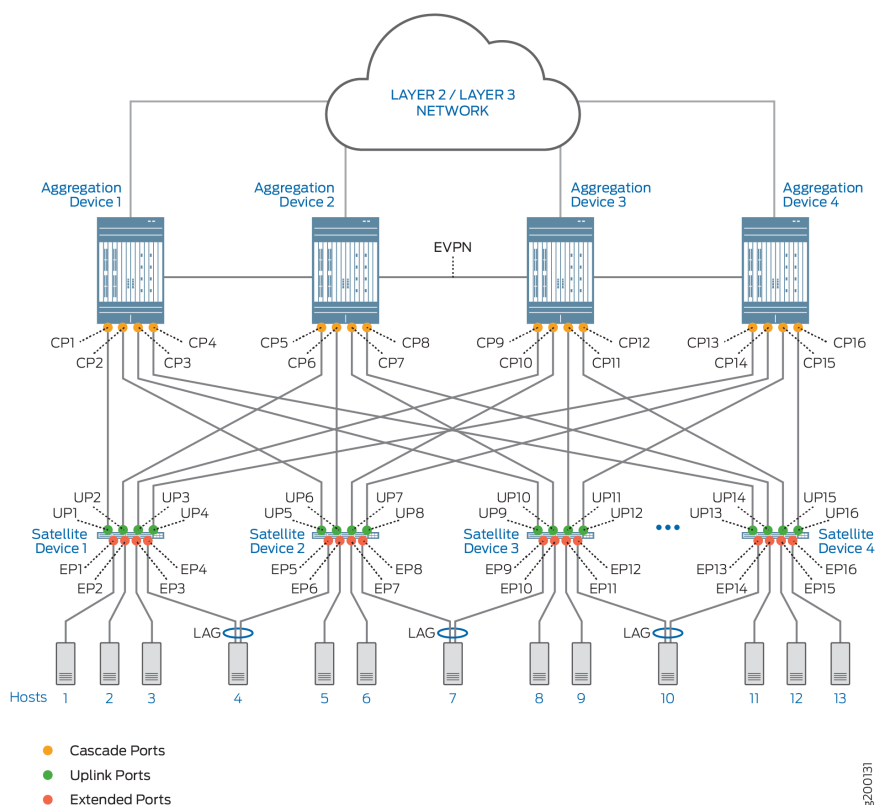
On the aggregation devices in each illustration, each link is connected to a cascade port (for example, CP1 on Aggregation device 1), while on the satellite devices, each link is connected to an uplink port (for example, UP1 on Satellite device 1). Hosts 1 through 4 are connected to Satellite device 1 through extended ports EP1 through EP4, and so on.

Figure 5: Cascade, Uplink, and Extended Ports in a Junos Fusion Topology With Two Aggregation Devices and MC-LAG



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**Figure 6: Cascade, Uplink, and Extended Ports in a Junos Fusion Data Center Topology With Four Aggregation Devices and EVPN**



This topic provides the following information:

- [Understanding Cascade Ports on page 15](#)
- [Understanding Uplink Ports on page 16](#)
- [Understanding Extended Ports on page 17](#)

## Understanding Cascade Ports

A *cascade port* is a physical interface on an aggregation device that provides a connection to a satellite device. A cascade port on an aggregation device connects to an uplink port on a satellite device.

On an aggregation device, you can set up one or more cascade port connections with a satellite device. For example, in the Junos Fusion topology shown in [Figure 5 on page 14](#), Aggregation device 1 has one cascade port connection (CP1) to Satellite device 1, and Aggregation device 2 has two cascade port connections (CP2 and CP3) to Satellite device 2. In the Junos Fusion Data Center in [Figure 6 on page 15](#), where EVPN multihoming is implemented, each aggregation device is connected to each satellite device through one cascade port. For example, on Aggregation device 1, cascade port CP1 is connected to the leftmost satellite device, cascade port CP2 is connected to the next satellite device, and so on.

When there are multiple cascade port connections to a satellite device, as shown in [Figure 5 on page 14](#), the traffic handled by the ports is automatically load-balanced. For a packet destined for a satellite device, the cascade port over which to forward the packet is chosen based on a per-packet hash that is computed using key fields in the packet. To select the key fields to be used, you can specify the **hash-key** statement in the **[edit forwarding-options]** hierarchy or the **enhanced-hash-key** statement in the **[edit forwarding-options]**, **[edit logical-systems *logical-system-name* routing-instances *instance-name* forwarding-options]**, and **[edit routing-instances *instance-name* forwarding-options]** hierarchies.



**NOTE:** The 802.1BR tag is not included in the load-balancing hash computation for cascade ports.

In addition, a cascade port can handle the traffic for all extended ports on a particular satellite device. However, you cannot specify that a particular cascade port handle the traffic for a particular extended port.

After you configure an interface as a cascade port (for example, by issuing **set interfaces xe-0/0/1 cascade-port**), you cannot configure the interface as a Layer 2 interface (for example, by issuing **set interfaces xe-0/0/1 unit 0 family bridge**) or a Layer 3 interface (for example, **set interfaces xe-0/0/1 unit 0 family inet**). If you try to configure a cascade port as a Layer 2 or Layer 3 interface, you receive an error message.

On a cascade port, you can configure class-of-service (CoS) policies.

## Understanding Uplink Ports

An *uplink port* is a physical interface on a satellite device that provides a connection to an aggregation device. An uplink port on a satellite device connects to a cascade port on an aggregation device.

After a cascade port is configured on the aggregation device end of a link, a corresponding uplink port is automatically created on the satellite device. From the aggregation device, you can monitor port and queue statistics for uplink ports. However, we do not recommend that you configure Layer 2 or Layer 3 forwarding features on uplink ports.

On a satellite device, you can set up one or more uplink port connections to an aggregation device. For example, in the Junos Fusion topology shown in [Figure 5 on page 14](#), Satellite device 1 has one uplink port (UP1) to Aggregation device 1, and Satellite device 2 has two uplink ports (UP2 and UP3) to Aggregation device 2. In the Junos Fusion Data Center in [Figure 6 on page 15](#), where EVPN multihoming is implemented, each satellite device is connected to each aggregation device through an uplink port. For example, on the leftmost satellite device, uplink port UP1 is connected to Aggregation device 1, uplink port UP2 is connected to Aggregation device 2, and so on.

When a satellite device has multiple uplink ports to an aggregation device, the traffic from the extended ports is automatically load-balanced among the uplink ports. For example, in the Junos Fusion topology shown in [Figure 5 on page 14](#), the traffic from extended ports EP5 through EP8 is load balanced between uplink ports UP2 and UP3 to

reach Aggregation device 2. In this situation, each packet is examined, and if an IPv4 or IPv6 header is found, a load-balancing algorithm chooses the uplink port based on the header (source and destination IP addresses, and source and destination TCP/UDP ports). If an IPv4 or IPv6 header is not found, the load-balancing algorithm chooses the uplink port based on the Layer 2 header (destination and source MAC addresses, Ether type, and outer VLAN ID) of the packet.

## Understanding Extended Ports

An *extended port* is a physical interface on a satellite device that provides a connection to servers or endpoints. To an aggregation device, a satellite device appears as an additional Flexible PIC Concentrator (FPC) and the extended ports on the satellite device appear as additional interfaces to be managed by the aggregation device.

On aggregation devices, you can configure extended ports by using the same Junos OS CLI and naming convention used for Junos OS interfaces on standalone routers and switches. The only difference is that when you specify an extended port name, the FPC slot number must be in the range of 100 through 254 in Junos OS Release 14.2 and in the range of 65 through 254 in Junos OS Release 16.1 and later.

For example, for the four extended ports shown on Satellite device 1 in [Figure 5 on page 14](#) and the leftmost satellite device in [Figure 6 on page 15](#), the FPC slot number could be 100, the PIC slot number could be 0, the first extended port could be 1, the second extended port could be 2, the third extended port could be 3, and the fourth extended port could be 4. The complete 10-Gigabit Ethernet extended port names could be as follows:

xe-100/0/1

xe-100/0/2

xe-100/0/3

xe-100/0/4

You can configure the following features on extended ports:

- Layer 2 bridging protocols
- Integrated routing and bridging (IRB)
- Firewall filters



**NOTE:** In a Junos Fusion Data Center with EVPN wherein VXLAN encapsulation is used, firewall filters with next-interface or next-ip actions are not supported.

- CoS policies

### Related Documentation

- [Understanding the Flow of Data Packets in a Junos Fusion Topology on page 26](#)
- *hash-key*

- *enhanced-hash-key*

## Understanding Port-Based Authentication in a Junos Fusion Provider Edge

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Junos Fusion supports port-based authentication as defined by IEEE 802.1X standard to prevent unauthorized network access on the extended ports of the satellite devices. The satellite device blocks all packets to and from the supplicant (client) except for Extensible Authentication Protocol over LAN (EAPoL) packets at the interface. EAPoL allows the client to authenticate to an authentication server, such as a RADIUS server. Once the authentication server validates the supplicant's credentials, the switch opens the interface to the supplicant and allows access to the network. For more information on 802.1X authentication, see *Configuring 802.1X Interface Settings on MX Series Routers in Enhanced LAN Mode*.

Junos fusion also supports central Web authentication. Central Web authentication redirects Web browser requests to a central Web authentication server that manages the authentication and authorization process. Upon successful authorization, the user is allowed access to the network. For more information on central Web authentication, see *Understanding Central Web Authentication*.



**NOTE:** The authentication server in a Junos Fusion should be connected directly to the aggregation device and not to an extended port on a satellite device.

### Related Documentation

- *IEEE 802.1x Port-Based Network Access Control Overview*
- *Understanding Central Web Authentication*
- *Configuring 802.1X Interface Settings on MX Series Routers in Enhanced LAN Mode*

## Understanding Software in a Junos Fusion Provider Edge

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This topic discusses the role of software in a Junos Fusion Provider Edge. It covers:

- [Understanding Junos OS for the Aggregation Device in a Junos Fusion on page 18](#)
- [Understanding Satellite Software for the Satellite Devices in a Junos Fusion on page 19](#)
- [Understanding the Preboot eXecution Environment \(PXE\) Junos OS Software Package for QFX5100 Switches in a Junos Fusion on page 20](#)
- [Understanding Minimum Software Requirements for a Junos Fusion on page 20](#)
- [Understanding Satellite Software Upgrade Groups on page 20](#)

### Understanding Junos OS for the Aggregation Device in a Junos Fusion

An aggregation device in a Junos Fusion always runs Junos OS software and is responsible for almost all management tasks, including configuring all network-facing ports—the *extended ports*—on all satellite devices in the Junos Fusion. The extended ports in a Junos

Fusion, therefore, support features that are supported by the version of Junos OS running on the aggregation device.

An aggregation device in a Junos Fusion runs the same Junos OS software regardless of whether it is or is not part of a Junos Fusion. Hence, Junos OS software is acquired, installed, and managed on an aggregation device in a Junos Fusion in the same manner that it is acquired, installed, and managed on a standalone device that is not part of a Junos Fusion.

## Understanding Satellite Software for the Satellite Devices in a Junos Fusion

The satellite devices in a Junos Fusion run satellite software that has the built-in intelligence to extend the feature set on the Junos OS software onto the satellite device. The satellite software is a Linux-based operating system that allows the satellite devices to communicate with the aggregation device for control plane data while also passing network traffic.

All satellite devices in a Junos Fusion must run the satellite software. The satellite software, notably, applies features from the Junos OS software on the aggregation device onto the satellite device. The satellite software allows the satellite device to participate in the Junos Fusion, but does not provide any other software features for the satellite device.

You can run the same version of satellite software on satellite devices that are different hardware platforms. For instance, if your Junos Fusion included EX4300 and QFX5100 switches as satellite devices, the EX4300 and QFX5100 switches acting as satellite devices could install the satellite software from the same satellite software package.

Different satellite devices can run different versions of satellite software within the same Junos Fusion.

You can download satellite software from the software center for any satellite device. Additionally, you have the option to order some switches with the satellite software pre-installed from the factory.

The satellite software packages are stored on the aggregation device after a satellite software package installation—which is typically managed from the aggregation device—has been executed. The satellite software packages remain in the file system even if the Junos OS software on the aggregation device is upgraded. The satellite software packages on an individual satellite device can be updated manually using CLI commands on the aggregation device but are typically installed using software upgrade groups, which are discussed in more detail in this document.

A device cannot simultaneously run Junos OS and the satellite software. If you remove a satellite device from a Junos Fusion, you have to install Junos OS onto the device before you can use it in your network as a standalone switch.

Satellite software is sometimes referred to as satellite network operating system (SNOS) software in the command-line interface and in the technical documentation.

The satellite software requirements for a Junos Fusion Provider Edge are discussed in [Understanding Junos Fusion Provider Edge Software and Hardware Requirements](#).

## Understanding the Preboot eXecution Environment (PXE) Junos OS Software Package for QFX5100 Switches in a Junos Fusion

The Preboot eXecution Environment (PXE) software is a version of Junos OS that must be used to convert a QFX5100 switch that is running satellite software as a satellite device into a standalone switch that is running Junos OS software.

The first version of PXE software that can be used to convert a QFX5100 switch from a satellite device to a standalone switch is introduced at Junos OS Release 14.1X53-D16. The PXE version of Junos OS software supports the same feature set as the other Junos OS software packages for a release, but is specifically engineered to install Junos OS onto a device running satellite software.

The PXE version of Junos OS software is required for QFX5100 switches only. Standard Junos OS software can be used to convert the other devices acting as satellite devices into standalone devices.

The PXE version of Junos OS software can be downloaded from the Software Center with the other QFX5100 switch software packages. For more information on PXE software images, see the *Junos OS Release Notes* for your software release. For information on using the PXE version of Junos OS software to convert a QFX5100 device into a standalone device, see [“Converting a Satellite Device in a Junos Fusion to a Standalone Device” on page 100](#).

## Understanding Minimum Software Requirements for a Junos Fusion

An aggregation device:

- Must be running Junos OS Release 14.2R3, or a later version of Junos OS Release 14.2.



**NOTE:** Junos Fusion is not supported in any Junos OS Release 15.1 release.

A satellite device:

- Must be running Junos OS Release 14.1X53-D16 or later prior to being converted into a satellite device.
- Must run a version of satellite software.

For more detailed information about satellite software support, see the Junos OS release notes for the version of Junos OS running on your aggregation device.

## Understanding Satellite Software Upgrade Groups

A *satellite software upgrade group* is a group of satellite devices that are designated to upgrade to the same satellite software version using the same satellite software package. One Junos Fusion can contain multiple software upgrade groups, and multiple software upgrade groups should be configured in most Junos Fusions to avoid network downtimes during satellite software installations.



When a satellite device is added to a Junos Fusion, the aggregation device checks if the satellite device is using an FPC ID that is included in a satellite software upgrade group. If the device is connected to a satellite device that is using an FPC ID that is part of a satellite software upgrade group, the device—unless it is already running the same version of satellite software—upgrades its satellite software using the satellite software associated with the satellite software upgrade group.

When the satellite software package associated with an existing satellite software group is changed, the satellite software for all member satellite devices is upgraded using a throttled upgrade. The throttled upgrade ensures that only a few satellite devices are updated at a time to minimize the effects of a traffic disruption due to too many satellite devices upgrading software simultaneously.

The two most common methods of installing satellite software—autoconverting a device into a satellite device when it is cabled into an aggregation device and manually converting a device that is cabled into an aggregation device into a satellite device—require that a satellite software upgrade group is configured.

Software upgrade groups are configured and managed on the aggregation device.

#### Related Documentation

- [Configuring or Expanding a Junos Fusion Enterprise](#)

## Understanding Junos Fusion Provider Edge Software and Hardware Requirements

This topic describes the software and hardware requirements for a Junos Fusion Provider Edge.

It covers:

- [Aggregation Devices on page 21](#)
- [Satellite Devices on page 24](#)

### Aggregation Devices

This section details the hardware and software requirements for an aggregation device in a Junos Fusion Provider Edge.

It includes the following sections.

- [Aggregation Device Hardware Models on page 21](#)
- [Support for Junos Node Slicing on page 22](#)
- [Maximum Number of Aggregation Devices on page 23](#)
- [Cascade Ports on page 23](#)

#### Aggregation Device Hardware Models

[Table 4 on page 22](#) lists the hardware platforms that are supported as aggregation devices, and the Junos OS release that introduced aggregation device support to Junos Fusion Provider Edge for the hardware.

**Table 4: Supported Aggregation Device Hardware and Initial Junos OS Release**

| Hardware                           | Initial Junos OS Release |
|------------------------------------|--------------------------|
| MX5 Universal Routing Platform     | 14.2R6                   |
| MX10 Universal Routing Platform    | 14.2R6                   |
| MX40 Universal Routing Platform    | 14.2R6                   |
| MX80 Universal Routing Platform    | 14.2R6                   |
| MX104 Universal Routing Platform   | 14.2R6                   |
| MX204 Universal Routing Platform   | 17.4R1                   |
| MX240 Universal Routing Platform   | 14.2R3                   |
| MX480 Universal Routing Platform   | 14.2R3                   |
| MX960 Universal Routing Platform   | 14.2R3                   |
| MX2010 Universal Routing Platform  | 14.2R3                   |
| MX2020 Universal Routing Platform  | 14.2R3                   |
| MX10003 Universal Routing Platform | 17.3R1                   |



**BEST PRACTICE:** We recommend installing a 64-bit version of Junos OS on the aggregation devices in a Junos Fusion, particularly in topologies that support a large number of satellite devices.

### Support for Junos Node Slicing

Starting in Junos OS Release 18.1R1, you can configure an aggregation device on a guest network fusion (GNF) on an MX 960, MX2010, and MX2020 series router. Using Junos Node Slicing, you can create multiple partitions on a single MX router. These partitions are referred to as a guest network functions (GNFs). Each MX series router supports a maximum of 10 GNFs with each GNF supporting a separate aggregation device. The aggregation device on each GNF supports a maximum of 10 satellite devices.

For more information on Junos Node Slicing, see *Junos Node Slicing Overview*.



**NOTE:** In a Junos Fusion Provider Edge topology that has a GNF configured as the aggregation device, you can only use EX4300 switches as satellite devices.



**NOTE:** In the GNF, you should use the following line cards to support the cascade port on the aggregation device:

- MPC7
- MPC8
- MPC9

### Maximum Number of Aggregation Devices

A Junos Fusion supports one aggregation device.

### Cascade Ports

A *cascade port* is a port on an aggregation device that sends and receives control and network traffic from an attached satellite device.

Table 5 on page 23 provides a list of line cards on an MX Series 5G Universal Routing Platform that have interfaces that can be converted into cascade ports, and the initial Junos OS release when cascade port support was introduced for interfaces on the line card.



**BEST PRACTICE:** A cascade port is typically a 10-Gbps SFP+ interface or a 40-Gbps QSFP+ interface, but any interface on the aggregation device that connects to the satellite device can be converted into a cascade port.

**Table 5: MX Series 5G Universal Routing Platform Line Card Cascade Port Support**

| Hardware    | Initial Junos OS Release |
|-------------|--------------------------|
| 16x10GE MPC | 14.2R3                   |
| MPC1 Q      | 14.2R3                   |
| MPC1E Q     | 14.2R3                   |
| MPC2 Q      | 14.2R3                   |
| MPC2E Q     | 14.2R3                   |
| MPC2E EQ    | 14.2R3                   |
| MPC2E EQ    | 14.2R3                   |
| MPC2E NG    | 14.2R6                   |
| MPC2E NG Q  | 14.2R6                   |
| MPC3E       | 14.2R3                   |

**Table 5: MX Series 5G Universal Routing Platform Line Card Cascade Port Support (continued)**

| Hardware  | Initial Junos OS Release |
|---|--------------------------|
| MPC3E NG  | 14.2R6                   |
| MPC3E NG Q  | 14.2R6                   |
| MPC4E   | 14.2R3                   |
| MPC5E   | 14.2R3                   |
| MPC5EQ  | 14.2R3                   |
| MPC6E<br><small>NOTE: MPC6E is supported with the 10-Gigabit Ethernet MIC with SFP+ (24 Ports) only</small> | 14.2R3                   |
| MPC7E   | 16.1R1                   |
| MPC8E   | 16.1R1                   |
| MPC9E   | 16.1R1                   |

## Satellite Devices

This section details the hardware and software requirements for a satellite device in a Junos Fusion Provider Edge.

It includes the following sections:

- [Satellite Device Hardware Models on page 24](#)
- [Power over Ethernet Requirements for a Satellite Device on page 25](#)
- [Maximum Number of Satellite Devices on page 26](#)

### Satellite Device Hardware Models

[Table 6 on page 25](#) lists the hardware platforms that are supported as satellite devices, as well as the minimum Junos OS release that must be running on the satellite device before it can be converted from a standalone switch to a satellite device.

A minimum version of Junos OS software is only required before a switch is converted into a satellite device. A satellite device in Junos Fusion Provider Edge runs satellite software after it is converted into a satellite device.

When you upgrade the satellite software version to a release later than the recommended versions listed in the [Junos Fusion Hardware and Software Compatibility Matrices](#), your Junos Fusion system will only benefit from the satellite software fixes. To acquire the full benefits of a satellite software release, including satellite software fixes and new features,

we recommend you upgrade both the aggregation device software and its compatible satellite device software for a complete upgrade.

**Table 6: Supported Satellite Device Hardware and Initial Junos OS Release**

| Hardware      | Initial Junos OS Release<br>—Satellite Device | Initial Junos OS Release—Aggregation<br>Device | Minimum Satellite Software<br>Version |
|---------------|---|--|---------------------------------------|
| QFX5100-24Q   | 14.1X53-D16                                   | 14.2R3   | 1.0R1                                 |
| QFX5100-48S   | 14.1X53-D16                                   | 14.2R3   | 1.0R1                                 |
| QFX5100-48T   | 14.1X53-D16                                   | 14.2R3   | 1.0R1                                 |
| QFX5100-96S   | 14.1X53-D16                                   | 14.2R3   | 1.0R1                                 |
| QFX5110-32Q   | 18.1R1  | 18.1R1   | 3.4R1                                 |
| QFX5110-48S   | 18.1R1  | 18.1R1   | 3.4R1                                 |
| QFX5200-32C   | 18.1R1  | 18.1R1   | 3.4R1                                 |
| EX4300-24P    | 14.1X53-D16                                   | 14.2R3   | 1.0R1                                 |
| EX4300-24T    | 14.1X53-D16                                   | 14.2R3   | 1.0R1                                 |
| EX4300-32F    | 14.1X53-D30                                   | 14.2R5   | 1.0R2.2                               |
| EX4300-32F-DC | 14.1X53-D30                                   | 14.2R5   | 1.0R2.2                               |
| EX4300-48P    | 14.1X53-D16                                   | 14.2R3   | 1.0R1                                 |
| EX4300-48T    | 14.1X53-D16                                   | 14.2R3   | 1.0R1                                 |
| EX4300-48T-DC | 14.1X53-D26                                   | 14.2R3   | 1.0R1                                 |

### Power over Ethernet Requirements for a Satellite Device

A satellite device that supports Power over Ethernet (PoE) must be running the minimum PoE controller software version. The EX4300 series switches must be running PoE controller software version 2.6.3.9.2.1 or higher.

To check the PoE controller software version, enter the **show chassis firmware detail** command and view the **PoE firmware** output.

For information on checking and upgrading the PoE controller software, see *Upgrading the PoE Controller Software*.

### Maximum Number of Satellite Devices

---

Junos Fusion Provider Edge supports up to eighteen satellite devices on the MX5, MX10, MX40, MX80, and MX104 Universal Routing Platform. For all other MX Series routers, Junos Fusion Provider Edge supports up to sixty-four satellite devices.

#### Release History Table

| Release | Description  |
|---------|--|
| 18.1R1  | Starting in Junos OS Release 18.1R1, you can configure an aggregation device on a guest network fusion (GNF) on an MX 960, MX2010, and MX2020 series router. |

#### Related Documentation

- [Configuring Junos Fusion Provider Edge on page 41](#)
- [Managing Satellite Software Upgrade Groups in a Junos Fusion on page 85](#)
- [Converting a Satellite Device in a Junos Fusion to a Standalone Device on page 100](#)

### Understanding the Flow of Data Packets in a Junos Fusion Topology

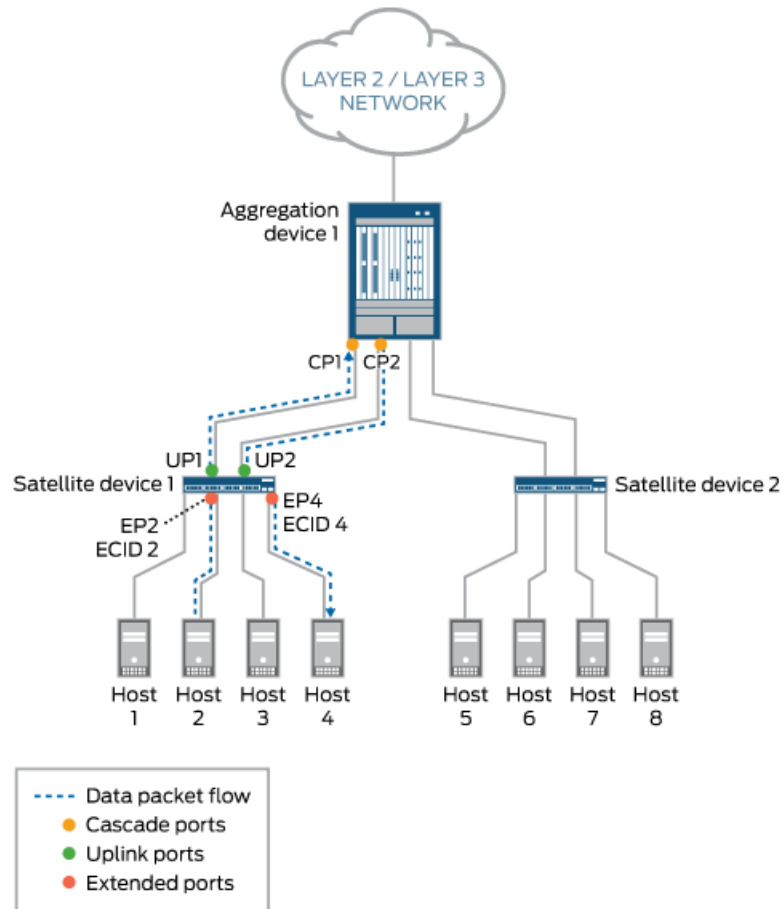
---

All Ethernet data packets that are exchanged between aggregation devices and satellite devices in a Junos Fusion topology include an E-channel tag (ETAG) header that carries an E-channel identifier (ECID) value. The ECID value, which is assigned by the aggregation device, identifies the source or destination extended port on one of the connected satellite devices.

In a sample Junos Fusion topology, where an aggregation device is connected to two satellite devices, the following Layer 2 unicast data packet flow scenarios can occur:

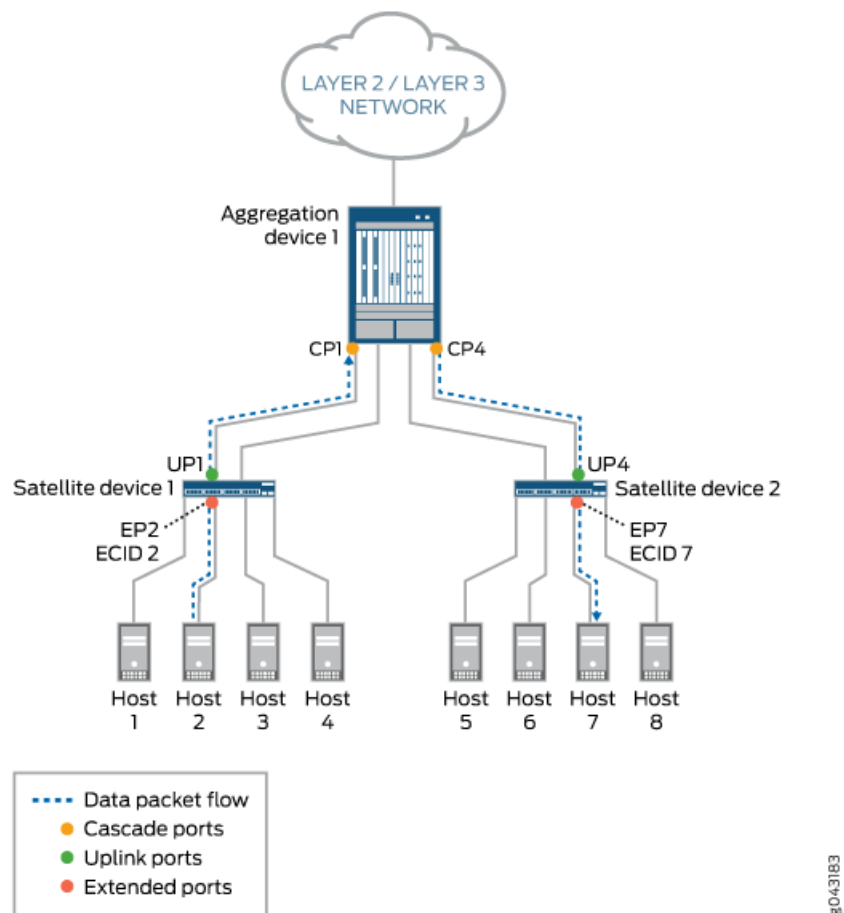
- Scenario 1—A host on one satellite device sends a packet to another host on the same satellite device. For example, Host 2 sends a unicast packet to Host 4. Both hosts are connected to Satellite device 1. (See [Figure 7 on page 27.](#))
- Scenario 2—A host on one satellite device sends a packet to another host on the other satellite device. For example, Host 2, which is connected to Satellite device 1, sends a unicast packet to Host 7, which is connected to Satellite device 2. (See [Figure 8 on page 28.](#))

Figure 7: Layer 2 Unicast Data Packet Flow Through a Junos Fusion Topology—Scenario 1



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Figure 8: Layer 2 Unicast Data Packet Flow Through a Junos Fusion Topology—Scenario 2



In scenario 1, where Host 2 sends a unicast data packet to Host 4, the following events occur:



**NOTE:** Only the events that are performed by Junos Fusion components are listed. Events handled by components that are not specific to the Junos Fusion topology are excluded.

1. Extended port EP2 on Satellite device 1 receives the packet from Host 2.
2. Satellite device 1 inserts an ETAG header in the packet. The ETAG header carries the ECID value (ECID 2), which is assigned by Aggregation device 1 to extended port EP2.
3. On Satellite device 1, two uplink ports (UP1 and UP2) are connected to Aggregation device 1. As a result, traffic between the devices can be load-balanced. In this case,



uplink port UP1 is chosen to forward the packet to cascade port CP1 on Aggregation device 1.

4. On receiving the packet, Aggregation device 1 extracts the ECID value (ECID 2) from the ETAG header of the packet and learns that the packet is from extended port EP2 on Satellite device 1. Aggregation device 1 then removes the ETAG header from the packet.
5. Aggregation device 1 performs a lookup for Host 4. The result of the lookup is extended port EP4 on Satellite device 1.
6. On Aggregation device 1, two cascade ports (CP1 and CP2) are connected to Satellite device 1. As a result, traffic between the devices can be load-balanced. In this case, cascade port CP2 is chosen to forward the packet to uplink port UP2 on Satellite device 1.
7. The packet is forwarded to cascade port CP2, where a new ETAG header and ECID value (ECID 4), which is assigned by Aggregation device 1 to extended port EP4, is added.
8. The packet is received by uplink port UP2 on Satellite device 1.
9. Satellite device 1 extracts the ECID value (ECID 4) from the ETAG header of the packet, then maps ECID 4 to extended port EP4.
10. Host 4 receives the packet from extended port EP4.

In scenario 2, where Host 2 sends a unicast data packet to Host 7, the events that occur are the same as for scenario 1 except for the following:

- Event 5—Aggregation device 1 performs a lookup for Host 7. The result of the lookup is extended port EP7 on Satellite device 2.
- Event 6—On Aggregation device 1, two cascade ports (CP3 and CP4) are connected to Satellite device 2. As a result, traffic between the devices can be load-balanced. In this case, cascade port CP4 is chosen to forward the packet to uplink port UP4 on Satellite device 2.
- Event 7—The packet is forwarded to cascade port CP4, where a new ETAG header and ECID value (ECID 7), which is assigned by Aggregation device 1 to extended port EP7, is added.
- Event 8—The packet is received by uplink port UP4 on Satellite device 2.
- Event 9—Satellite device 2 extracts the ECID value (ECID 7) from the ETAG header of the packet, and then maps ECID 7 to extended port EP7.
- Event 10—Host 7 receives the packet from extended port EP7.

**Related  
Documentation**

- [Understanding Junos Fusion Provider Edge Components on page 5](#)
- [Understanding Junos Fusion Enterprise Components](#)

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## Understanding Satellite Policies in a Junos Fusion

- [Satellite Policies Overview on page 30](#)
- [Understanding Environment Monitoring Satellite Policies on page 31](#)
- [Understanding Uplink Failure Detection Satellite Policies on page 31](#)
- [Understanding Satellite Policies for Remapping Uplink Traffic Flows on a Junos Fusion Data Center on page 31](#)

### Satellite Policies Overview

Satellite policies are used in a Junos Fusion to define how certain features are configured for standalone satellite devices within a Junos Fusion. Satellite policies can be used to configure standalone satellite devices or all satellite devices in a satellite device cluster.

Environment monitoring of the satellite devices, uplink failure detection for satellite device uplink ports, and remapping uplinks—with port pinning, uplink selection, and local port mirroring—are configured using satellite policies. See “[Understanding Environment Monitoring Satellite Policies](#)” on page 31, “[Understanding Uplink Failure Detection Satellite Policies](#)” on page 31, and “[Understanding Satellite Policies for Remapping Uplink Traffic Flows on a Junos Fusion Data Center](#)” on page 31.

Satellite policies are configured as independent policies on the aggregation device, and then associated with the Junos Fusion configuration.

## Understanding Environment Monitoring Satellite Policies

You can configure an environment monitoring satellite policy in a Junos Fusion to configure how a Junos Fusion responds to link-down alarms on satellite devices.

In the environment monitoring satellite policy, you define how you want a link-down alarm from a satellite device to be handled by the Junos Fusion. The Junos Fusion can treat the link-down alarm as a yellow or red alarm, or it can be configured to ignore the alarm.

The environment monitoring policy provides the flexibility to define different alarm handling based on user preference. You can, for instance, assign environment monitoring policies to individual satellite devices based on FPC ID. You can also configure environment monitoring policies based on the product model of the satellite devices, if desired. You can, for instance, specify that all link-down alarms from EX4300 switches acting as satellite devices are treated as yellow alarms, while all link-down alarms from QFX5100 switches acting as satellite devices are treated as red alarms.

Environment monitoring satellite policies are configured using the [environment-monitoring-policy](#) statement in the [\[edit policy-options satellite-policies\]](#) hierarchy level.

An environment monitoring policy is applied for a single satellite device in a Junos Fusion using the [environment-monitoring-policy](#) statement in the [\[edit chassis satellite-management\]](#) or the [\[edit chassis satellite-management fpc slot-id\]](#) hierarchy levels.

You can configure a different environment monitoring policy for a single satellite device in the **fpc slot-id** when an environment monitoring policy for all satellite devices is configured. The environment monitoring policy for the FPC is enabled in cases when both an individual and global environment monitoring policy is configured.

## Understanding Uplink Failure Detection Satellite Policies

Satellite policies are used to configure uplink failure detection on satellite device uplink ports within a Junos Fusion.



**NOTE:** Uplink failure detection is supported only on Junos Fusion Data Center.

For information on uplink failure detection within a Junos Fusion, see [“Overview of Uplink Failure Detection on a Junos Fusion”](#) on page 631.

## Understanding Satellite Policies for Remapping Uplink Traffic Flows on a Junos Fusion Data Center

Satellite policies are used to configure the remapping of uplink traffic flows within a Junos Fusion Data Center. You can configure uplink port pinning and flow-based uplink selection to improve load-balancing of traffic flows across uplink ports. You can use local port mirroring to troubleshoot and monitor applications.

See *Understanding Remapping Uplink Traffic Flows on a Junos Fusion Data Center*.

- Related Documentation**
- [Configuring Junos Fusion Provider Edge on page 41](#)
  - [Configuring or Expanding a Junos Fusion Enterprise](#)

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## Junos Fusion Provider Edge Supported Protocols

Junos Fusion Provider Edge expands the number of available network interfaces on an aggregation device by connecting satellite devices that act as extensions of the aggregation device. The entire system—the interconnected aggregation device and satellite devices—is called a Junos Fusion. Junos Fusion Provider Edge simplifies network aggregation device administration because the aggregation device acts as a single, port-dense device, managed using one IP address.

- [Layer 3 Protocols Supported on Junos Fusion Provider Edge on page 32](#)
- [Multicast Protocols Supported on Junos Fusion Provider Edge on page 33](#)
- [VPN Protocols Supported on Junos Fusion Provider Edge on page 34](#)

### Layer 3 Protocols Supported on Junos Fusion Provider Edge

Starting with Junos OS Release 14.2R4, many of the routing protocols supported on MX Series routers have been extended to the satellite devices in a Junos Fusion Provider Edge topology. You can configure the following Layer 3 routing protocols on satellite device extended ports:

- BFD (Centralized only)
- BGP
- BGP for IPv6
- IS-IS
- OSPF
- OSPF version 3

You can configure the following Layer 3 routing protocols on satellite device extended ports that are included in link aggregation groups (LAGs):

- BGP
- IS-IS
- OSPF

---

### BFD Support on Junos Fusion Provider Edge

Bidirectional Forwarding Detection (BFD) is a protocol used to detect failure in the data path. Hello packets are sent at a specified, regular interval. A neighbor failure is detected when the routing device stops receiving a reply after a specified interval. BFD works with a wide variety of network environments and topologies.



**NOTE:** Junos Fusion Provider Edge only supports centralize BFD.

For more information, see the following:

- *Understanding BFD for BGP*
- *Understanding BFD for IS-IS*
- *Understanding BFD for OSPF*

### BGP Support on Junos Fusion Provider Edge

Border Gateway Protocol (BGP) is a standardized exterior gateway protocol that exchanges routing and reachability information between autonomous systems on the Internet. The protocol can be a path vector protocol or a distance-vector routing protocol. BGP makes routing decisions based on paths, network policies, or rule-sets configured by a network administrator for core routing decisions. For more information, see the *BGP Feature Guide* and the CLI statement *bgp*.

### IS-IS Support on Junos Fusion Provider Edge

Intermediate System to Intermediate System (IS-IS) moves information within either a computer network, a group of physically connected computers, or between similar devices. It accomplishes this by determining the best route for traffic through a packet-switched network. For more information, see the *IS-IS Feature Guide*.

### OSPF Support on Junos Fusion Provider Edge

Open Shortest Path First (OSPF) is a routing protocol for IP networks using a link state routing algorithm. This interior routing protocol operates within a single autonomous system. For more information, see the *OSPF Feature Guide* and the CLI statements *ospf* and *ospf3*.

## Multicast Protocols Supported on Junos Fusion Provider Edge

You can configure the following multicast protocols on satellite device extended ports:

- PIM
- IGMP
- MLD

### PIM on Junos Fusion Provider Edge

Protocol-Independent Multicast (PIM) is a family of multicast routing protocols for Internet Protocol (IP) networks that provide one-to-many and many-to-many distribution of data over a LAN, WAN or the Internet. It is termed protocol-independent because PIM does not include its own topology discovery mechanism, but instead uses routing information supplied by other routing protocols, in this case Internet Group Management Protocol (IGMP) on extended ports. All four PIM modes work on extended ports—PIM

sparse Mode (default), PIM dense Mode, bidirectional PIM, and PIM source-specific multicast. For more information, see the *PIM Overview* and the CLI statement *pim*.

---

### IGMP on Junos Fusion Provider Edge

Internet Group Management Protocol (IGMP) is a communications protocol used by hosts and adjacent routers on IPv4 networks to establish multicast group membership. IGMP is an integral part of IP multicast, and is used for one-to-many networking applications such as online streaming video and gaming because it allows more efficient use of resources when supporting these types of applications. For more information, see *Understanding IGMP* and the CLI statement *igmp*.

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### MLD on Junos Fusion Provider Edge

Multicast Listener Discovery (MLD) is a component of the Internet Protocol Version 6 (IPv6) suite. MLD is used by IPv6 routers for discovering multicast listeners on a directly attached link, much like IGMP is used in IPv4. MLD uses ICMPv6 messaging in contrast to IGMP's bare IP encapsulation. For more information, see the *mld* CLI statement.

Junos Fusion supports multicast and broadcast packet replication on the aggregation device and the satellite devices. For more information on multicast replication, see [“Understanding Multicast Replication in a Junos Fusion” on page 665](#).

## VPN Protocols Supported on Junos Fusion Provider Edge

You can configure the following VPN protocols on satellite device extended ports:

- Layer 2 Circuits
- Layer 2 VPNs
- Layer 3 VPNs
- VPLS
- EVPN with VXLAN



**NOTE:** Extended ports on satellite devices can only be configured as customer edge (CE) router interfaces in a VPN. Provider edge (PE) router interfaces must be configured directly on the native port of the aggregation device.

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### Layer 2 Circuits on Junos Fusion Provider Edge

You can configure a local switching interface to ignore the MTU configuration set for an associated physical interface. This enables you to bring up a circuit between two logical interfaces that are defined on physical interfaces with different MTU values. For more information, see the *Configuring Interfaces for Layer 2 Circuits Overview*.

---

### Layer 2 VPNs on Junos Fusion Provider Edge

Layer 2 VPNs provide communication between a provider network and a customer network. Provider edge routers or PEs at the edge of a provider network communicate with each customer edge or CE router. Customers configure their routers to carry all

Layer 3 traffic, while the service provider needs to know only how much traffic the Layer 2 VPN needs to carry. For more information, see the *Layer 2 VPNs and VPLS Feature Guide for Routing Devices*.

### Layer 3 VPNs on Junos Fusion Provider Edge

Layer 3 VPNs also provide communication between a provider network and a customer network. However, in a Layer 3 VPN, routing occurs on the service provider's router. Therefore, Layer 3 VPNs require more configuration on the part of the service provider, because the service provider's PE routers must store and process the customer's routes. For more information, see the *Layer 3 VPNs Feature Guide for Routing Devices*.

### VPLS on Junos Fusion Provider Edge

Virtual Private LAN Service (VPLS) provides Ethernet-based multipoint to multipoint communication over IP or MPLS networks. It allows geographically dispersed sites to share an Ethernet broadcast domain by connecting sites with pseudowires. The technologies that can be used as pseudowire can be Ethernet over MPLS, L2TPv3 or even GRE. For more information, see the *Layer 2 VPNs and VPLS Feature Guide for Routing Devices*.

### EVPN with VXLAN

You can configure ports on the satellite devices managed by MX Series routers to support Ethernet VPNs (EVPNs) with Virtual Extensible LAN (VXLAN) encapsulation. EVPN provides layer 2 VPN services with advance multi-homing capabilities by using the BGP control plane to distribute routes over IP or IP/MPLS backbone. VXLAN is a tunneling scheme that overlays layer 2 ethernet frames on top of layer 3 UDP packets. EVPN with VXLAN encapsulation allows you to create a logical network for hosts that span across a physical network and supports up to 16 million VXLAN segments. For more information on EVPN and VXLAN, see *Understanding EVPN with VXLAN Data Plane Encapsulation*

#### Related Documentation

- [Understanding the Flow of Data Packets in a Junos Fusion Topology on page 26](#)
- [Junos Fusion Provider Edge Overview on page 3](#)

## Local Switching on Junos Fusion Provider Edge

Junos Fusion supports packet forwarding both on the aggregation device and on satellite devices. The default behavior is to forward the packets received on the extended port to the aggregation device. The satellite device does not perform any processing on the incoming traffic. The aggregation device processes and directs the data traffic.

Local switching in Junos Fusion reduces the traffic that is exchanged between satellite devices and the aggregation device by handling some of the local switching. When you enable local switching, the satellite device handles the bridging traffic locally on the satellite device. The satellite device maintains a bridge forwarding table with the local MAC addresses for devices that are connected directly to the satellite device and forwards the data packets with local MAC addresses. Packets with unknown MAC addresses are sent to the aggregate device. Local switching applies to all the ports on the satellite device.

To configure local switching on a satellite device, include the **local-switching** statement in the forwarding options hierarchy:

```
[edit forwarding-options]
satellite {
  fpc slot {
    local-switching;
  }
}
```

## Selective VLAN Local Switching

In some cases, you might want to enable local switching for only a select number of VLANs on the satellite device—for example, offloading data traffic based on the type of service. This will allow you to control traffic more precisely. To enable selective VLAN local switching on a satellite device, include selected VLANs in a virtual switch routing instance. VLANs that are not included in the routing instance will default to forwarding data packets to the aggregate device.

To configure selective VLAN local switching on a satellite device, include the **selective-vlan-switching** statement in the forwarding options hierarchy with a virtual switch routing instance:

```
[edit forwarding-options]
satellite {
  fpc slot {
    selective-vlan-switching {
      routing-instance routing-instance-name;
    }
  }
}
```

When you have digital subscriber line access multiplexer (DSLAM) ports and broadband network gateway (BNG) ports on a satellite device, you should configure the satellite device to switch traffic locally from the DSLAM ports to the BNG port while restricting the traffic between two DSLAM ports. Configure the satellite device to switch traffic locally from a DSLAM port to a BNG port by including the **core-facing** keyword in all BNG port interfaces. Restrict switched traffic between DSLAM ports by including the **no-local switching** keyword in the bridge domain.

## Policer

Traffic policing enables you to control the maximum rate of traffic that will be sent or received on an interface. A policer defines a set of traffic rate limits and sets the action for traffic that does not conform to the configured limits. Packets in a traffic flow that do not conform to traffic limits are either discarded or are marked with a different forwarding class or packet loss priority (PLP) level.

You can limit the flow of Layer 2 traffic that is sent to the aggregation device by applying an ingress policer at the satellite device. You configure the Layer 2 ingress policer by using the **input-policer** statement at the **[edit interfaces interface-name layer2-policer]** hierarchy



level. Because the satellite device is only aware of locally switched logical interface, the ingress policer is applied to Layer 2 input traffic at the satellite device ports.

### Example: Configuring Selective VLAN Local Switching

In this configuration example, the satellite device is configured with the following options:

- VLANs 101, 102, 103, and 104 are enabled for selective VLAN local switching.
- VLAN 101 and 102 have DSLAM traffic.
- Interface xe-100/0/0 is a BNG port.
- Interfaces xe-100/0/1 and xe-100/0/2

```

interfaces {
  xe-100/0/0 {
    unit 0 {
      family bridge {
        interface-mode trunk;
        vlan-id-list [100-110];
        core-facing;
      }
    }
  }
  xe-100/0/1 {
    layer2-policer {
      input-policer SD-policer-A;
    }
    unit 0 {
      family bridge {
        interface-mode trunk;
        vlan-id-list [100-110];
      }
    }
  }
  xe-100/0/2 {
    layer2-policer {
      input-policer SD-policer-A;
    }
    unit 0 {
      family bridge {
        interface-mode trunk;
        vlan-id-list [100-110];
      }
    }
  }
}

```

```

routing-instances {
  vs-1 {
    instance-type virtual-switch;
    interface xe-100/0/0.0;
    interface xe-100/0/2.0;
    interface xe-100/0/2.0;
  }
}

```

```

bridge-domains {
  bd-1 {
    vlan-id 101;
    no-local-switching;
  }
  bd-2 {
    vlan-id 102;
    no-local-switching;
  }
  bd-3 {
    vlan-id 103;
  }
  bd-4 {
    vlan-id 104;
  }
}
forwarding-options {
  satellite {
    fpc 100 {
      sd-vlan-switching {
        routing-instance vs-1;
      }
    }
  }
}
}

```

**Related Documentation**

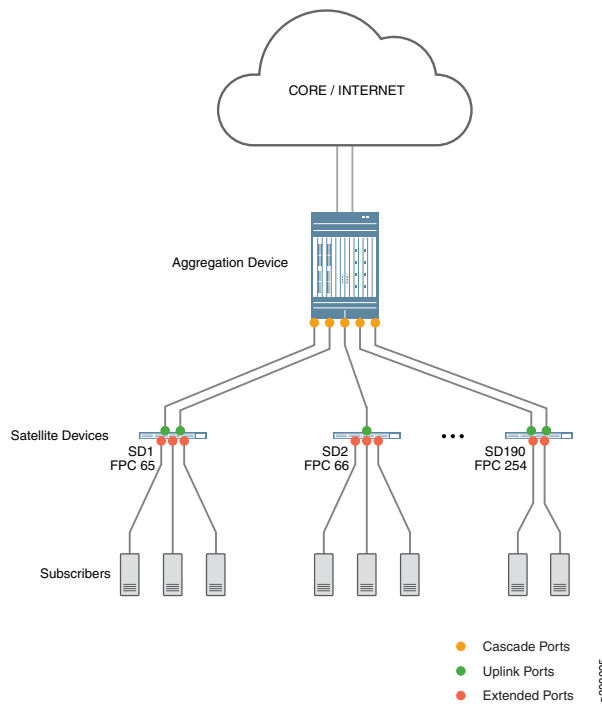
- [Two-Color Policer Configuration Overview](#)

## Broadband Subscription Services on Junos Fusion

Starting in Junos OS Release 18.4R1, Junos Fusion Provider Edge supports Broadband Edge Subscriber Management. The aggregation device in Junos Fusion functions as Broadband Network Gateway (BNG) while the extended ports on the satellite devices function as ports on the BNG. From the standpoint of a broadband network, the extended ports appear to be local physical ports and follow the Junos Fusion naming convention for port interfaces. The Satellite device is identified with a Flexible PIC Concentrator (FPC) ID and the extended ports use the FPC ID as part of the interface name.

[Figure 9 on page 39](#) illustrates a basic subscriber network on a Junos Fusion Provider Edge. The first satellite device (satellite device 1) off the cascade port is identified with a FPC ID of 65 with the first extended port on satellite device 1 named as xe-65/0/0.

Figure 9: Broadband Network Gateway on Junos Fusion

**NOTE:**

BNG on Junos Fusion Provider Edge is supported only with a MX240, MX480, MX960, MX2010, MX2020, or MX10003 Universal Routing Platform as an aggregation device with EX4300, QFX5100, QFX5110, or QFX5200 switches as satellite devices.

BNG on Junos Fusion Provider Edge supports the following:

- DHCP and PPOE Subscribers.
- Static and Dynamic VLANs.
- Full support for broadband subscriber firewall services.
- Non-Fusion broadband subscribers are also supported on the aggregation device. This means that the customer premise equipment can connect directly to the MX router.
- Deep packet inspections of layer 4 through layer 7 payloads.
- Lawful-intercept.

BNG on Junos Fusion Provider Edge has the following limitations:

- Support for satellite Devices with only a single connection to a cascade port on aggregation device.

- Port mirroring is not supported.
- The line rate of the cascade port limits the number of extended ports that can be provisioned. To prevent oversubscription on a Junos Fusion, we recommend that you do not provision the sum of the bandwidth for the ports on the satellite device to exceed the bandwidth of the cascade port.

For more information on configuring, provisioning, and managing broadband subscribers, see *Junos OS Broadband Subscriber Management and Services Library*

## Benefits of Broadband Subscription on Junos Fusion

Broadband subscription support on Junos Fusion allows you to use a single point of management on an aggregation device to configure and manage a large number of network-facing subscriber interfaces to operate as a group on satellite devices. As your network grows, you can easily expand the size of your subscriber access network by adding satellite devices as they are needed. Junos Fusion supports both Broadband Subscribers and Non-Fusion broadband subscribers on the aggregation device. Existing Junos Fusion deployments can migrate to Broadband Subscriber management gradually by adding new subscribers to current Junos Fusion Provider Edge deployment while adding new satellite devices.

### Related Documentation

- [Understanding CoS on an MX Series Aggregation Device in Junos Fusion Provider Edge on page 713](#)

## CHAPTER 2

# Junos Fusion Provider Edge Configuration

- [Configuring Junos Fusion Provider Edge on page 41](#)
- [Configuring Satellite Device Alarm Handling Using an Environment Monitoring Satellite Policy in a Junos Fusion on page 56](#)

## **Configuring Junos Fusion Provider Edge**

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This topic provides the instructions needed to configure a Junos Fusion Provider Edge. The instructions in this topic can also be used to add a new satellite device to a Junos Fusion Provider Edge after initial installation. It covers:

- [Preparing the Aggregation Device on page 42](#)
- [Configuring the Cascade Ports on the Aggregation Device on page 43](#)
- [Configuring the FPC Slot Identifiers on page 43](#)
- [Configuring Software Upgrade Groups on the Aggregation Device on page 45](#)
- [Preparing the Satellite Device on page 47](#)
- [Adding Satellite Devices to the Junos Fusion Provider Edge on page 48](#)

## Preparing the Aggregation Device

This section provides instructions on the required steps to prepare a switch to become the aggregation device in a Junos Fusion Provider Edge.

This section does not discuss the cascade port, FPC slot identification, or the software upgrade group configuration, which are important elements of preparing your aggregation device for a Junos Fusion Provider Edge installation and are discussed in [“Configuring the Cascade Ports on the Aggregation Device” on page 43](#), [“Configuring the FPC Slot Identifiers” on page 43](#), and [“Configuring Software Upgrade Groups on the Aggregation Device” on page 45](#). The instructions for adding satellite devices to the Junos Fusion Provider Edge are also provided later in this topic.

To prepare your aggregation device for a Junos Fusion Provider Edge:

1. Enable Enhanced IP:

```
[edit]
user@aggregation-device# set chassis network-services enhanced-ip
```

2. Configure the Junos Fusion into single home mode:

```
[edit]
user@aggregation-device# set chassis satellite-management single-home satellite all
```



.....

**NOTE:** Configuring the Junos Fusion into single home mode using this step is optional when the aggregation device is running Junos OS Release 14.2R5 or later.

Configuring the Junos Fusion into single home mode is required when the aggregation device is running Junos OS Release 14.2R3 or 14.2R4.

.....

3. Commit the configuration to both Routing Engines:

```
[edit]
user@aggregation-device# commit synchronize
```

If you are using an aggregation device with a single Routing Engine:

```
[edit]
user@aggregation-device# commit
```

4. Ensure your aggregation device is running a version of Junos OS software that is compatible with Junos Fusion Provider Edge, such as Junos OS Release 14.2R3 or later. If the aggregation device does not have the correct version installed, upgrade your aggregation device.

```
user@aggregation-device> request system software add aggregation-device-package-name
```

5. Reboot both Routing Engines:

```
user@aggregation-device> request system reboot both-routing-engines
```

A reboot is required to enable enhanced IP.

If you only want to reboot a single Routing Engine:

```
user@aggregation-device> request system reboot
```

Reboot the other Routing Engine at a later time to ensure it is ready to manage the Junos Fusion in the event of a Routing Engine switchover.

## Configuring the Cascade Ports on the Aggregation Device

A cascade port is a port on an aggregation device that connects to a satellite device. Data and control traffic is passed between the aggregation device and the satellite devices over the cascade port link.

A cascade port must be configured before a satellite device is recognized by the Junos Fusion Provider Edge. Cascade port configuration, therefore, is always a required step for configuring a Junos Fusion Provider Edge.

To configure a cascade port or ports:

1. Log in to the aggregation device.
2. Configure the interface on the aggregation device side of the link into a cascade port:

```
[edit]
user@aggregation-device# set interfaces interface-name cascade-port
```

For example, to configure interface xe-0/0/1 on the aggregation device into a cascade port:

```
[edit]
user@aggregation-device# set interfaces xe-0/0/1 cascade-port
```

3. Commit the configuration:

```
[edit]
user@aggregation-device# commit
```

If you want to commit the configuration to both Routing Engines:

```
[edit]
user@aggregation-device# commit synchronize
```

## Configuring the FPC Slot Identifiers

In a Junos Fusion, each satellite device must be mapped to an FPC identifier (FPC ID). The FPC ID is used for Junos Fusion configuration, monitoring, and maintenance. Interface names—which are identified using the *type-fpc / pic / port* format—use the FPC ID as the *fpc* variable when the satellite device is participating in a Junos Fusion. For instance, built-in port 2—a gigabit Ethernet interface on a satellite device that is using 101 as it's

FPC ID— uses **ge-101/0/2** as its interface name. The range for the FPC ID is 100 -255 in Junos OS Release 14.2 and 65 to 254 in Junos OS Release 16.1 and later.

A Junos Fusion Provider Edge provides two methods of assigning an FPC identifier: Unique-ID based FPC identification and connectivity-based FPC identification. Unique-ID based FPC identification maps an FPC slot ID to a satellite device's MAC address or serial number, while Unique-ID based FPC identification maps an FPC slot ID to a cascade port. Both options are discussed in [“Understanding Junos Fusion Provider Edge Components” on page 5](#).

- To configure the FPC slot ID using connectivity-based FPC identification, enter:

```
[edit]
user@aggregation-device# set chassis satellite-management fpc slot-id cascade-ports
interface-name
```

where *slot-id* becomes the FPC slot ID of the satellite device, and *interface-name* is the name of the interface.

For example, to configure the FPC slot ID of the satellite device that is connected to xe-0/0/1 to 101:

```
[edit]
user@aggregation-device# set chassis satellite-management fpc 101 cascade-ports xe-0/0/1
```

- To configure the FPC slot ID using unique-ID based FPC identification, use one of the following options:
  - To map the FPC slot ID to a satellite device's serial number:

```
[edit]
user@aggregation-device# set chassis satellite-management fpc slot-id serial-number
serial-number
```

where *slot-id* becomes the FPC slot ID of the satellite device and *serial-number* is the satellite device's serial number. The FPC slot ID functions as the FPC slot identifier.

For instance, to map FPC slot ID 101 to the satellite device using the serial number ABCDEFGHIJKL:

```
[edit]
user@aggregation-device# set chassis satellite-management fpc 101 serial-number
ABCDEFGHIJKL
```

- To map the FPC slot ID to a satellite device's MAC address:

```
[edit]
user@aggregation-device# set chassis satellite-management fpc slot-id system-id
mac-address
```

where *slot-id* becomes the FPC slot ID of the satellite device and *mac-address* is the satellite device's MAC address. The FPC slot ID functions as the FPC slot identifier.

For example, to map FPC slot ID to the satellite device using MAC address 12:34:56:AB:CD:EF:



```
[edit]
user@aggregation-device# set chassis satellite-management fpc 110 system-id
12:34:56:AB:CD:EF
```

If a prospective satellite device is connected to a Junos Fusion Provider Edge without having a configured FPC slot ID, the prospective satellite device does not participate in the Junos Fusion Provider Edge until an FPC ID is associated with it. The **show chassis satellite unprovision** output includes a list of satellite devices that are not participating in a Junos Fusion Provider Edge due to an FPC ID association issue.

## Configuring Software Upgrade Groups on the Aggregation Device

A satellite software upgrade group is a group of satellite devices that are designated to upgrade to the same satellite software version using the same satellite software package. One Junos Fusion can contain multiple software upgrade groups, and multiple software upgrade groups should be configured in most Junos Fusions to avoid network downtimes during satellite software installations.

When a satellite device is added to a Junos Fusion, the aggregation device checks if the satellite device is using an FPC ID that is included in a satellite software upgrade group. If the device is connected to a satellite device that is using an FPC ID that is part of a satellite software upgrade group, the device—unless it is already running the same version of satellite software—upgrades its satellite software using the satellite software associated with the satellite software upgrade group.

When the satellite software package associated with an existing satellite software group is changed, the satellite software for all member satellite devices is upgraded using a throttled upgrade. The throttled upgrade ensures that only a few satellite devices are updated at a time to minimize the effects of a traffic disruption due to too many satellite devices upgrading software simultaneously.

The two most common methods of installing satellite software onto an aggregation device—autoconverting a device into a satellite device when it is cabled into an aggregation device and manually converting a device that is cabled into an aggregation device into a satellite device—require that a satellite software upgrade group is configured.

Software upgrade groups are configured and managed from the aggregation device.

To configure a software upgrade group:

1. Log in to the aggregation device.
2. Create the software upgrade group, and add the satellite devices to the group.

```
[edit]
user@aggregation-device# set chassis satellite-management upgrade-groups
upgrade-group-name satellite slot-id-number-or-range
```

where *upgrade-group-name* is the name of the upgrade group, and the *slot-id-number-or-range* is FPC slot ID number or range of numbers, of the satellite devices that are being added to the upgrade group. If you enter an existing upgrade

group name as the *upgrade-group-name*, you add new satellite devices to the existing software upgrade group.

For example, to create a software upgrade group named **group1** that includes all satellite devices numbered 101 through 120:

```
[edit]
user@aggregation-device# set chassis satellite-management upgrade-groups group1
satellite 101-120
```

3. Commit the configuration to both Routing Engines on the aggregation device:

```
[edit]
user@aggregation-device# commit synchronize
```

If you are using an aggregation device with a single Routing Engine or want to commit the configuration to a single Routing Engine only:

```
[edit]
user@aggregation-device# commit
```

The configuration must be committed before associating a satellite software image with the satellite software upgrade group, which is done in Step 4.

4. Associate a satellite software package with the software upgrade group:

```
user@aggregation-device> request system software add package-name upgrade-group
upgrade-group-name
```

where *package-name* is the URL to the satellite software package, and *upgrade-group-name* is the name of the upgrade group that was assigned by the user earlier in this procedure.

For example, to associate a satellite software image named **satellite-1.0R1.1-signed.tgz** that is currently stored in the **/var/tmp** directory on the aggregation device to the upgrade group named **group1**:

```
user@aggregation-device> request system software add
/var/tmp/satellite-1.0R1.1-signed.tgz upgrade-group group1
```

Associating a satellite software image to a new satellite software package can trigger a satellite software upgrade. A throttled satellite software upgrade might begin after entering the **request system software add** command to associate a satellite software package with a satellite software upgrade group. A satellite software upgrade might also be triggered when a configuration that uses the satellite software upgrade group is committed.

## Preparing the Satellite Device

This section discusses the steps that must be performed on a standalone switch before converting it into a satellite device in a Junos Fusion Provider Edge.

To perform this procedure:

These instructions assume your device is already running Junos OS Release 14.1X53-D16 or later.

1. Log in to the device using the console port.
2. Zeroize the device:

```
[edit]
user@satellite-device# request system zeroize
```



**NOTE:** The device reboots to complete the procedure for zeroizing the device.

If you are not logged in to the device using the console port connection, your connection to the device is lost after entering the **request system zeroize** command.

If you lose your connection to the device, login using the console port.

3. (EX4300 switches only) After the reboot is complete, convert the built-in 40-Gbps QSFP+ interfaces from Virtual Chassis ports (VCPs) into network ports:

```
user@satellite-device> request virtual-chassis vc-port delete pic-slot 1 port port-number
```

For example, to convert all four built-in 40-Gbps QSFP+ interfaces on an EX4300-24P switch into network ports:

```
user@satellite-device> request virtual-chassis vc-port delete pic-slot 1 port 0
user@satellite-device> request virtual-chassis vc-port delete pic-slot 1 port 1
user@satellite-device> request virtual-chassis vc-port delete pic-slot 1 port 2
user@satellite-device> request virtual-chassis vc-port delete pic-slot 1 port 3
```

This step is required for the 40-Gbps QSFP+ interfaces that will be used as uplink interfaces in a Junos Fusion.

This step is needed because the built-in 40-Gbps QSFP+ interfaces on EX4300 switches are configured into VCPs by default, and the default settings are restored after the device is zeroized.

The number of built-in 40-Gbps QSFP+ interfaces varies by EX4300 switch model. See *EX4300 Switches Hardware Overview*.

## Adding Satellite Devices to the Junos Fusion Provider Edge

This section discusses the processes for adding satellite devices to a Junos Fusion Provider Edge.

A switch must be running the satellite software to operate as a satellite device. The instructions in this procedure include the required steps to install the satellite software onto your satellite device.

You can add satellite devices to your Junos Fusion Provider Edge using one of the following procedures:

- [Autoconverting a Switch into a Satellite Device on page 49](#)
- [Manually Converting a Switch into a Satellite Device on page 52](#)
- [Configuring a Switch into a Satellite Device Before Interconnecting It into a Junos Fusion Provider Edge on page 54](#)

### Autoconverting a Switch into a Satellite Device

Use this procedure to automatically configure a switch into a satellite device when it is cabled into the aggregation device.

You can use the autoconversion procedure to add one or more satellite devices to your Junos Fusion topology. The autoconversion procedure is especially useful when you are adding multiple satellite devices to your Junos Fusion, because it allows you to easily configure the entire topology before or after cabling the satellite devices to the aggregation devices.

Before you begin:

- Ensure that your aggregation device is running Junos OS Release 14.2R3 or later, and that the satellite devices are running Junos OS Release 14.1X53-D16 or later.
- Ensure that you have prepared your satellite device for the installation, following the instructions in [“Preparing the Satellite Device” on page 47](#).

To autoconvert a switch into a satellite device:

1. Cable a link between the aggregation device and the satellite device, if desired.



**NOTE:** You can cable the aggregation device to the satellite device at any point in this procedure.

When the aggregation device is cabled to the satellite device during this procedure, the process for converting a switch into a satellite device to finalize this process occurs immediately.

If the aggregation device is not cabled to the satellite device, the process for converting a switch into a satellite device to finalize this process starts when the satellite device is cabled to the aggregation device.

2. Log in to the aggregation device.
3. Configure the cascade ports. See [“Configuring the Cascade Ports on the Aggregation Device” on page 43](#).

For example, to configure interface xe-0/0/1 on the aggregation device into a cascade port:

```
[edit]
user@aggregation-device# set interfaces xe-0/0/1 cascade-port
```

4. Associate an FPC slot ID with each satellite device.

There are multiple methods of assigning FPC slot IDs. See [“Configuring the FPC Slot Identifiers” on page 43](#).

Examples:

- To configure the FPC slot ID of the satellite device that is connected to xe-0/0/1 to 101:

```
[edit]
user@aggregation-device# set chassis satellite-management fpc 101 cascade-ports
xe-0/0/1
```

- To map FPC slot ID 101 to the satellite device using the serial number ABCDEFGHIJKL:

```
[edit]
user@aggregation-device# set chassis satellite-management fpc 101 serial-number
ABCDEFGHIJKL
```

- To map FPC slot ID to the satellite device using MAC address 12:34:56:AB:CD:EF:

```
[edit]
user@aggregation-device# set chassis satellite-management fpc 110 system-id
12:34:56:AB:CD:EF
```

5. (Recommended) Configure an alias name for the satellite device:

```
[edit]
user@aggregation-device# set chassis satellite-management fpc slot-id alias alias-name
```

where *slot-id* is the FPC slot ID of the satellite device defined in the previous step, and *alias-name* is the alias.

For example, to configure the satellite device numbered 101 as **qfx5100-48s-1**:

```
[edit]
user@aggregation-device# set chassis satellite-management fpc 101 alias qfx5100-48s-1
```

6. Configure an FPC slot ID into a software upgrade group. See [“Configuring Software Upgrade Groups on the Aggregation Device” on page 45](#).

For example, to add the satellite device using FPC slot ID 101 to an existing software group named **group1**, or create a software upgrade group named **group1** and add the satellite device using FPC slot 101 to the software upgrade group:

```
[edit]
user@aggregation-device# set chassis satellite-management upgrade-group group1 satellite
101
```

If you are creating a new software upgrade group in this step, you also need to associate the group with a satellite software image. You can skip this final step if the software upgrade group has already been created and a satellite software package association exists.

The configuration with the satellite software upgrade group must be committed before a satellite software image is associated with a satellite software upgrade group:

```
[edit]
user@aggregation-device# commit synchronize
```

After committing the configuration, associate a satellite software image named **satellite-1.0R1.1-signed.tgz** to the upgrade group named **group1**:

```
user@aggregation-device> request system software add  
/var/tmp/satellite-1.0R1.1-signed.tgz upgrade-group group1
```

7. Enable automatic satellite conversion:

```
[edit]  
user@aggregation-device# set chassis satellite-management auto-satellite-conversion  
satellite slot-id
```

For example, to automatically convert FPC 101 into a satellite device:

```
[edit]  
user@aggregation-device# set chassis satellite-management auto-satellite-conversion  
satellite 101
```

8. Commit the configuration:

```
[edit]  
user@aggregation-device# commit
```

If you want to commit the configuration to both Routing Engines:

```
[edit]  
user@aggregation-device# commit synchronize
```

The satellite software upgrade on the satellite device begins after this final step is completed, or after you cable the satellite device to a cascade port using automatic satellite conversion if you have not already cabled the satellite device to the aggregation device.

After the satellite software update, the switch operates as a satellite device in the Junos Fusion.

## Manually Converting a Switch into a Satellite Device

---

Use this procedure to manually convert a switch into a satellite device after cabling it into the Junos Fusion Provider Edge.

This procedure should be used to convert a switch that is not currently acting as a satellite device into a satellite device. A switch might not be recognized as a satellite device for several reasons, including that the device was not previously autoconverted into a satellite device or that the switch had previously been reverted from a satellite device to a standalone switch.

Before you begin:

- Ensure that your aggregation device is running Junos OS Release 14.2R3 or later, and that the switches that will become satellite devices are running Junos OS Release 14.1X53-D16 or later.
- Ensure that you have prepared your switches that will become satellite devices for the installation, following the instructions in the [“Preparing the Satellite Device” on page 47](#) section.

To manually convert a switch into a satellite device:

1. Cable a link between the aggregation device and the satellite device.
2. Log in to the aggregation device.
3. Configure the link on the aggregation device into a cascade port, if you have not done so already. See [“Configuring the Cascade Ports on the Aggregation Device” on page 43](#).

For example, to configure interface xe-0/0/1 on the aggregation device into a cascade port:

```
[edit]
user@aggregation-device# set interfaces xe-0/0/1 cascade-port
```

4. Associate an FPC slot ID with the satellite device.

There are multiple methods of assigning FPC slot IDs. See [“Configuring the FPC Slot Identifiers” on page 43](#).

Examples:

- To configure the FPC slot ID of the satellite device that is connected to xe-0/0/1 to 101:

```
[edit]
user@aggregation-device# set chassis satellite-management fpc 101 cascade-ports
xe-0/0/1
```

- To map FPC slot ID 101 to the satellite device using the serial number ABCDEFGHIJKL:

```
[edit]
```



```
user@aggregation-device# set chassis satellite-management fpc 101 serial-number
ABCDEFHIJKL
```

- To map FPC slot ID to the satellite device using MAC address 12:34:56:AB:CD:EF:

```
[edit]
user@aggregation-device# set chassis satellite-management fpc 110 system-id
12:34:56:AB:CD:EF
```

5. Configure the interface on the aggregation device into a software upgrade group. See [“Configuring Software Upgrade Groups on the Aggregation Device” on page 45](#).

For example, to add the satellite device using FPC slot ID 101 to an existing software group named **group1**, or create a software upgrade group named **group1** and add the satellite device using FPC slot 101 to the software upgrade group:

```
[edit]
user@aggregation-device# set chassis satellite-management upgrade-group group1 satellite
101
```

If you are creating a new software upgrade group in this step, you also need to associate the group with a satellite software image. You can skip this final step if the software upgrade group has already been created and a satellite software package association exists.

The configuration with the satellite software upgrade group must be committed before a satellite software image is associated with the satellite software upgrade group:

```
[edit]
user@aggregation-device# commit synchronize
```

After committing the configuration, associate a satellite software image named **satellite-1.0R1.1-signed.tgz** to the upgrade group named **group1**:

```
user@aggregation-device> request system software add
/var/tmp/satellite-1.0R1.1-signed.tgz upgrade-group group1
```

6. Commit the configuration:

```
[edit]
user@aggregation-device# commit
```

If you want to commit the configuration to both Routing Engines:

```
[edit]
user@aggregation-device# commit synchronize
```

7. Manually configure the switch into a satellite device:

```
user@aggregation-device> request chassis satellite interface interface-name device-mode
satellite
```

For example, to manually configure the switch that is connecting the satellite device to interface xe-0/0/1 on the aggregation device into a satellite device:

```
user@aggregation-device> request chassis satellite interface xe-0/0/1 device-mode satellite
```

The satellite software upgrade on the satellite device begins after this final step is completed.

After the satellite software update, the switch operates as a satellite device in the Junos Fusion Provider Edge.

### Configuring a Switch into a Satellite Device Before Interconnecting It into a Junos Fusion Provider Edge

---

Use this procedure to install the satellite software onto a switch before interconnecting it into the Junos Fusion Provider Edge as a satellite device. Installing the satellite software on a switch before interconnecting it into the Junos Fusion Provider Edge allows you to more immediately deploy the switch as a satellite device by avoiding the downtime associated with the satellite software installation procedure in the Junos Fusion Provider Edge.

Before you begin:

- Ensure that your switch that will become a satellite device is running Junos OS Release 14.1X53-D16 or later. See *Installing Software Packages on QFX Series Devices* for information on upgrading Junos OS on your device.
- Ensure that you have copied the satellite software onto the device that will become a satellite device.

You can manually install the satellite software onto a switch by entering the following command:

```
user@satellite-device> request chassis device-mode satellite URL-to-satellite-software
```

For instance, to install the satellite software package **satellite-1.0R1.1-signed.tgz** stored in the **/var/tmp/** folder on the switch:

```
user@satellite-device> request chassis device-mode satellite  
/var/tmp/satellite-1.0R1.1-signed.tgz
```

The device will reboot to complete the satellite software installation.

After the satellite software is installed, follow this procedure to connect the switch into the Junos Fusion Provider Edge:

1. Log in to the aggregation device.
2. Configure the link on the aggregation device into a cascade port, if you have not done so already. See [“Configuring the Cascade Ports on the Aggregation Device” on page 43](#).

For example, to configure interface xe-0/0/1 on the aggregation device into a cascade port:

```
[edit]  
user@aggregation-device# set interfaces xe-0/0/1 cascade-port
```

3. Associate an FPC slot ID with the satellite device.

There are multiple methods of assigning FPC slot IDs. See [“Configuring the FPC Slot Identifiers” on page 43](#).

Examples:

- To configure the FPC slot ID of the satellite device that is connected to xe-0/0/1 to 101:

```
[edit]
user@aggregation-device# set chassis satellite-management fpc 101 cascade-ports
xe-0/0/1
```

- To map FPC slot ID 101 to the satellite device using the serial number ABCDEFGHIJKL:

```
[edit]
user@aggregation-device# set chassis satellite-management fpc 101 serial-number
ABCDEFGHIJKL
```

- To map FPC slot ID to the satellite device using MAC address 12:34:56:AB:CD:EF:

```
[edit]
user@aggregation-device# set chassis satellite-management fpc 110 system-id
12:34:56:AB:CD:EF
```

4. Configure the satellite switch into a satellite software upgrade group that is using the same version of satellite software that was manually installed onto the switch. See [“Configuring Software Upgrade Groups on the Aggregation Device” on page 45](#).

This step is advisable, but not always required. Completing this step ensures that the satellite software on your device is not upgraded to the version of satellite software associated with the satellite software upgrade group upon installation.

5. Commit the configuration to both Routing Engines:

```
[edit]
user@aggregation-device# commit synchronize
```

If you want to commit the configuration to a single Routing Engine:

```
[edit]
user@aggregation-device# commit
```

6. Cable a link between the aggregation device and the satellite device.

#### Related Documentation

- [Verifying Connectivity, Device States, Satellite Software Versions, and Operations in a Junos Fusion on page 89](#)
- [Understanding Junos Fusion Provider Edge Components on page 5](#)
- [Understanding Software in a Junos Fusion Provider Edge on page 18](#)

## Configuring Satellite Device Alarm Handling Using an Environment Monitoring Satellite Policy in a Junos Fusion

---

This topic shows how to configure the alarm levels for link-down events on a satellite device in a Junos Fusion.

To configure system alarm handling in a Junos Fusion using an environment monitoring satellite policy:

1. Log in to the aggregation device.
2. Create and name the environment monitoring satellite policy:

```
[edit]
user@aggregation-device# set policy-options satellite-policies
environment-monitoring-policy policy-name
```

For example, to create an environment monitoring satellite policy named **linkdown-alarm-monitoring-1**:

```
[edit]
user@aggregation-device# set policy-options satellite-policies
environment-monitoring-policy linkdown-alarm-monitoring-1
```

3. Configure the link-down alarm behavior for the Junos Fusion using one or both of the following methods:
  - Set the default link-down alarm to one setting whenever it is experienced in a Junos Fusion:

```
[edit policy-options satellite-policies environment-monitoring-policy
policy-name]
user@aggregation-device# set alarm linkdown [ignore | red | yellow]
```

For example, to set the default link-down alarm to ignore for **linkdown-alarm-monitoring-1**:

```
[edit policy-options satellite-policies environment-monitoring-policy
linkdown-alarm-monitoring-1]
user@aggregation-device# set alarm linkdown ignore
```

- Set the link-down alarm behavior for a specific satellite device hardware model using terms:

```
[edit policy-options satellite-policies environment-monitoring-policy
policy-name]
user@aggregation-device# set term term-name from product-model model-name alarm
linkdown [ignore | red | yellow]
```

where *term-name* is the user-defined name of the term, and *model-name* defines the product model of the satellite device that uses the satellite policy.

You can apply environment monitoring satellite policies individually or globally. You can, therefore, create multiple policies using the instructions in this step and apply them to different satellite devices in your Junos Fusion, when needed.

You can use multiple terms in the same environment monitoring satellite policy.

For example, if you wanted to configure EX4300 switches acting as satellite devices to send yellow alarms when link-down errors occur while QFX5100 switches acting as satellite devices send red alarms for the same condition:

```
[edit policy-options satellite-policies environment-monitoring-policy
linkdown-alarm-monitoring-1]
user@aggregation-device# set term ex4300-yellow from product-model EX4300* alarm
linkdown yellow
user@aggregation-device# set term qfx5100-red from product-model QFX5100* alarm
linkdown red
```

#### 4. Associate the environment monitoring satellite policy with a Junos Fusion configuration.

- To associate an environment monitoring satellite policy for all satellite devices in a Junos Fusion:

```
[edit chassis satellite-management]
user@aggregation-device# set environment-monitoring-policy policy-name
```

For example, to associate an environment monitoring satellite policy named **linkdown-alarm-monitoring-1** for all satellite devices in a Junos Fusion:

```
[edit chassis satellite-management]
user@aggregation-device# set environment-monitoring-policy
linkdown-alarm-monitoring-1
```

- To associate an environment monitoring satellite policy for select FPC IDs in a Junos Fusion:

```
[edit chassis satellite-management fpc slot-id]
user@aggregation-device# set environment-monitoring-policy policy-name
```

For example, to associate an environment monitoring satellite policy named **linkdown-alarm-monitoring-1** for the satellite device associated with FPC ID 101 in a Junos Fusion:

```
[edit chassis satellite-management fpc 101]
user@aggregation-device# set environment-monitoring-policy
linkdown-alarm-monitoring-1
```

You can configure a different environment monitoring policy for a single satellite device using the **fpc slot-id** when an environment monitoring policy for all satellite devices is configured. The environment monitoring policy for the FPC is enabled in cases when both an individual and global environment monitoring policy are configured.

#### 5. Commit the configuration to both Routing Engines:

```
[edit]
user@aggregation-device# commit synchronize
```

If you want to commit the configuration to the active Routing Engine only:

```
[edit]  
user@aggregation-device# commit
```

- Related Documentation**
- [Configuring Junos Fusion Provider Edge on page 41](#)
  - *Configuring or Expanding a Junos Fusion Enterprise*

## CHAPTER 3

# Junos Fusion Provider Edge Configuration Statements

- [aging-timer \(Junos Fusion\) on page 60](#)
- [alarm \(Satellite Policies\) on page 61](#)
- [alias \(Junos Fusion\) on page 62](#)
- [auto-satellite-conversion \(Junos Fusion\) on page 63](#)
- [cascade-port on page 64](#)
- [cascade-ports on page 65](#)
- [description \(Junos Fusion\) on page 66](#)
- [environment-monitoring-policy \(satellite-management\) on page 67](#)
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- [fpc \(Junos Fusion\) on page 69](#)
- [linkdown \(satellite-policies alarm\) on page 70](#)
- [network-services on page 71](#)
- [satellite \(Junos Fusion Automatic Satellite Conversion\) on page 72](#)
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- [satellite-management \(Junos Fusion\) on page 74](#)
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## aging-timer (Junos Fusion)

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>aging-timer <i>aging-timer</i>;</code>   |
| <b>Hierarchy Level</b>          | <code>[edit chassis <a href="#">satellite-management</a>]</code>   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.<br>Statement introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.   |
| <b>Description</b>              | <p>Configure the aging timer on the aggregation device in a Junos Fusion.</p> <p>The aging timer is used on the aggregation device to specify the amount of time, in minutes, to maintain the device state of an unreachable satellite device before deleting the satellite device from the Junos Fusion.</p> <p>If the unreachable satellite device is discovered before the aging timer expires, the satellite device is reactivated in the Junos Fusion without having to restore its device state.</p> |
| <b>Default</b>                  | The default aging time is 10 minutes.  |
| <b>Options</b>                  | The remaining statements are explained separately.<br><b>Range:</b> 2 through 60,000 minutes   |
| <b>Required Privilege Level</b> | admin—To view this statement in the configuration.<br>admin-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring or Expanding a Junos Fusion Enterprise</i></li><li>• <a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li></ul>  |



## alarm (Satellite Policies)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>alarm {   linkdown [ignore   red   yellow] }</pre>  |
| <b>Hierarchy Level</b>          | [edit policy-options <a href="#">satellite-policies</a> <a href="#">environment-monitoring-policy</a> <i>policy-name</i> ]   |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.</p> <p>Statement introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.</p> <p>Statement introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.</p>                        |
| <b>Description</b>              | Configure the link down alarm that is sent within the Junos Fusion whenever a satellite device experiences a link-down error.  |
| <b>Default</b>                  | Link-down alarms are not sent on satellite devices in a Junos Fusion until an environment monitoring policy is configured.   |
| <b>Options</b>                  | The remaining statements are explained separately.   |
| <b>Required Privilege Level</b> | <p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Satellite Device Alarm Handling Using an Environment Monitoring Satellite Policy in a Junos Fusion on page 56</a></li> <li>• <a href="#">Understanding Satellite Policies in a Junos Fusion on page 30</a></li> </ul> |

## alias (Junos Fusion)

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|                          |   |
|--------------------------|---|
| Syntax                   | <code>alias <i>alias</i>;</code>  |
| Hierarchy Level          | <code>[edit chassis <a href="#">satellite-management fpc slot-id</a>]</code>  |
| Release Information      | Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.<br>Statement introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.<br>Statement introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.  |
| Description              | <p>Configure an alias to label a satellite device.</p> <p>Satellite device alias configuration is optional, but recommended. In a Junos Fusion, satellite device aliases assist with administration tasks, such as monitoring satellite devices using <b>show</b> command outputs, as well as with some configuration tasks that provide an option to identify a satellite device by its alias.</p> |
| Default                  | Satellite devices are not assigned an alias, by default.  |
| Options                  | <b>alias</b> —The user-defined text name of the alias.  |
| Required Privilege Level | admin—To view this statement in the configuration.<br>admin-control—To add this statement to the configuration.   |
| Related Documentation    | <ul style="list-style-type: none"><li>• <i>Configuring or Expanding a Junos Fusion Enterprise</i></li><li>• <a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li></ul>   |

## auto-satellite-conversion (Junos Fusion)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>auto-satellite-conversion {   satellite [slot-id   range   all]; }</pre>  |
| <b>Hierarchy Level</b>          | [edit chassis <a href="#">satellite-management</a> ]   |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.</p> <p>Statement introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.</p> <p>Statement introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.</p>  |
| <b>Description</b>              | <p>Enable automatic satellite conversion in a Junos Fusion.</p> <p>Automatic satellite conversion automatically configures a switch into a satellite device when it is cabled into the aggregation device.</p> <p>Additional configuration steps are required to add satellite devices to a Junos Fusion using automatic satellite conversion. See <a href="#">“Configuring Junos Fusion Provider Edge” on page 41</a> or <i>Configuring or Expanding a Junos Fusion Enterprise</i>.</p> |
| <b>Options</b>                  | The remaining statements are explained separately.   |
| <b>Required Privilege Level</b> | <p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Configuring or Expanding a Junos Fusion Enterprise</i></li> <li><a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li> </ul>   |

## **cascade-port**

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>cascade-port;</code>  |
| <b>Hierarchy Level</b>          | <code>[edit interfaces <i>interface-name</i>]</code>  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.<br>Statement introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.<br>Statement introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.  |
| <b>Description</b>              | <p>Configure the specified interface on the aggregation device in a Junos Fusion into a cascade port.</p> <p>Additional configuration is required to configure cascade ports on a Junos Fusion. See <a href="#">“Configuring Junos Fusion Provider Edge” on page 41</a> or <i>Configuring or Expanding a Junos Fusion Enterprise</i>.</p> |
| <b>Default</b>                  | No interfaces are cascade ports, by default.  |
| <b>Options</b>                  | <i>interface-name</i> —Specifies the name of the interface.   |
| <b>Required Privilege Level</b> | admin—To view this statement in the configuration.<br>admin-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring or Expanding a Junos Fusion Enterprise</i></li><li>• <a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li></ul>   |

## cascade-ports

|                          |  |
|--------------------------|--|
| Syntax                   | <code>cascade-ports <i>interface-name</i>;</code>  |
| Hierarchy Level          | [edit chassis <a href="#">satellite-management fpc slot-id</a> ]   |
| Release Information      | Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.<br>Statement introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.<br>Statement introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.   |
| Description              | <p>Associate a cascade port with an FPC slot ID number in a Junos Fusion.</p> <p>The FPC slot ID of the satellite device is determined by the value entered as the FPC <i>slot-id</i>. For instance, if the <b>set chassis satellite-management fpc 105 cascade-ports xe-0/0/1</b> statement is used to configure interface xe-0/0/1 into a cascade port, the satellite device that connects to interface xe-0/0/1 has an FPC slot ID of 105 in the Junos Fusion.</p> <p>A Junos Fusion provides two methods of assigning an FPC identifier: Unique ID-based FPC identification and connectivity-based FPC identification. Unique ID-based FPC identification maps an FPC slot ID to a satellite device's MAC address or serial number, while connectivity-based FPC identification maps an FPC slot ID to a cascade port. This statement is used to assign an FPC ID using connectivity-based FPC identification by mapping an FPC slot ID to a cascade port.</p> <p>In a Junos Fusion, each satellite device must be mapped to an FPC identifier (FPC ID). The FPC ID is used for Junos Fusion configuration, monitoring, and maintenance. Interface names—which are identified using the <i>type-fpc / pic / port</i> format—use the FPC ID as the <i>fpc</i> variable when the satellite device is participating in a Junos Fusion. For instance, built-in port 2—a Gigabit Ethernet interface on a satellite device that is using 101 as its FPC ID—uses ge-101/0/2 as its interface name.</p> <p>For additional information on the role of FPC slot IDs in a Junos Fusion, see <a href="#">“Understanding Junos Fusion Provider Edge Components” on page 5</a> or <i>Understanding Junos Fusion Enterprise Components</i>.</p> |
| Default                  | No FPC slot IDs are associated with satellite devices, by default.   |
| Options                  | <i>interface-name</i> —Specifies the name of the interface.  |
| Required Privilege Level | admin—To view this statement in the configuration.<br>admin-control—To add this statement to the configuration.  |
| Related Documentation    | <ul style="list-style-type: none"> <li><a href="#">Configuring or Expanding a Junos Fusion Enterprise</a></li> <li><a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li> </ul>  |

## description (Junos Fusion)

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|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>description <i>description</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit chassis <a href="#">satellite-management fpc slot-id</a> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.<br>Statement introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.<br>Statement introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center. |
| <b>Description</b>              | Configure a description for the satellite device.<br><br>The description is optional and used for information purposes only.   |
| <b>Default</b>                  | Satellite devices do not have descriptions, by default.  |
| <b>Options</b>                  | <b><i>description</i></b> —A text description of the satellite device.   |
| <b>Required Privilege Level</b> | admin—To view this statement in the configuration.<br>admin-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li><li>• <i>Configuring or Expanding a Junos Fusion Enterprise</i></li></ul>  |

## environment-monitoring-policy (satellite-management)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>environment-monitoring-policy <i>policy-name</i>;</code>  |
| <b>Hierarchy Level</b>          | <code>[edit chassis <a href="#">satellite-management</a>]</code><br><code>[edit chassis <a href="#">satellite-management</a> <a href="#">fpc slot-id</a>]</code>  |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.</p> <p>Statement introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.</p> <p>Statement introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.</p>   |
| <b>Description</b>              | <p>Enable an environment monitoring policy in a Junos Fusion.</p> <p>You configure environment monitoring policies for a Junos Fusion in the <code>[edit policy-options environment-monitoring-policy <i>policy-name</i>]</code> hierarchy.</p> <p>You can configure an environment monitoring policy in a Junos Fusion for a single satellite device using the <b><i>fpc slot-id</i></b> option, or for all satellite devices in the Junos Fusion by not specifying the <b><i>fpc slot-id</i></b> option.</p> <p>You can configure a different environment monitoring policy for a single satellite device using the <b><i>fpc slot-id</i></b> when an environment monitoring policy for all satellite devices is configured. The environment monitoring policy for the FPC is enabled in cases when both an individual and global environment monitoring policy are configured.</p> |
| <b>Default</b>                  | <p>No environment monitoring policies for the Junos Fusion are present.</p> <p>If you enable an environment monitoring policy in a Junos Fusion without specifying the <b><i>fpc slot-id</i></b> option, the environment monitoring policy is applied for all satellite devices in the Junos Fusion.</p>  |
| <b>Options</b>                  | <p><b><i>policy-name</i></b>—Specifies the name of the environment monitoring policy.</p> <p>The <i>policy-name</i> name is defined as part of the environment monitoring policy configuration procedure, which is handled in the <code>[edit policy-options environment-monitoring-policy <i>policy-name</i>]</code> hierarchy.</p>  |
| <b>Required Privilege Level</b> | <p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Satellite Device Alarm Handling Using an Environment Monitoring Satellite Policy in a Junos Fusion on page 56</a></li> <li>• <a href="#">Understanding Satellite Policies in a Junos Fusion on page 30</a></li> </ul>  |

## environment-monitoring-policy (satellite-policies)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>environment-monitoring-policy <i>policy-name</i>{   alarm {     linkdown [ignore   red   yellow]   }   term <i>term-name</i>{     from {       product-model <i>model-name</i>;     }   } }</pre>   |
| <b>Hierarchy Level</b>          | [edit policy-options satellite-policies]   |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.</p> <p>Statement introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.</p> <p>Statement introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.</p>  |
| <b>Description</b>              | <p>Configure an environment monitoring satellite policy for a device or devices in a Junos Fusion.</p> <p>An environment monitoring satellite policy is used to configure alarm behavior on satellite devices in a Junos Fusion.</p> <p>The environment monitoring policy is applied to a Junos Fusion using the <a href="#">environment-monitoring-policy</a> statement in the [edit <i>chassis</i> <a href="#">satellite-management</a>] or [edit <i>chassis</i> <a href="#">satellite-management fpc slot-id</a>] hierarchy levels.</p> |
| <b>Options</b>                  | <p><b><i>policy-name</i></b>—Specifies the user-defined name of the environment monitoring policy.</p> <p>The remaining statements are explained separately.</p>   |
| <b>Required Privilege Level</b> | <p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Satellite Device Alarm Handling Using an Environment Monitoring Satellite Policy in a Junos Fusion on page 56</a></li> <li>• <a href="#">Understanding Satellite Policies in a Junos Fusion on page 30</a></li> </ul>   |



## fpc (Junos Fusion)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>fpc slot-id{   alias alias;   cascade-ports interface-name;   description description;   environment-monitoring-policy policy;   serial-number serial-number;   system-id mac-address;   uplink-failure-detection {     candidate-uplink-policy policy;   }   local switching;   selective-vlan-switching{     routing-instance routing-instance;   } }</pre>  |
| <b>Hierarchy Level</b>          | [edit chassis <a href="#">satellite-management</a> ]  |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.</p> <p>Statement introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.</p> <p>Statement introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.</p> <p><b>local-switching</b> and <b>selective-vlan-switching</b> introduced in Junos OS Release 17.2R1 for Junos Fusion Provider Edge.</p>   |
| <b>Description</b>              | Configure an FPC identifier for a satellite device within a Junos Fusion, or modify the configuration of an existing satellite device in a Junos Fusion.  |
| <b>Options</b>                  | <p><b>slot-id</b>—Specifies the FPC identifier of the device and functions as the FPC identifier in the interface name when configuring satellite device interfaces.</p> <p>In a Junos Fusion Data Center, the <i>slot-id</i> must have a value in the range of 65 to 254.</p> <p>In a Junos Fusion Enterprise or Junos Fusion Provider Edge, the <i>slot-id</i> must have a value of 34 or greater.</p> <p><b>local switching</b>—Enables local-switching for all the ports on the satellite device.</p> <p>The remaining statements are explained separately.</p> |
| <b>Required Privilege Level</b> | <p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li> <li>• <a href="#">Configuring or Expanding a Junos Fusion Enterprise</a></li> </ul>   |

## linkdown (satellite-policies alarm)

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | linkdown [ignore   red   yellow]  |
| <b>Hierarchy Level</b>          | [edit policy-options <a href="#">satellite-policies</a> <a href="#">environment-monitoring-policy</a> <i>policy-name</i> <a href="#">alarm</a> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.<br>Statement introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.<br>Statement introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.  |
| <b>Description</b>              | <p>Configure the alarm behavior when an Ethernet link goes down on a satellite device in a Junos Fusion.</p> <p>The configured alarm behavior can be applied to any satellite device in the Junos Fusion. The alarm behavior is applied to satellite devices using environment monitoring policies.</p> |
| <b>Options</b>                  | <p><b>ignore</b>—Do not signal an alarm when an Ethernet link-down event occurs.</p> <p><b>red</b>—Raise a major alarm when an Ethernet link-down event occurs.</p> <p><b>yellow</b>—Raise a minor alarm when an Ethernet link-down event occurs.</p>   |
| <b>Required Privilege Level</b> | <p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Satellite Device Alarm Handling Using an Environment Monitoring Satellite Policy in a Junos Fusion on page 56</a></li><li>• <a href="#">Understanding Satellite Policies in a Junos Fusion on page 30</a></li></ul>                     |

## network-services

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>network-services (ethernet   enhanced-ethernet   ip   enhanced-ip   lan);</code>   |
| <b>Hierarchy Level</b>          | <code>[edit chassis]</code>  |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 8.5.</p> <p><b>enhanced-ethernet</b> and <b>enhanced-ip</b> options introduced in Junos OS Release 11.4.</p> <p><b>limited-ifl-scaling</b> option introduced in Junos OS Release 15.1R3 for MX Series routers.</p>   |
| <b>Description</b>              | <p>Set the router's network services to a specific mode of operation. On MX240, MX480, and MX960 routers, MPC5E and MPC7E power on only if the network services mode configured is <b>enhanced-ip</b> or <b>enhanced-ethernet</b>.</p> <p>MX2010 and MX2020 support only <b>enhanced-ip</b> and <b>enhanced-ethernet</b> network services modes.</p>   |
| <b>Default</b>                  | <ul style="list-style-type: none"> <li>MX80, MX104, MX2010, MX2020—<b>enhanced-ip</b></li> <li>MX240, MX480, MX960—<b>ip</b></li> </ul>  |
| <b>Options</b>                  | <p><b>ethernet</b>—Set the router's network services to Ethernet and use standard, compiled firewall filter format.</p> <p><b>enhanced-ethernet</b>—Set the router's network services to enhanced Ethernet and use enhanced mode capabilities. Only MPCs and MS-DPCs are powered on in the chassis.</p> <p><b>ip</b>—Set the router's network services to Internet Protocol and use standard, compiled firewall filter format.</p> <p><b>enhanced-ip</b>—Set the router's network services to enhanced Internet Protocol and use enhanced mode capabilities. Only MPCs and MS-DPCs are powered on in the chassis. Non-service DPCs do not work with enhanced network services mode options. This feature is enabled by default on MX80, MX104, MX2010, and MX2020 Universal Routing Platforms.</p> <p><b>lan</b>—Set the router's network services to LAN and use standard, compiled firewall filter format. Reboot the system after setting the router's network services to LAN.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Network Services Mode Overview</i></li> <li><i>Firewall Filters and Enhanced Network Services Mode Overview</i></li> <li><i>Configuring Junos OS to Run a Specific Network Services Mode in MX Series Routers</i></li> </ul>   |

- *Configuring Enhanced IP Network Services for a Virtual Chassis*
- *Limiting the Maximum Number of Logical Interfaces on MX Series Routers With MS-DPCs in Enhanced IP Network Services Mode*

## satellite (Junos Fusion Automatic Satellite Conversion)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>satellite [slot-id   range   all];</code>   |
| <b>Hierarchy Level</b>          | [edit chassis <a href="#">satellite-management auto-satellite-conversion</a> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.<br>Statement introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.<br>Statement introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.  |
| <b>Description</b>              | <p>Specify the interface to enable automatic software conversion in a Junos Fusion.</p> <p>The device that is cabled to the slot specified in this command is automatically converted into a satellite device.</p> <p>Additional configuration steps are required to add satellite devices to a Junos Fusion using automatic satellite conversion. See <i>Configuring or Expanding a Junos Fusion Enterprise</i> or “<a href="#">Configuring Junos Fusion Provider Edge</a>” on page 41.</p>  |
| <b>Options</b>                  | <p><b>slot-id</b>—Specifies the FPC slot identifier of the device that will be automatically converted into a satellite device.</p> <p>The FPC identifier must be mapped to a cascade port interface before this command is operational. See <i>Configuring or Expanding a Junos Fusion Enterprise</i> or “<a href="#">Configuring Junos Fusion Provider Edge</a>” on page 41.</p> <p><b>range</b>—Specifies a range of FPC slot identifiers that will automatically be converted into satellite devices. For instance, to specify that FPC IDs 103, 104, and 105 should be automatically converted into satellite devices, enter a <b>range</b> of <b>103-105</b>.</p> <p><b>all</b>—Specifies that all FPC slot identifiers in the Junos Fusion will automatically be converted into satellite devices.</p> |
| <b>Required Privilege Level</b> | <p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li> <li>• <i>Configuring or Expanding a Junos Fusion Enterprise</i></li> </ul>  |

## satellite (Junos Fusion Satellite Software Upgrade Groups)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>satellite [<i>slot-id</i>   <i>range</i>   <i>all</i>];</code>  |
| <b>Hierarchy Level</b>          | <code>[edit chassis <b>satellite-management</b> <b>upgrade-groups</b> <i>upgrade-group-name</i>]</code>   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.<br>Statement introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.<br>Statement introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.  |
| <b>Description</b>              | Specify the satellite device to add to the satellite software upgrade group.<br><br>This statement is entered on an aggregation device in a Junos Fusion. Software upgrade groups are configured and managed using the aggregation device.  |
| <b>Options</b>                  | <p><b><i>slot-id</i></b>—Specifies the FPC slot identification number of the satellite device that is being added to the satellite software upgrade group.</p> <p><b><i>range</i></b>—Specifies a range of FPC slot identifiers to add to the satellite software upgrade group. For instance, to specify that FPC IDs 103, 104, and 105 should be automatically converted into satellite devices, enter a <i>range</i> of <b>103-105</b>.</p> <p><b><i>all</i></b>—Specifies that all FPC slot identifiers in the Junos Fusion are added to the satellite software upgrade group.</p> <p>The remaining statements are explained separately.</p> |
| <b>Required Privilege Level</b> | <p><b>admin</b>—To view this statement in the configuration.</p> <p><b>admin-control</b>—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li> <li>• <a href="#">Configuring or Expanding a Junos Fusion Enterprise</a></li> </ul>   |

## satellite-management (Junos Fusion)

```
Syntax satellite-management {
    aging-timer aging-timer;
    auto-satellite-conversion {
        satellite [slot-id | range | all];
    }
    cluster cluster-name {
        cascade-ports interface-name;
        cluster-id cluster-id-number;
        fpc slot-id {
            alias alias;
            description description;
            member-id member-id-number;
            system-id mac-address;
        }
    }
    designated-event-forwarding
    environment-monitoring-policy policy;
    firewall
        family family-name {
            filter filter-name {
                term term-name {
                    from {
                        match-conditions;
                    }
                    then {
                        action;
                        action-modifiers;
                    }
                }
            }
        }
    }
    fpc slot-id {
        alias alias;
        cascade-ports interface-name;
        description description;
        environment-monitoring-policy policy;
        serial-number serial-number;
        system-id mac-address;
        uplink-failure-detection {
            candidate-uplink-policy policy;
        }
    }
    psu {
        redundancy {
            n-plus-n;
        }
    }
    redundancy-groups {
        chassis-id number;
        redundancy-group-name {
            redundancy-group-id redundancy-group-id-number;
        }
    }
}
```

```

peer-chassis-id peer-chassis-id-number {
  inter-chassis-link interface-name;
  no-auto-iccp-provisioning;
  no-auto-vlan-provisioning;
  satellite satellite-device-fpc-IDs;
}
}
single-home {
  satellite [slot-id | slot-id-range | all];
}
upgrade-groups upgrade-group-name {
  satellite [slot-id | range | all];
}
uplink-failure-detection {
  candidate-uplink-policy policy;
}
}

```

**Hierarchy Level** [edit chassis]

**Release Information** Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.  
Statement introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.  
Statement introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.

**Description** Configure and manage a Junos Fusion.

If you enter the **delete chassis satellite-management** command to delete a Junos Fusion configuration, we recommend also rebooting the Routing Engines on your device to maximize device performance.



**NOTE:** In a Junos Fusion Data Center with EVPN wherein VXLAN encapsulation is used, firewall filters with next-interface or next-ip actions are not supported.

**Options** The remaining statements are explained separately.

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

**Related Documentation**

- [Configuring or Expanding a Junos Fusion Enterprise](#)
- [Configuring Junos Fusion Provider Edge on page 41](#)

## serial-number (Junos Fusion)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>serial-number <i>serial-number</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit chassis <a href="#">satellite-management</a> <a href="#">fpc</a> <i>slot-id</i> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.<br>Statement introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.<br>Statement introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.  |
| <b>Description</b>              | <p>Bind the specified FPC slot ID to a satellite device based on the serial number.</p> <p>A Junos Fusion provides two methods of assigning an FPC identifier: Unique ID-based FPC identification and connectivity-based FPC identification. Unique ID-based FPC identification maps an FPC slot ID to a satellite device's MAC address or serial number, while connectivity-based FPC identification maps an FPC slot ID to a cascade port. This statement is used to assign an FPC ID using unique ID-based FPC identification by mapping the FPC slot ID to the satellite device's serial number.</p> <p>In a Junos Fusion, each satellite device must be mapped to an FPC identifier (FPC ID). The FPC ID is used for Junos Fusion configuration, monitoring, and maintenance. Interface names—which are identified using the <i>type-fpc / pic / port</i> format—use the FPC ID as the <i>fpc</i> variable when the satellite device is participating in a Junos Fusion. For instance, built-in port 2—a Gigabit Ethernet interface on a satellite device that is using 101 as its FPC ID—uses ge-101/0/2 as its interface name.</p> <p>For additional information on the role of FPC slot IDs in a Junos Fusion, see <i>Understanding Junos Fusion Enterprise Components</i> or “<a href="#">Understanding Junos Fusion Provider Edge Components</a>” on page 5.</p> <p>If the serial number that is configured using this statement does not match the serial number of the satellite device, the device is not converted into a satellite device.</p> |
| <b>Default</b>                  | No FPC slot IDs are associated with satellite devices, by default.  |
| <b>Options</b>                  | <b><i>serial-number</i></b> —Specifies the serial number of the satellite device.   |
| <b>Required Privilege Level</b> | admin—To view this statement in the configuration.<br>admin-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li> <li><a href="#">Configuring or Expanding a Junos Fusion Enterprise</a></li> </ul>   |



## selective-vlan-switching

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>selective-vlan-switching {<br/>    routing-instance <i>routing-instance</i>;<br/>}</pre>                       |
| <b>Hierarchy Level</b>          | [edit forwarding-options satellite fpc],  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 17.2R1 for Junos Fusion Provider Edge..                                    |
| <b>Description</b>              | Enables local switching for only a select number of VLANs on the satellite device.                                  |
| <b>Options</b>                  | <b>routing-instance</b> —Configure routing instance.  |
| <b>Required Privilege Level</b> | admin—To view this statement in the configuration.<br>admin-control—To add this statement to the configuration.     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li></ul> |

## single-home (Junos Fusion)

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>single-home {<br/>  satellite [<i>slot-id</i>   <i>slot-id-range</i>   all];<br/>}</pre>  |
| <b>Hierarchy Level</b>          | [edit chassis <a href="#">satellite-management</a> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.<br>Statement introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.<br>Statement introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center. |
| <b>Description</b>              | Specify that the links connecting the satellite device to the aggregation device are connected to the aggregation device only.   |
| <b>Options</b>                  | The remaining statements are explained separately.   |
| <b>Required Privilege Level</b> | admin—To view this statement in the configuration.<br>admin-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li><li>• <i>Configuring or Expanding a Junos Fusion Enterprise</i></li></ul>  |

## system-id (Junos Fusion)

|                            |   |
|----------------------------|---|
| <b>Syntax</b>              | <code>system-id mac-address;</code>   |
| <b>Hierarchy Level</b>     | <code>[edit chassis <a href="#">satellite-management fpc slot-id</a>]</code>  |
| <b>Release Information</b> | <p>Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.</p> <p>Statement introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.</p> <p>Statement introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.</p>   |
| <b>Description</b>         | <p>Assign the specified FPC identifier to the satellite device based on the satellite device's MAC address.</p> <p>For instance, if you wanted the satellite device using MAC address <b>01:02:03:AA:BB:CC</b> to be assigned FPC identifier 101, enter the <b>set chassis satellite-management fpc 101 system-id 01:02:03:AA:BB:CC</b> statement.</p> <p>A Junos Fusion provides two methods of assigning an FPC identifier: Unique ID-based FPC identification and connectivity-based FPC identification. Unique ID-based FPC identification maps an FPC slot ID to a satellite device's MAC address or serial number, while connectivity-based FPC identification maps an FPC slot ID to a cascade port. This statement is used to assign an FPC ID using unique ID-based FPC identification by mapping the FPC slot ID to the satellite device's MAC address.</p> <p>In a Junos Fusion, each satellite device must be mapped to an FPC identifier (FPC ID). The FPC ID is used for Junos Fusion configuration, monitoring, and maintenance. Interface names—which are identified using the <i>type-fpc / pic / port</i> format—use the FPC ID as the <i>fpc</i> variable when the satellite device is participating in a Junos Fusion. For instance, built-in port 2—a gigabit Ethernet interface on a satellite device that is using 101 as its FPC ID—uses ge-101/0/2 as its interface name.</p> <p>For additional information on the role of FPC slot IDs in a Junos Fusion, see <a href="#">“Understanding Junos Fusion Provider Edge Components” on page 5</a> or <i>Understanding Junos Fusion Enterprise Components</i>.</p> <p>If the serial number that is configured using this statement does not match the serial number of the satellite device, the device is not converted into a satellite device.</p> <p>If the MAC address that is configured using this statement does not match the MAC address of the satellite device, the device is not converted into a satellite device.</p> |
| <b>Default</b>             | No FPC slot IDs are associated with satellite devices, by default.  |
| <b>Options</b>             | <b>mac-address</b> —Specifies the MAC address of the satellite device.  |

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

**Related Documentation**

- [Configuring Junos Fusion Provider Edge on page 41](#)
- *Configuring or Expanding a Junos Fusion Enterprise*

## term (satellite-policies)

|                            |   |
|----------------------------|---|
| <b>Syntax</b>              | <pre>term <i>term-name</i>{   from {     <b>product-model</b> <i>model-name</i>;   } }</pre>  |
| <b>Hierarchy Level</b>     | <pre>[edit policy-options satellite-policies candidate-uplink-policy <i>policy-name</i>], [edit policy-options satellite-policies environment-monitoring-policy <i>policy-name</i>], [edit policy-options satellite-policies forwarding-policy <i>policy-name</i>]</pre>  |
| <b>Release Information</b> | <p>Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.</p> <p>Statement introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.</p> <p>Statement introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.</p>   |
| <b>Description</b>         | <p>Create and configure a term in a candidate uplink satellite policy, an environment monitoring satellite policy, or a forwarding policy satellite policy, within a satellite policy.</p> <p>A term in a candidate uplink policy, an environment monitoring policy, or a forwarding policy for satellite devices is used to apply the policy to certain satellite devices only. The more complex options that are available for other policies in Junos OS—such as the terms available for routing policies—are not available for satellite policies.</p> <p>The actions of a candidate uplink satellite policy, an environment monitoring satellite policy, or forwarding-policy satellite policy are defined at the <b>[edit policy-options satellite-policies candidate-uplink-policy <i>policy-name</i>]</b>, <b>[edit policy-options satellite-policies environment-monitoring-policy <i>policy-name</i>]</b>, and <b>[edit policy-options satellite-policies forwarding-policy <i>policy-name</i>]</b> hierarchy levels.</p> |
| <b>Options</b>             | <p><b>term <i>term-name</i></b>—Specifies the user-defined name of the term.</p> <p>A <i>term</i> is a named structure in which match conditions and actions are defined. A candidate uplink policy or environment monitoring policy can contain multiple terms. The term name can contain letters, numbers, and hyphens (-) and can be up to 255 characters long. To include spaces in the name, enclose the entire name in double quotation marks.</p> <p><b>from</b>—(Optional) Defines the match criteria for the satellite policy.</p> <p>The only match criteria available for a satellite policy is the product model.</p> <p>If you omit the <b>from</b> option, the satellite policy is applied globally.</p> <p><b>product-model <i>model-name</i></b>—Defines the product model of the satellite device that uses the satellite policy.</p>  |

If you want the satellite policy to apply to all EX4300 switches in the satellite device role, enter **EX4300\*** as the *model-name*.

If you want the satellite policy to apply to all QFX5100 switches in the satellite device role, enter **QFX5100\*** as the *model-name*.

|                           |   |
|---------------------------|---|
| <b>Required Privilege</b> | admin—To view this statement in the configuration.        |
| <b>Level</b>              | admin-control—To add this statement to the configuration. |

|                              |   |
|------------------------------|---|
| <b>Related Documentation</b> | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Satellite Device Alarm Handling Using an Environment Monitoring Satellite Policy in a Junos Fusion on page 56</a></li> <li>• <a href="#">Understanding Satellite Policies in a Junos Fusion on page 30</a></li> <li>• <a href="#">Configuring Uplink Port Pinning for Satellite Devices on a Junos Fusion Data Center</a></li> <li>• <a href="#">Understanding Remapping Uplink Traffic Flows on a Junos Fusion Data Center</a></li> </ul> |
|------------------------------|---|

## upgrade-groups (Junos Fusion)

|                            |  |
|----------------------------|--|
| <b>Syntax</b>              | <pre>upgrade-groups <i>upgrade-group-name</i> {   <i>satellite</i> [<i>slot-id</i>   <i>range</i>   all]; }</pre>  |
| <b>Hierarchy Level</b>     | [edit chassis <i>satellite-management</i> ]  |
| <b>Release Information</b> | <p>Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.</p> <p>Statement introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.</p> <p>Statement introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.</p>  |
| <b>Description</b>         | <p>Create and name a satellite software upgrade group for a Junos Fusion, or specify an existing satellite software upgrade group to configure.</p> <p>A satellite software upgrade group is a group of satellite devices that are designated to upgrade to the same satellite software version using the same satellite software package. One Junos Fusion can contain multiple software upgrade groups, and multiple software upgrade groups should be configured in most Junos Fusions to avoid network downtimes during satellite software installations.</p> <p>The two most common methods of installing satellite software in a Junos Fusion—autoconverting a device into a satellite device when it is cabled into an aggregation device and manually converting a device that is cabled into an aggregation device into a satellite device—require a configured satellite software upgrade group.</p> <p>Software upgrade groups are configured and managed from the aggregation device.</p> <p>To associate a satellite software package with a satellite software upgrade group, use the <b>request system software add <i>package-name</i> upgrade-group <i>upgrade-group-name</i></b> command.</p> <p>This statement is entered on an aggregation device in a Junos Fusion. Software upgrade groups are configured and managed from the aggregation device.</p> <p>The software upgrade group configurations must match exactly—including the same <i>package-name</i> and <i>upgrade-group-name</i>—in every Junos Fusion with dual aggregation devices to avoid satellite device downtime.</p> <p>All satellite devices in a satellite device cluster are associated with a single satellite software upgrade group, which is automatically created when a satellite device cluster becomes part of a Junos Fusion. The satellite software upgrade group is named after the satellite device cluster name, and ensures that all satellite devices in the cluster run the same version of satellite software. See <i>Understanding Software in a Junos Fusion Enterprise</i> for additional information on software management for a satellite device cluster.</p> |
| <b>Default</b>             | No satellite software upgrade groups are present, by default.  |

A satellite software upgrade group with the name of the satellite device cluster is created automatically when a satellite device cluster is created.

**Options**    ***upgrade-group-name***—Specifies the user-defined name for the satellite software upgrade group.

The remaining statements are explained separately.

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

**Related Documentation**    • *Configuring or Expanding a Junos Fusion Enterprise*  
   • [Configuring Junos Fusion Provider Edge on page 41](#)



## CHAPTER 4

# Junos Fusion Provider Edge Administration

- [Managing Satellite Software Upgrade Groups in a Junos Fusion on page 85](#)
- [Verifying Connectivity, Device States, Satellite Software Versions, and Operations in a Junos Fusion on page 89](#)
- [Converting a Satellite Device in a Junos Fusion to a Standalone Device on page 100](#)
- [Installing Junos OS Software on a Standalone Device Running Satellite Software on page 105](#)

### Managing Satellite Software Upgrade Groups in a Junos Fusion

---

This topic discusses maintaining satellite software upgrade groups in a Junos Fusion. For more information on the process for creating a satellite software upgrade group, see [“Configuring Junos Fusion Provider Edge” on page 41](#) or *Configuring or Expanding a Junos Fusion Enterprise*.

A satellite software upgrade group is a group of satellite devices that are designated to upgrade to the same satellite software version using the same satellite software package. One Junos Fusion can contain multiple software upgrade groups, and multiple software upgrade groups should be configured in most Junos Fusions to avoid network downtimes during satellite software installations.

When a satellite device is added to a Junos Fusion, the aggregation device checks if the satellite device is using an FPC ID that is included in a satellite software upgrade group. If the satellite device is using an FPC ID that is part of a satellite software upgrade group, the device upgrades its satellite software to the version of software associated with the satellite software upgrade group - unless it is already running the defined version.

When the satellite software package associated with an existing satellite software group is changed, the satellite software for all member satellite devices is upgraded using a throttled upgrade. The throttled upgrade ensures that the aggregation device is not overwhelmed with providing satellite software simultaneously to many satellite devices.

The two most common methods of installing satellite software—autoconverting a device into a satellite device when it is cabled into an aggregation device and manually converting a device that is cabled into an aggregation device into a satellite device—require a configured satellite software upgrade group.

Software upgrade groups are configured and managed from the aggregation device. All satellite devices in a satellite device cluster are part of the same software upgrade group, and a software upgrade group with the name of the satellite device cluster is automatically created when the satellite device cluster is created.

- [Creating a Satellite Software Upgrade Group on page 86](#)
- [Adding Satellite Devices to a Satellite Software Upgrade Group on page 86](#)
- [Removing a Satellite Device from a Satellite Software Upgrade Group on page 87](#)
- [Modifying the Satellite Software Used by a Satellite Software Upgrade Group on page 87](#)
- [Deleting Associated Satellite Software from a Satellite Software Upgrade Group on page 88](#)
- [Deleting Satellite Software on the Aggregation Device on page 89](#)

## Creating a Satellite Software Upgrade Group

If your satellite device is a member of a satellite device cluster, a satellite software upgrade group with the name of the satellite device cluster is automatically created when the satellite device cluster is created. This satellite software upgrade group must be used to manage the satellite software for all member satellite devices in the satellite device cluster.

For information on creating a satellite software upgrade group for a satellite device that is not part of a satellite device cluster, see [“Configuring Junos Fusion Provider Edge” on page 41](#) or [Configuring or Expanding a Junos Fusion Enterprise](#).

## Adding Satellite Devices to a Satellite Software Upgrade Group

To add a satellite device to an existing satellite software upgrade group, enter the **set chassis satellite-management upgrade-groups *upgrade-group-name* satellite *slot-id-or-range*** command:

```
[edit]
user@aggregation-device# set chassis satellite-management upgrade-groups
upgrade-group-name satellite slot-id-or-range
```

where *upgrade-group-name* is the name of the existing satellite software upgrade group, and the *slot-id-or-range* is the FPC slot ID or range of FPC slot IDs of the satellite devices that are being added to the upgrade group.

For example, to add FPC slot IDs 121, 122, and 123 to a satellite software upgrade group named **group1**:

```
[edit]
user@aggregation-device# set chassis satellite-management upgrade-groups group1 satellite
121-123
```

Additionally, you can use the **all** statement as your *slot-id-or-range* to include all satellite devices in the Junos Fusion in the satellite software upgrade group.

For example, to add all satellite devices in the Junos Fusion to a satellite software upgrade group named **group1**:

```
[edit]
user@aggregation-device# set chassis satellite-management upgrade-groups group1 satellite
all
```

## Removing a Satellite Device from a Satellite Software Upgrade Group

To remove a satellite device from an existing satellite software upgrade group, enter the **delete chassis satellite-management upgrade-groups *upgrade-group-name* satellite *slot-id-or-range*** statement to delete the statements that initially added the member satellite devices to the satellite software upgrade group.

```
[edit]
user@aggregation-device# delete chassis satellite-management upgrade-groups
upgrade-group-name satellite slot-id-or-range
```

where *upgrade-group-name* is the name of the existing satellite software upgrade group, and the *slot-id-or-range* is the FPC slot ID or range of FPC slot IDs of the satellite devices that are being added to the upgrade group.

In cases where you want to remove some FPC slot IDs that were configured within a range of FPC slot IDs, you might consider re-creating the satellite software group by first deleting it, then re-creating it. To delete the satellite software upgrade group:

```
[edit]
user@aggregation-device# delete chassis satellite-management upgrade-groups
upgrade-group-name
```

You can then re-create the satellite software upgrade group and add satellite devices using the **set chassis satellite-management upgrade-groups *upgrade-group-name* satellite *slot-id-or-range*** statement:

```
[edit]
user@aggregation-device# set chassis satellite-management upgrade-groups
upgrade-group-name satellite slot-id-or-range
```

For more information on the satellite software upgrade group creation process, see [“Configuring Junos Fusion Provider Edge” on page 41](#) or *Configuring or Expanding a Junos Fusion Enterprise*.

## Modifying the Satellite Software Used by a Satellite Software Upgrade Group

To associate a new satellite software image with the software upgrade group:

Before you begin:

- Ensure that a satellite software package is downloaded to the location where you will use it to install the satellite software.

```
user@aggregation-device> request system software add package-name upgrade-group
upgrade-group-name
```



**NOTE:** A satellite software *upgrade-group-name* can be a user-configured upgrade group or the name of a satellite device cluster.

To associate a satellite software image named **satellite-2.0R1.2-signed.tgz** that is currently stored in the **/var/tmp/** directory from the aggregation device to the upgrade group named **group1**:

```
user@aggregation-device> request system software add /var/tmp/satellite-2.0R1.2-signed.tgz
upgrade-group group1
```

To associate a satellite software package that was previously installed on the aggregation device with a software upgrade group:

```
user@aggregation-device> request system software add version version upgrade-group group1
```

For instance:

```
user@aggregation-device> request system software add version 2.0R1.2 upgrade-group group1
```

The satellite software upgrade group is associated with the software package after either of these commands are entered.



**NOTE:** A satellite software upgrade group can be a user-configured upgrade group or the name of a satellite device cluster.

If the group was already associated with a satellite software upgrade group, the previous satellite software package associated with the software group remains the second option for updating satellite software for the satellite software upgrade group. You can disassociate any satellite software package from a satellite software upgrade group using the instructions in the next section.

## Deleting Associated Satellite Software from a Satellite Software Upgrade Group

This section describes how to delete a satellite software package association from a satellite software upgrade group.

This procedure is always optional. You can always update the satellite software associated with a satellite software upgrade group using the procedure in the previous section, without deleting the satellite software from the satellite software upgrade group.

When a new satellite software package is associated with a satellite software upgrade, the previous satellite software package remains associated with the upgrade group as a backup option. The satellite software upgrade group can be associated with up to two satellite software packages, so no other satellite software packages can be associated with the satellite software upgrade group.

This process disassociates the specified satellite software package from the list of potential packages used by a satellite software upgrade group. It is useful for maintenance

purposes only, like if you wanted to ensure a satellite software upgrade group was never associated with a specific satellite software package.

To disassociate a satellite software image from a satellite software upgrade group:

```
user@aggregation-device> request system software delete upgrade-group upgrade-group-name
```

where the *upgrade-group-name* is the name of the upgrade group that was assigned by the user.

For example, to delete the current satellite software image association to the upgrade group named **group1**:

```
user@aggregation-device> request system software delete upgrade-group group1
```

## Deleting Satellite Software on the Aggregation Device

This section describes how to remove a satellite software package from a Junos Fusion system. This will remove the software from the aggregation device as well as any association with any satellite software upgrade groups. This should be done when another satellite software version is available and will free up the space occupied by the software being removed.



**NOTE:** We recommend deleting satellite software that is not in use to free up space on a QFX10000 acting as an aggregation device.

```
user@aggregation-device> request system software delete version version
```

For example:

```
user@aggregation-device> request system software delete version 2.0R1.2
```

### Related Documentation

- [Configuring Junos Fusion Provider Edge on page 41](#)
- [Configuring or Expanding a Junos Fusion Enterprise](#)

## Verifying Connectivity, Device States, Satellite Software Versions, and Operations in a Junos Fusion

This topic provides information on common procedures to verify connectivity, device states, satellite software versions, and other operations in a Junos Fusion. It covers:

- [Verifying a Junos Fusion Configuration on page 90](#)
- [Verifying Basic Junos Fusion Connectivity on page 90](#)
- [Verifying the Satellite Device Hardware Model on page 92](#)
- [Verifying Cascade Port and Uplink Port State on page 92](#)
- [Verifying That a Cascade Port Recognizes a Satellite Device on page 95](#)
- [Verifying Extended Port Operation on page 97](#)

- [Verifying the Satellite Software Version on page 98](#)
- [Verifying the Devices and Software Used in a Satellite Software Upgrade Group on page 99](#)

## Verifying a Junos Fusion Configuration

**Purpose** Verify that a device is recognized as a satellite device by the aggregation device.

**Action** Enter the **show chassis satellite** command and review the output.



**NOTE:** On a Junos Fusion Data Center with a QFX10000 switch in the aggregation device role, the number of the FPC in the interface name of the cascade ports is always 0.

```
user@aggregation-device> show chassis satellite
```

| Alias          | Slot | Device State | Cascade Ports        | Port State       | Extended Ports Total/Up |
|----------------|------|--------------|----------------------|------------------|-------------------------|
| qfx5100-24q-01 | 100  | Online       | xe-0/0/1<br>xe-1/3/0 | online<br>online | 9/2                     |
| qfx5100-24q-02 | 101  | Online       | xe-0/0/2<br>xe-1/3/1 | online<br>online | 20/10                   |
| qfx5100-24q-03 | 102  | Online       | xe-0/0/3<br>xe-1/3/2 | online<br>online | 16/4                    |
| qfx5100-24q-04 | 103  | Online       | xe-0/0/4<br>xe-1/3/3 | absent<br>online | 13/3                    |
| ex4300-01      | 109  | Online       | xe-1/0/1             | online           | 49/2                    |
| ex4300-02      | 110  | Online       | xe-1/0/2             | online           | 49/2                    |

**Meaning** Use the output of **show chassis satellite** to confirm the following connections in a Junos Fusion:

- Whether a satellite device is recognized at all by the aggregation device. If the satellite device does not appear in the **show chassis satellite** output, then it is not recognized by the aggregation device as a satellite device.
- The state of a particular satellite device, via the **Device State** output.
- The state of the cascade port connection, via the **Cascade State** output.

## Verifying Basic Junos Fusion Connectivity

**Purpose** Verify that all satellite devices are recognized by the aggregation device, and that all cascade and extended ports are recognized.

**Action** Enter the **show chassis satellite** command on the aggregation device.



**NOTE:** On a Junos Fusion Data Center with a QFX10000 switch in the aggregation device role, the number of the FPC in the interface name of the cascade ports is always 0.

```
user@aggregation-device> show chassis satellite
```

| Alias          | Slot | Device State | Cascade Ports        | Port State       | Extended Ports Total/Up |
|----------------|------|--------------|----------------------|------------------|-------------------------|
| qfx5100-24q-01 | 100  | Online       | xe-0/0/1<br>xe-1/3/0 | online<br>online | 9/2                     |
| qfx5100-24q-02 | 101  | Online       | xe-0/0/2<br>xe-1/3/1 | online<br>online | 20/12                   |
| qfx5100-24q-03 | 102  | Online       | xe-0/0/3<br>xe-1/3/2 | online<br>online | 16/6                    |
| qfx5100-24q-04 | 103  | Online       | xe-0/0/4<br>xe-1/3/3 | online<br>online | 16/4                    |
| qfx5100-24q-05 | 104  | Online       | xe-0/0/5<br>xe-1/3/4 | online<br>online | 13/3                    |
| qfx5100-24q-06 | 105  | Online       | xe-0/0/6<br>xe-1/3/5 | online<br>online | 24/15                   |
| qfx5100-24q-07 | 106  | Online       | xe-0/0/7<br>xe-1/3/6 | online<br>online | 24/15                   |
| qfx5100-24q-08 | 107  | Online       | xe-0/0/8<br>xe-1/3/7 | online<br>online | 21/12                   |
| ex4300-01      | 109  | Online       | xe-1/0/1             | online           | 49/2                    |
| ex4300-02      | 110  | Online       | xe-1/0/2             | online           | 49/2                    |
| ex4300-03      | 111  | Online       | xe-1/0/3             | online           | 49/2                    |
| ex4300-04      | 112  | Online       | xe-1/0/4             | online           | 49/11                   |
| ex4300-05      | 113  | Online       | xe-1/0/5             | online           | 49/11                   |
| ex4300-06      | 114  | Online       | xe-1/0/6             | online           | 49/11                   |
| ex4300-07      | 115  | Online       | xe-1/0/7             | online           | 49/11                   |
| ex4300-08      | 116  | Online       | xe-1/1/0             | online           | 49/11                   |
| ex4300-09      | 117  | Online       | xe-1/1/1             | online           | 49/11                   |
| ex4300-10      | 118  | Online       | xe-1/1/2             | online           | 49/11                   |
| ex4300-11      | 119  | Online       | xe-1/1/3             | online           | 49/11                   |
| ex4300-12      | 120  | Online       | xe-1/1/4             | online           | 49/11                   |
| ex4300-13      | 121  | Online       | xe-1/1/5             | online           | 49/11                   |
| ex4300-14      | 122  | Online       | xe-1/1/6             | online           | 49/11                   |
| ex4300-15      | 123  | Online       | xe-1/1/7             | online           | 49/11                   |
| ex4300-16      | 124  | Online       | xe-1/2/1             | online           | 49/11                   |
| ex4300-17      | 125  | Online       | xe-1/2/2             | online           | 49/11                   |
| ex4300-18      | 126  | Online       | xe-1/2/3             | online           | 49/2                    |
| ex4300-19      | 127  | Online       | xe-1/2/4             | online           | 49/1                    |
| ex4300-20      | 128  | Online       | xe-1/2/5             | online           | 49/1                    |
| ex4300-21      | 129  | Online       | xe-1/2/6             | online           | 49/1                    |
| ex4300-22      | 130  | Online       | xe-1/2/7             | online           | 49/1                    |

**Meaning** The output confirms:

- Each listed satellite device—the satellite devices are listed by alias-name in the **Alias** column or by FPC slot ID in the **Slot** column—is recognized by the aggregation device, because the **Device State** output is **Online** for every listed satellite device.

- Each cascade port is operational, because **Port State** is **online** for every cascade port. The cascade port is the port on the aggregation device that connects to the satellite device.
- The number of available and active extended ports for each satellite device, using the **Extended Ports total** and **Extended Ports up** outputs. The number of extended ports varies by satellite devices, and in this output the total number of extended ports includes both network-facing extended ports as well as uplink ports.

## Verifying the Satellite Device Hardware Model

**Purpose** Verify the hardware model of each satellite device in the Junos Fusion.

**Action** Enter the **show chassis satellite terse** command on the aggregation device.

```
user@aggregation-device> show chassis satellite terse
```

| Slot | Device |                | Extended Ports |         |
|------|--------|----------------|----------------|---------|
|      | State  | Model          | Total/Up       | Version |
| 101  | Online | QFX5100-48S-6Q | 7/6            | 3.0R1.0 |
| 102  | Online | QFX5100-48S-6Q | 7/6            | 3.0R1.0 |
| 103  | Online | QFX5100-48S-6Q | 6/4            | 3.0R1.0 |
| 104  | Online | QFX5100-48S-6Q | 14/14          | 3.0R1.0 |
| 105  | Online | QFX5100-48S-6Q | 18/18          | 3.0R1.0 |
| 106  | Online | QFX5100-48S-6Q | 17/16          | 3.0R1.0 |
| 107  | Online | EX4300-48T     | 52/6           | 3.0R1.0 |
| 108  | Online | EX4300-48T     | 52/13          | 3.0R1.0 |
| 109  | Online | EX4300-48T     | 51/13          | 3.0R1.0 |
| 110  | Online | EX4300-48T     | 51/14          | 3.0R1.0 |
| 111  | Online | EX4300-48T     | 51/13          | 3.0R1.0 |
| 112  | Online | EX4300-48T     | 51/12          | 3.0R1.0 |
| 113  | Online | EX4300-48T     | 51/13          | 3.0R1.0 |
| 114  | Online | QFX5100-24Q-2P | 17/13          | 3.0R1.0 |

**Meaning** The output shows the device model of each satellite device in the **Device Model** output, which are listed by FPC slot identification number using the **Slot** output.

This command is also useful for verifying the version satellite software running on each satellite device, as the version is listed in the **Version** output.

## Verifying Cascade Port and Uplink Port State

**Purpose** Verify that the cascade port and uplink port interfaces are up.

**Action** Enter the **show chassis satellite interface** command:

```
user@aggregation-device> show chassis satellite interface
```

| Interface | State | Type |
|-----------|-------|------|
|-----------|-------|------|



|            |    |           |
|------------|----|-----------|
| lo0        | Up | Loopback  |
| sd-101/0/0 | Up | Satellite |
| sd-102/0/0 | Up | Satellite |
| sd-103/0/0 | Up | Satellite |
| sd-104/0/0 | Up | Satellite |
| sd-105/0/0 | Up | Satellite |
| sd-106/0/0 | Up | Satellite |
| sd-107/0/0 | Up | Satellite |
| sd-108/0/0 | Up | Satellite |
| sd-109/0/0 | Up | Satellite |
| sd-110/0/0 | Up | Satellite |
| sd-111/0/0 | Up | Satellite |
| sd-112/0/0 | Up | Satellite |
| sd-113/0/0 | Up | Satellite |
| sd-114/0/0 | Up | Satellite |
| xe-0/0/1   | Up | Cascade   |
| xe-0/0/2   | Up | Cascade   |
| xe-0/0/3   | Up | Cascade   |
| xe-0/0/4   | Up | Cascade   |
| xe-0/0/5   | Up | Cascade   |
| xe-0/0/6   | Up | Cascade   |
| xe-0/0/7   | Up | Cascade   |
| xe-0/0/8   | Up | Cascade   |
| xe-0/0/9   | Up | Cascade   |
| xe-0/2/0   | Up | Cascade   |
| xe-0/2/1   | Up | Cascade   |
| xe-0/2/2   | Up | Cascade   |
| xe-0/2/3   | Up | Cascade   |
| xe-0/2/4   | Up | Cascade   |
| xe-0/2/5   | Up | Cascade   |

|          |    |         |
|----------|----|---------|
| xe-0/2/6 | Up | Cascade |
| xe-0/2/7 | Up | Cascade |
| xe-1/0/1 | Up | Cascade |
| xe-1/0/2 | Up | Cascade |
| xe-1/0/3 | Up | Cascade |
| xe-1/2/1 | Up | Cascade |
| xe-1/2/2 | Up | Cascade |
| xe-1/2/3 | Up | Cascade |
| xe-2/0/0 | Up | Cascade |
| xe-2/0/1 | Up | Cascade |
| xe-2/0/2 | Up | Cascade |
| xe-2/0/3 | Up | Cascade |
| xe-2/0/4 | Up | Cascade |
| xe-2/0/5 | Up | Cascade |
| xe-2/0/6 | Up | Cascade |
| xe-2/0/7 | Up | Cascade |
| xe-2/1/0 | Up | Cascade |
| xe-2/1/1 | Up | Cascade |
| xe-2/1/2 | Up | Cascade |
| xe-2/1/3 | Up | Cascade |
| xe-2/1/4 | Up | Cascade |
| xe-2/1/5 | Up | Cascade |
| xe-2/1/6 | Up | Cascade |
| xe-2/1/7 | Up | Cascade |
| xe-2/2/0 | Up | Cascade |
| xe-2/2/1 | Up | Cascade |
| xe-2/2/2 | Up | Cascade |
| xe-2/2/3 | Up | Cascade |
| xe-2/2/4 | Up | Cascade |
| xe-2/2/5 | Up | Cascade |

|          |    |         |
|----------|----|---------|
| xe-2/2/6 | Up | Cascade |
| xe-2/2/7 | Up | Cascade |
| xe-2/3/0 | Up | Cascade |
| xe-2/3/3 | Dn | Cascade |
| xe-2/3/4 | Up | Cascade |
| xe-2/3/5 | Up | Cascade |
| xe-2/3/6 | Up | Cascade |
| xe-2/3/7 | Up | Cascade |

**Meaning** The output shows:

- Whether the recognized port is up or down, using the **State** column output. The **State** column output is **Up** when the interface is up and **Dn** when the interface is down.

## Verifying That a Cascade Port Recognizes a Satellite Device

**Purpose** Verify that a cascade port on an aggregation device recognizes a satellite device in the Junos Fusion. This procedure also provides a method of verifying the hardware and software information for each satellite device in the Junos Fusion.

**Action** Enter the **show chassis satellite neighbor** command:

```
user@aggregation-device> show chassis satellite neighbor
```

| Interface     | State   | Port Info   | System Name    | Model          | SW Version       |
|---------------|---------|-------------|----------------|----------------|------------------|
| xe-2/3/7      | Init    |             |                |                |                  |
| xe-2/3/6      | Init    |             |                |                |                  |
| xe-2/3/5      | Init    |             |                |                |                  |
| xe-2/3/4      | Init    |             |                |                |                  |
| xe-2/3/3      | Dn      |             |                |                |                  |
| xe-2/3/0      | Two-Way | xe-0/2/2    | ex4300-29      | EX4300-48T     | 0.1I20150224_182 |
| 7_dc-builder  |         |             |                |                |                  |
| xe-2/2/7      | Two-Way | xe-0/2/2    | ex4300-28      | EX4300-48T     | 0.1I20150224_182 |
| 7_dc-builder  |         |             |                |                |                  |
| xe-2/2/6      | Two-Way | xe-0/2/2    | ex4300-27      | EX4300-48T     | 0.1I20150224_182 |
| 7_dc-builder  |         |             |                |                |                  |
| xe-2/2/5      | Two-Way | xe-0/2/2    | ex4300-26      | EX4300-48T     | 0.1I20150224_182 |
| 7_dc-builder  |         |             |                |                |                  |
| xe-2/2/4      | Init    |             |                |                |                  |
| xe-2/2/3      | Init    |             |                |                |                  |
| xe-2/2/2      | Two-Way | xe-0/0/48:3 | qfx5100-48s-06 | QFX5100-48S-6Q | 0.1I20150224_18  |
| 27_dc-builder |         |             |                |                |                  |
| xe-2/2/1      | Two-Way | xe-0/0/48:3 | qfx5100-48s-05 | QFX5100-48S-6Q | 0.1I20150224_18  |
| 27_dc-builder |         |             |                |                |                  |
| xe-2/2/0      | Init    |             |                |                |                  |
| xe-2/1/7      | Init    |             |                |                |                  |
| xe-2/1/6      | Init    |             |                |                |                  |

|               |         |             |                |                |                  |
|---------------|---------|-------------|----------------|----------------|------------------|
| xe-2/1/5      | Two-Way | xe-0/0/4:2  | qfx5100-24q-09 | QFX5100-24Q-2P | 0.1I20150224_18  |
| 27_dc-builder |         |             |                |                |                  |
| xe-2/1/4      | Two-Way | xe-0/2/1    | ex4300-31      | EX4300-48T     | 0.1I20150224_182 |
| 7_dc-builder  |         |             |                |                |                  |
| xe-2/1/3      | Two-Way | xe-0/2/1    | ex4300-30      | EX4300-48T     | 0.1I20150224_182 |
| 7_dc-builder  |         |             |                |                |                  |
| xe-2/1/2      | Two-Way | xe-0/2/1    | ex4300-29      | EX4300-48T     | 0.1I20150224_182 |
| 7_dc-builder  |         |             |                |                |                  |
| xe-2/1/1      | Two-Way | xe-0/2/1    | ex4300-28      | EX4300-48T     | 0.1I20150224_182 |
| 7_dc-builder  |         |             |                |                |                  |
| xe-2/1/0      | Init    |             |                |                |                  |
| xe-2/0/7      | Two-Way | xe-0/2/1    | ex4300-26      | EX4300-48T     | 0.1I20150224_182 |
| 7_dc-builder  |         |             |                |                |                  |
| xe-2/0/6      | Init    |             |                |                |                  |
| xe-2/0/5      | Init    |             |                |                |                  |
| xe-2/0/4      | Init    |             |                |                |                  |
| xe-2/0/3      | Init    |             |                |                |                  |
| xe-2/0/2      | Two-Way | xe-0/0/48:2 | qfx5100-48s-04 | QFX5100-48S-6Q | 0.1I20150224_18  |
| 27_dc-builder |         |             |                |                |                  |
| xe-2/0/1      | Two-Way | xe-0/0/48:2 | qfx5100-48s-03 | QFX5100-48S-6Q | 0.1I20150224_18  |
| 27_dc-builder |         |             |                |                |                  |
| xe-2/0/0      | Init    |             |                |                |                  |
| xe-1/2/3      | Two-Way | xe-0/0/0:0  | qfx5100-24q-09 | QFX5100-24Q-2P | 0.1I20150224_18  |
| 27_dc-builder |         |             |                |                |                  |
| xe-1/2/2      | Two-Way | xe-0/2/0    | ex4300-31      | EX4300-48T     | 0.1I20150224_182 |
| 7_dc-builder  |         |             |                |                |                  |
| xe-1/2/1      | Two-Way | xe-0/2/0    | ex4300-30      | EX4300-48T     | 0.1I20150224_182 |
| 7_dc-builder  |         |             |                |                |                  |
| xe-1/0/3      | Two-Way | xe-0/2/0    | ex4300-29      | EX4300-48T     | 0.1I20150224_182 |
| 7_dc-builder  |         |             |                |                |                  |
| xe-1/0/2      | Two-Way | xe-0/2/0    | ex4300-28      | EX4300-48T     | 0.1I20150224_182 |
| 7_dc-builder  |         |             |                |                |                  |
| xe-1/0/1      | Two-Way | xe-0/2/0    | ex4300-27      | EX4300-48T     | 0.1I20150224_182 |
| 7_dc-builder  |         |             |                |                |                  |
| xe-0/2/7      | Two-Way | xe-0/0/0:1  | qfx5100-24q-09 | QFX5100-24Q-2P | 0.1I20150224_18  |
| 27_dc-builder |         |             |                |                |                  |
| xe-0/2/6      | Init    |             |                |                |                  |
| xe-0/2/5      | Init    |             |                |                |                  |
| xe-0/2/4      | Two-Way | xe-0/0/48:1 | qfx5100-48s-05 | QFX5100-48S-6Q | 0.1I20150224_18  |
| 27_dc-builder |         |             |                |                |                  |
| xe-0/2/3      | Two-Way | xe-0/0/48:1 | qfx5100-48s-04 | QFX5100-48S-6Q | 0.1I20150224_18  |
| 27_dc-builder |         |             |                |                |                  |
| xe-0/2/2      | Two-Way | xe-0/0/48:1 | qfx5100-48s-03 | QFX5100-48S-6Q | 0.1I20150224_18  |
| 27_dc-builder |         |             |                |                |                  |
| xe-0/2/1      | Init    |             |                |                |                  |
| xe-0/2/0      | Init    |             |                |                |                  |
| xe-0/0/9      | Two-Way | xe-0/2/0    | ex4300-26      | EX4300-48T     | 0.1I20150224_182 |
| 7_dc-builder  |         |             |                |                |                  |
| xe-0/0/8      | Two-Way | xe-0/2/0    | ex4300-25      | EX4300-48T     | 0.1I20150224_182 |
| 7_dc-builder  |         |             |                |                |                  |
| xe-0/0/7      | Two-Way | xe-0/0/48:0 | qfx5100-48s-07 | QFX5100-48S-6Q | 0.1I20150224_18  |
| 27_dc-builder |         |             |                |                |                  |
| xe-0/0/6      | Two-Way | xe-0/0/48:0 | qfx5100-48s-06 | QFX5100-48S-6Q | 0.1I20150224_18  |
| 27_dc-builder |         |             |                |                |                  |
| xe-0/0/5      | Two-Way | xe-0/0/48:0 | qfx5100-48s-05 | QFX5100-48S-6Q | 0.1I20150224_18  |
| 27_dc-builder |         |             |                |                |                  |
| xe-0/0/4      | Two-Way | xe-0/0/48:0 | qfx5100-48s-04 | QFX5100-48S-6Q | 0.1I20150224_18  |
| 27_dc-builder |         |             |                |                |                  |
| xe-0/0/3      | Two-Way | xe-0/0/48:0 | qfx5100-48s-03 | QFX5100-48S-6Q | 0.1I20150224_18  |
| 27_dc-builder |         |             |                |                |                  |

```
xe-0/0/2    Two-Way    xe-0/0/48:0 qfx5100-48s-02 QFX5100-48S-6Q 0.1I20150224_18
27_dc-builder
xe-0/0/1    Init
```

**Meaning** The output confirms:

- The cascade ports on the aggregation device that are recognized by the Junos Fusion. All recognized cascade port interfaces are listed in the **Interface** output.
- The uplink ports on the satellite devices that are connected to the cascade ports. The cascade port on each satellite device is identified in the **Port Info** column, and the satellite device itself is identified in the **System Name** output.
- Whether the cascade port to uplink port connection has initialized, using the **State** output. The **State** output is **Two-Way** when the satellite device is properly initialized, and traffic can be passed between the aggregation device and the satellite device over the link.
- The hardware model of each satellite device in the **Model** column, and the satellite software running on each satellite device in the **SW Version** output.

## Verifying Extended Port Operation

**Purpose** Verify that a specific extended port is recognized by the aggregation device, and is operational.

**Action** Enter the **show chassis satellite extended-port** command on the aggregation device:

```
user@aggregation-device> show chassis satellite extended-port
```

Legend for interface types:  
\* -- Uplink interface

| Name        | State       | Rx Request | Rx State | Tx Request | Tx State | Admin/Op | IFD Idx | PCID |
|-------------|-------------|------------|----------|------------|----------|----------|---------|------|
| et-100/0/2  | AddComplete | None       |          | Ready      |          | Up/Dn    | 838     | 110  |
| et-104/0/2  | AddComplete | None       |          | Ready      |          | Up/Dn    | 813     | 110  |
| et-107/0/23 | AddComplete | None       |          | Ready      |          | Up/Up    | 544     | 194  |
| ge-109/0/0  | AddComplete | None       |          | Ready      |          | Up/Up    | 402     | 115  |
| ge-109/0/1  | AddComplete | None       |          | Ready      |          | Up/Dn    | 403     | 114  |
| ge-109/0/10 | AddComplete | None       |          | Ready      |          | Up/Dn    | 412     | 113  |
| ge-109/0/11 | AddComplete | None       |          | Ready      |          | Up/Dn    | 413     | 112  |
| ge-109/0/12 | AddComplete | None       |          | Ready      |          | Up/Dn    | 414     | 123  |
| ge-109/0/13 | AddComplete | None       |          | Ready      |          | Up/Dn    | 415     | 122  |
| ge-109/0/14 | AddComplete | None       |          | Ready      |          | Up/Dn    | 416     | 125  |
| ge-109/0/15 | AddComplete | None       |          | Ready      |          | Up/Dn    | 417     | 124  |
| ge-109/0/16 | AddComplete | None       |          | Ready      |          | Up/Dn    | 418     | 131  |
| ge-109/0/17 | AddComplete | None       |          | Ready      |          | Up/Dn    | 419     | 130  |
| ge-109/0/18 | AddComplete | None       |          | Ready      |          | Up/Dn    | 420     | 133  |
| ge-109/0/19 | AddComplete | None       |          | Ready      |          | Up/Dn    | 421     | 132  |
| ge-109/0/2  | AddComplete | None       |          | Ready      |          | Up/Dn    | 404     | 117  |
| ge-109/0/20 | AddComplete | None       |          | Ready      |          | Up/Dn    | 422     | 127  |
| ge-109/0/21 | AddComplete | None       |          | Ready      |          | Up/Dn    | 423     | 126  |
| ge-109/0/22 | AddComplete | None       |          | Ready      |          | Up/Dn    | 424     | 129  |

|             |             |      |       |       |     |     |
|-------------|-------------|------|-------|-------|-----|-----|
| ge-109/0/23 | AddComplete | None | Ready | Up/Dn | 425 | 128 |
| ge-109/0/24 | AddComplete | None | Ready | Up/Dn | 426 | 103 |
| ge-109/0/25 | AddComplete | None | Ready | Up/Dn | 427 | 102 |
| ge-109/0/26 | AddComplete | None | Ready | Up/Dn | 428 | 105 |
| ge-109/0/27 | AddComplete | None | Ready | Up/Dn | 429 | 104 |
| ge-109/0/28 | AddComplete | None | Ready | Up/Dn | 430 | 107 |
| ge-109/0/29 | AddComplete | None | Ready | Up/Dn | 431 | 106 |
| ge-109/0/3  | AddComplete | None | Ready | Up/Dn | 405 | 116 |
| ge-109/0/30 | AddComplete | None | Ready | Up/Dn | 432 | 109 |
| ge-109/0/31 | AddComplete | None | Ready | Up/Dn | 433 | 108 |
| ge-109/0/32 | AddComplete | None | Ready | Up/Dn | 434 | 135 |
| ge-109/0/33 | AddComplete | None | Ready | Up/Dn | 435 | 134 |
| ge-109/0/34 | AddComplete | None | Ready | Up/Dn | 436 | 137 |
| ge-109/0/35 | AddComplete | None | Ready | Up/Dn | 437 | 136 |
| ge-109/0/36 | AddComplete | None | Ready | Up/Dn | 438 | 144 |
| ge-109/0/37 | AddComplete | None | Ready | Up/Dn | 439 | 143 |
| ge-109/0/38 | AddComplete | None | Ready | Up/Dn | 440 | 146 |
| ge-109/0/39 | AddComplete | None | Ready | Up/Dn | 441 | 145 |
| ge-109/0/4  | AddComplete | None | Ready | Up/Dn | 406 | 119 |
| ge-109/0/40 | AddComplete | None | Ready | Up/Dn | 442 | 140 |
| ge-109/0/41 | AddComplete | None | Ready | Up/Dn | 443 | 139 |
| ge-109/0/42 | AddComplete | None | Ready | Up/Dn | 444 | 142 |
| ge-109/0/43 | AddComplete | None | Ready | Up/Dn | 445 | 141 |
| ge-109/0/44 | AddComplete | None | Ready | Up/Dn | 446 | 148 |
| ge-109/0/45 | AddComplete | None | Ready | Up/Dn | 447 | 147 |
| ge-109/0/46 | AddComplete | None | Ready | Up/Dn | 448 | 150 |
| ge-109/0/47 | AddComplete | None | Ready | Up/Dn | 449 | 149 |
| ge-109/0/5  | AddComplete | None | Ready | Up/Dn | 407 | 118 |
| ge-109/0/6  | AddComplete | None | Ready | Up/Dn | 408 | 121 |
| ge-109/0/7  | AddComplete | None | Ready | Up/Dn | 409 | 120 |
| ge-109/0/8  | AddComplete | None | Ready | Up/Dn | 410 | 111 |
| ge-109/0/9  | AddComplete | None | Ready | Up/Dn | 411 | 110 |
| ge-110/0/0  | AddComplete | None | Ready | Up/Up | 728 | 115 |
| ge-110/0/1  | AddComplete | None | Ready | Up/Dn | 729 | 114 |

**Meaning** The output confirms:

- That an extended port is recognized by the aggregation device. All extended ports are listed in the **Name** column of the output.
- That the listed extended ports have been added to the Junos Fusion, as shown by the **AddComplete** output in the **State** column.
- The administrative and operational state of each extended port. An extended port is operating correctly when the **Admin State** and **Op State** outputs are both in the **Up** state.

## Verifying the Satellite Software Version

**Purpose** Verify the satellite software versions available on the aggregation device in a Junos Fusion.

**Action** Enter the **show chassis satellite software** command on the aggregation device.

```
user@aggregation-device> show chassis satellite software
```

|         |           |  |
|---------|-----------|--|
| Version | Platforms | Group  |
| 3.0R1.1 | i386 ppc  | group1<br>group2<br>group3<br>group4<br>group5 |
| 3.0R1.0 | i386 ppc  |  |

For more detailed output, you can also enter the **show chassis satellite software detail** on the aggregation device.

```

Software package version: 3.0R1.6
Platforms supported by package: i386 ppc arm arm563xx
  Platform      Host Version  Models Supported
  i386          3.0.3      QFX5100-24Q-2P
                        QFX5100-48C-6Q
                        QFX5100-48S-6Q
                        QFX5100-48T-6Q
                        QFX5100-96S-8Q
                        QFX5100-48SH-6Q
                        QFX5100-48TH-6Q
  ppc          1.1.2      EX4300-24P
                        EX4300-24T
                        EX4300-48P
                        EX4300-48T
                        EX4300-48T-BF
                        EX4300-48T-DC
                        EX4300-48T-DC-BF
  arm          1.0.0      EX2300-24P
                        EX2300-24T-DC
                        EX2300-C-12T
                        EX4300-C-12P
  arm563xx     1.0.0      EX3400-24P
                        EX3400-24T
                        EX3400-48T
                        EX3400-48P
Current Groups: group1
                group2
                group3
                group4
                group5

```

**Meaning** The version of satellite software installed is displayed in the **Version** or **Software package version** column, and the satellite software upgrade group associated with each version of satellite software is listed in the **Group** or **Current Groups** output.

## Verifying the Devices and Software Used in a Satellite Software Upgrade Group

**Purpose** Verify the satellite software upgrade groups in the Junos Fusion, and which satellite devices are part of which satellite software upgrade groups.

A satellite software upgrade group can be a user configured group or the name of a satellite device cluster.

**Action** Enter the **show chassis satellite upgrade-group** command on the aggregation device.

### show chassis satellite upgrade-group

```
user@aggregation-device> show chassis satellite upgrade-group
```

| Group                   | Sw-Version | Group State | Slot | Device State    |
|-------------------------|------------|-------------|------|-----------------|
| __ungrouped__<br>group1 | 3.0R1.1    | in-sync     | 107  | version-in-sync |
|                         |            |             | 108  | version-in-sync |
|                         |            |             | 109  | version-in-sync |
|                         |            |             | 110  | version-in-sync |
|                         |            |             | 111  | version-in-sync |
|                         |            |             | 112  | version-in-sync |
| group2                  | 3.0R1.1    | in-sync     | 113  | version-in-sync |
|                         |            |             | 102  | version-in-sync |
|                         |            |             | 103  | version-in-sync |
|                         |            |             | 104  | version-in-sync |
|                         |            |             | 105  | version-in-sync |
|                         |            |             | 106  | version-in-sync |
|                         |            |             | 114  | version-in-sync |

**Meaning** The output shows that two satellite software upgrade groups—**ex4300** and **qfx**—have been created, and that both are using satellite software version 1.0R1.1. The **Group Slot** output shows which satellite devices—listed by FPC slot ID number—are in which software group, and the **Device State** output showing **version-in-sync** confirms that the satellite devices are running the satellite software that is associated with the satellite software upgrade group.

**Related Documentation**

- [Configuring Junos Fusion Provider Edge on page 41](#)
- *Configuring or Expanding a Junos Fusion Enterprise*

## Converting a Satellite Device in a Junos Fusion to a Standalone Device

In the event that you need to convert a satellite device to a standalone device, you will need to download and install a new Junos OS software package on the satellite device. The satellite device stops participating in the Junos Fusion topology once the software installation starts.



The following steps explain how to convert a satellite device that is participating in a Junos Fusion to a standalone device running Junos OS. If you have a standalone switch that is not part of a Junos Fusion but is running satellite software, and you want the switch to run Junos OS software, see [“Installing Junos OS Software on a Standalone Device Running Satellite Software” on page 105](#).



**NOTE:** The QFX5100-48SH and QFX5100-48TH switch models are shipped from the factory with satellite device software. You cannot convert these switches to become standalone devices.

Conversion of EX2300 and EX3400 switches from satellite devices to standalone devices cannot be initiated from the aggregation device. To install Junos OS software on an EX2300 or EX3400 switch acting as a satellite device, see [“Installing Junos OS Software on a Standalone Device Running Satellite Software” on page 105](#).

- [Download Junos OS Software on page 101](#)
- [Disable the Automatic Conversion Configuration on page 102](#)
- [Install Junos OS Software on the Satellite Device on page 104](#)

## Download Junos OS Software

Before you install a new Junos OS software package on a satellite device, make sure you download the correct software package for that device:

- If the satellite device is a QFX5110, QFX5200 or EX4300 switch, you install a standard, signed **jinstall** version of Junos OS.
- If the satellite device is a QFX5100 switch that can be converted to a standalone device, you must install a Preboot eXecution Environment (PXE) version of Junos OS. The PXE version of Junos OS software supports the same feature set as the other Junos OS software packages for a release, but is specially engineered to install Junos OS onto a device running satellite software. The PXE Junos OS package name uses the format **install-media-pxe-qfx-5-version-domestic.tgz**.
- For Junos Fusion systems running Junos OS Release 17.2R1 and later, if the satellite device is a QFX5100 switch that can be converted to a standalone device, you must install a signed PXE version of Junos OS to convert the satellite device running satellite software to a standalone device running Junos OS software. The signed PXE Junos OS package name uses the format **install-media-pxe-qfx-5-version-domestic-signed.tgz**.

To download the version of Junos OS that you want to run on the satellite device after removing it from the Junos Fusion:

1. Using a Web browser, navigate to the Junos OS software download URL on the Juniper Networks webpage:  
<https://www.juniper.net/support/downloads>
2. Log in to the Juniper Networks authentication system using the username (generally your e-mail address) and password supplied by Juniper Networks representatives.
3. Select **By Technology > Junos Platform > Junos Fusion** from the drop-down list and select the switch platform series and model for your satellite device.
4. Select the version of Junos OS that you want to run on the satellite device after removing it from the Junos Fusion.
5. Review and accept the End User License Agreement.
6. Download the software to a local host.
7. Copy the software to the routing platform or to your internal software distribution site.

## Disable the Automatic Conversion Configuration

Before removing a satellite device from an operational Junos Fusion, you must disable the configuration for automatic satellite conversion. If automatic satellite conversion is enabled for the FPC slot ID, the Junos OS installation cannot proceed.

For example, the following installation on an EX4300 satellite device is blocked:

```
[edit]
user@aggregation-device> request chassis satellite install fpc-slot 103
/var/tmp/jinstall-ex-4300-14.1X53-D43.7-domestic-signed.tgz
Convert satellite device to Junos standalone device? [yes,no] (no) yes

Verified jinstall-ex-4300-14.1X53-D43.7-domestic.tgz signed by
PackageProductionEc_2017 method ECDSA256+SHA256
Satellite 103 is configured in the auto-satellite-conversion list
Please remove it from the list before converting to standalone
```

You can check the automatic satellite conversion configuration by entering the **show** statement at the **[edit chassis satellite-management auto-satellite-conversion]** hierarchy level.

1. If automatic satellite conversion is enabled for the satellite device's FPC slot ID, remove the FPC slot ID from the automatic satellite conversion configuration.

```
[edit]
```

```
user@aggregation-device# delete chassis satellite-management auto-satellite-conversion  
satellite slot-id
```

For example, to remove FPC slot ID 103 from the Junos Fusion.

```
[edit]  
user@aggregation-device# delete chassis satellite-management auto-satellite-conversion  
satellite 103
```

2. Commit the configuration.

- To commit the configuration to a single Routing Engine only:

```
[edit]  
user@aggregation-device# commit
```

- To commit the configuration to all Routing Engines in multiple-aggregation device topology:

```
[edit]  
user@aggregation-device# commit synchronize
```

## Install Junos OS Software on the Satellite Device

1. To install the Junos OS software on the satellite device to convert the device to a standalone device, use the following CLI command:

```
[edit]
user@aggregation-device> request chassis satellite install fpc-slot slot-id
URL-to-software-package
```

For example, to install a software package stored in the **var/tmp** folder on the aggregation device onto an EX4300 switch acting as the satellite device using FPC slot 103:

```
[edit]
user@aggregation-device> request chassis satellite install fpc-slot 103
/var/tmp/jinstall-ex-4300-14.1X53-D43.7-domestic-signed.tgz
Convert satellite device to Junos standalone device? [yes,no] (no) yes
```

```
Verified jinstall-ex-4300-14.1X53-D43.7-domestic.tgz signed by
PackageProductionEc_2017 method ECDSA256+SHA256
Initiating Junos standalone conversion on device 103...
Response from device: Conversion started
```



**NOTE:** If you are converting a QFX5100 switch and the Junos Fusion is running a Junos OS release earlier than 17.2R1, you must install the unsigned PXE software package on the QFX5100 switch:

```
[edit]
user@aggregation-device> request chassis satellite install fpc-slot 103
/var/tmp/install-media-pxe-qfx-5-14.1X53-D43.7-domestic.tgz
```

The satellite device stops participating in the Junos Fusion topology once the software installation starts. The software upgrade starts after this command is entered.

2. To check the progress of the conversion, issue the **show chassis satellite fpc-slot** command:

```
[edit]
user@aggregation-device> show chassis satellite fpc-slot 103 extensive
```

| Alias         | Slot | Device State | Cascade Ports | Port State | Extended Ports |
|---------------|------|--------------|---------------|------------|----------------|
| ex4300-24t-16 | 103  | Online       | xe-1/0/3      | online     | 52/29          |
| xe-2/0/3      |      | online       |               |            |                |

| When                | Event                          | Action             |
|---------------------|--------------------------------|--------------------|
| Nov 30 15:48:22.914 | Rx SW-Update JSON-RPC response | Conversion started |
| Nov 30 15:47:54.375 | Start-SW-Update                | Junos conversion   |

3. Wait for the reboot that accompanies the software installation to complete.
4. When you are prompted to log back into your device, uncable the device from the Junos Fusion topology. See *Removing a Transceiver*. Your device has been removed from Junos Fusion.



**NOTE:** The device uses a factory-default configuration after the Junos OS installation is complete.

Release History Table

| Release | Description  |
|---------|--|
| 17.2R1  | For Junos Fusion systems running Junos OS Release 17.2R1 and later, if the satellite device is a QFX5100 switch that can be converted to a standalone device, you must install a signed PXE version of Junos OS to convert the satellite device running satellite software to a standalone device running Junos OS software. |

#### Related Documentation

- [Understanding Software in a Junos Fusion Provider Edge on page 18](#)
- [Understanding Software in a Junos Fusion Enterprise](#)
- [Understanding Software in a Junos Fusion Data Center](#)

## Installing Junos OS Software on a Standalone Device Running Satellite Software

This process should be used when you have a standalone switch running satellite software and you want the switch to run Junos OS software. A standalone device is running satellite software for one of the following reasons:

- It was removed from a Junos Fusion without following the instructions in [“Converting a Satellite Device in a Junos Fusion to a Standalone Device” on page 100](#), which include a Junos OS installation.
- Satellite software was installed on the device but the device was never provisioned into a Junos Fusion.



**NOTE:** If you are removing a satellite device from a Junos Fusion, you must first make sure that automatic satellite conversion is disabled for the satellite device's FPC slot ID. See [“Converting a Satellite Device in a Junos Fusion to a Standalone Device” on page 100](#).

To install Junos OS onto a QFX5100, QFX5100 or QFX5200 switch running satellite software:

- Select a Junos OS image that meets the satellite software to Junos OS conversion requirements. See [Junos Fusion Hardware and Software Compatibility Matrices](#) for satellite software to Junos OS conversion requirements.
- Copy the Junos OS image onto a USB flash drive and use the USB flash drive to install the Junos OS. See [Performing a Recovery Installation Using an Emergency Boot Device](#).

To install Junos OS onto an EX4300 switch running satellite software:

1. Log in to the console port of your switch.
2. Power off the switch, and power it back on.
3. While the switch is powering back on, enter the UBoot prompt (`=>`) by pressing Ctrl+C on your keyboard.
4. From the Uboot prompt, set the operating system environment mode on the switch to Junos. Save the configuration and reset the kernel:

```
=> setenv osmode junos
=> setenv snos_previous_boot 0
=> save
=> reset
```

After the reset operation completes, the loader prompt (**loader>**) appears.

5. Install Junos OS using a USB flash drive from the loader prompt. See *Booting an EX Series Switch Using a Software Package Stored on a USB Flash Drive*.

To install Junos OS onto an EX2300 or EX3400 switch running satellite software:

- Log in to the satellite software (SNOS) on the switch to be converted back to Junos OS and use the following sequence of commands to install the Junos package:

```
#####
dd bs=512 count=1 if=/dev/zero of=/dev/sda
echo -e "o\nn\np\n1\n\nnw" | fdisk /dev/sda
mkfs.vfat /dev/sda1
fw_setenv target_os
reboot
#####
>>Get to the loader prompt
#####
loader> install --format tftp://<tftp server>/<Junos package name>
```

#### Related Documentation

- *Understanding Junos Fusion Enterprise Software and Hardware Requirements*
- [Junos Fusion Hardware and Software Compatibility Matrices](#)
- [Converting a Satellite Device in a Junos Fusion to a Standalone Device on page 100](#)





## CHAPTER 5

# Junos Fusion Provider Edge Operational Commands

- request chassis device-mode satellite
- request chassis satellite disable
- request chassis satellite enable
- request chassis satellite file-copy
- request chassis satellite install
- request chassis satellite interface
- request chassis satellite login
- request chassis satellite reboot
- request chassis satellite restart
- request chassis satellite shell-command
- request system software add
- request system software delete
- request system software rollback
- request system storage cleanup
- show chassis alarms
- show chassis environment
- show chassis environment fpc
- show chassis environment pem
- show chassis environment routing-engine
- show chassis firmware
- show chassis fan
- show chassis hardware
- show chassis led satellite
- show chassis routing-engine
- show chassis satellite
- show chassis satellite extended-port

- [show chassis satellite interface](#)
- [show chassis satellite neighbor](#)
- [show chassis satellite software](#)
- [show chassis satellite statistics](#)
- [show chassis satellite unprovision](#)
- [show chassis satellite upgrade-group](#)
- [show chassis temperature-thresholds](#)
- [show interfaces extensive satellite-device](#)
- [show interfaces satellite-device](#)
- [show interfaces statistics](#)
- [show interfaces terse satellite-device](#)
- [show system core-dumps](#)
- [show system storage satellite](#)

## request chassis device-mode satellite

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>request chassis device-mode satellite <i>package-name</i></code>  |
| <b>Release Information</b>      | Command introduced in Junos OS Release 14.1X53-D16.   |
| <b>Description</b>              | <p>Manually install satellite software onto a switch before interconnecting the switch as a satellite device into a Junos Fusion.</p> <p>There are other methods of installing satellite software onto a satellite device, and each Junos Fusion has individual requirements for manually installing satellite software. See <a href="#">“Configuring Junos Fusion Provider Edge” on page 41</a> or <i>Configuring or Expanding a Junos Fusion Enterprise</i> before manually installing satellite software.</p> <p>This command is entered from a standalone device before it is configured into a satellite device in a Junos Fusion.</p> |
| <b>Options</b>                  | <i>package-name</i> —The URL to the satellite software package.   |
| <b>Required Privilege Level</b> | system-control  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li> <li>• <i>Configuring or Expanding a Junos Fusion Enterprise</i></li> </ul>  |
| <b>List of Sample Output</b>    | <a href="#">request chassis device-mode satellite /var/tmp/satellite-3.0R1.1-signed.tgz on page 111</a>   |

### Sample Output

`request chassis device-mode satellite /var/tmp/satellite-3.0R1.1-signed.tgz`

```
user@satellite-device> request chassis device-mode satellite
/var/tmp/satellite-3.0R1.1-signed.tgz
```

## request chassis satellite disable

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>request chassis satellite disable<br/>&lt;device-alias <i>alias-name</i>&gt;<br/>&lt;fpc-slot <i>fpc-slot</i>&gt;</code>  |
| <b>Release Information</b>      | Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.<br>Command introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.<br>Command introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.  |
| <b>Description</b>              | <p>Disable the specified satellite device from the Junos Fusion.</p> <p>When a satellite device is disabled from a Junos Fusion, all extended ports are immediately placed in the down state. The satellite device cannot send or receive traffic for the Junos Fusion until it is reenabled.</p> <p>This command is useful whenever you need to disable a satellite device from a Junos Fusion, such as for troubleshooting scenarios. If you are removing a satellite device from a Junos Fusion to use the device elsewhere on the network, use the <a href="#">request chassis satellite install</a> command to install Junos OS onto your satellite device before removing it from the Junos Fusion. See <i>Removing a Satellite Device from a Junos Fusion</i>.</p> <p>You can reenable a satellite device that was disabled using this command using the <a href="#">request chassis satellite enable</a> command.</p> |
| <b>Options</b>                  | <p><b>device-alias <i>alias-name</i></b>—Disable the satellite device with the specified alias name from the Junos Fusion.</p> <p><b>fpc <i>fpc-slot</i></b>—Disable the satellite device with the specified FPC slot identifier from the Junos Fusion.</p>   |
| <b>Required Privilege Level</b> | system-control  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li><li>• <a href="#">Configuring or Expanding a Junos Fusion Enterprise</a></li></ul>  |
| <b>List of Sample Output</b>    | <a href="#">request chassis satellite disable device-alias satellite-01 on page 112</a><br><a href="#">request chassis satellite disable fpc-slot 101 on page 113</a>   |

## Sample Output

[request chassis satellite disable device-alias satellite-01](#)

```
user@aggregation-device> request chassis satellite disable device-alias satellite-01
```

## Sample Output

request chassis satellite disable fpc-slot 101

```
user@aggregation-device> request chassis satellite disable fpc-slot 101
```

## request chassis satellite enable

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>request chassis satellite enable</code><br><code>&lt;device-alias <i>alias-name</i>&gt;</code><br><code>&lt;fpc-slot <i>fpc-slot</i>&gt;</code>  |
| <b>Release Information</b>      | Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.<br>Command introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.<br>Command introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.   |
| <b>Description</b>              | <p>Enable the specified device as a satellite device in a Junos Fusion.</p> <p>This command is typically not used in any standard Junos Fusion initial configuration procedure. This command is typically needed in cases where the satellite device or cascade port has been disabled and needs to be re-enabled.</p> |
| <b>Options</b>                  | <p><b>device-alias <i>alias-name</i></b>—Enable the satellite device with the specified alias name in the Junos Fusion.</p> <p><b>fpc <i>fpc-slot</i></b>—Enable the device with the specified FPC slot ID as a satellite device in the Junos Fusion.</p>  |
| <b>Required Privilege Level</b> | system-control   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring or Expanding a Junos Fusion Enterprise</a></li><li>• <a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li></ul>   |
| <b>List of Sample Output</b>    | <a href="#">request chassis satellite enable device-alias satellite-01 on page 114</a><br><a href="#">request chassis satellite enable fpc-slot 101 on page 114</a>  |

### Sample Output

#### request chassis satellite enable device-alias satellite-01

```
user@aggregation-device> request chassis satellite enable device-alias satellite-01
```

### Sample Output

#### request chassis satellite enable fpc-slot 101

```
user@aggregation-device> request chassis satellite enable fpc-slot 101
```

## request chassis satellite file-copy

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>request chassis satellite file-copy [remote   local] &lt;source-URL&gt; &lt;destination-URL&gt;</code>  |
| <b>Release Information</b>      | <p>Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.</p> <p>Command introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.</p> <p>Command introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.</p>   |
| <b>Description</b>              | Copy a file between a satellite device and an aggregation device in a Junos Fusion.   |
| <b>Options</b>                  | <p><b>local</b>—Indicate that the file-copy from satellite-device has been initiated by a local user.</p> <p><b>remote</b>—Indicate that the file-copy from satellite-device has been initiated by a remote user.</p> <p><b>source-URL</b>—Specify the URL of the file that is copied.</p> <p>If no device is specified as the <i>source-URL</i>, the file is copied from the aggregation device.</p> <p>To specify a satellite device in the <i>source-URL</i>, enter <b>sdslot-id-number</b> at the beginning of the <i>source-URL</i>. For example, enter <b>sd101:/var/tmp/filename.txt</b> to specify that filename.txt in the /var/tmp directory on the satellite device using FPC slot ID number 101 is the <i>source-URL</i>.</p> <p><b>destination-URL</b>—Specify the destination URL where the file is copied into.</p> <p>If no device is specified as the <i>destination-URL</i>, the file is copied into the aggregation device.</p> <p>To specify a satellite device in the <i>destination-URL</i>, enter <b>sdslot-id-number</b> at the beginning of the <i>destination-URL</i>. For example, enter <b>sd101:/var/tmp/</b> to specify the /var/tmp directory on the satellite device using FPC slot ID number 101 as the <i>source-URL</i>.</p> |
| <b>Required Privilege Level</b> | system-control  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring or Expanding a Junos Fusion Enterprise</a></li> <li>• <a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li> </ul>   |
| <b>List of Sample Output</b>    | <a href="#">request chassis satellite file-copy on page 116</a>   |

## Sample Output

### request chassis satellite file-copy

```
user@aggregation-device> request chassis satellite file-copy /var/tmp/file_name  
sd101:/var/tmp/
```



## request chassis satellite install

**Syntax** `request chassis satellite install package-name  
[fpc-slot fpc-slot | device-alias device-alias]  
<no-confirm>`

**Release Information** Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.  
Command introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.  
Command introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.

**Description** Install a version of Junos OS software onto a satellite device in a Junos Fusion.

Any device operating as a satellite device in a Junos Fusion is running satellite software. A device running satellite software cannot operate as a standalone network device until it is running a version of Junos OS software.

You would typically enter this command to install Junos OS onto a satellite device before removing the satellite device from a Junos Fusion. Installing the Junos OS software onto the satellite device before removing it from the Junos Fusion allows you to more easily install the device elsewhere in your network.

If you are using the automatic satellite conversion feature to convert devices into satellite devices in your Junos Fusion, remove the FPC slot ID to the satellite device from the automatic satellite conversion configuration before using this command to install the Junos OS software. You can update the automatic satellite conversion feature using the **set chassis satellite-management auto-satellite-conversion satellite slot-id** configuration statement.

You must install a PXE version of compatible Junos OS to convert the satellite device running satellite software to a standalone device running Junos OS software on QFX5100 switches acting as satellite devices. The PXE version of Junos OS is the software that includes **pxe** in the Junos OS package name when it is downloaded from the Software Center—for example, the PXE image for Junos OS Release 14.1X53-D16 is named **install-media-pxe-qfx-5-14.1X53-D16.2.tgz**.

For Junos Fusion systems running Junos OS Release 17.2R1 and later, you must install a signed PXE version of Junos OS to convert the satellite device running satellite software to a standalone device running Junos OS software. The signed PXE Junos OS package name uses the format **install-media-pxe-qfx-5-version-domestic-signed.tgz**.

The device uses a factory-default configuration after the Junos OS installation is complete. No Junos OS configuration is modified and the previous Junos OS configuration is not restored after the Junos OS software installation.

**Options** ***package-name***—Specify the URL to the Junos OS image to install onto the satellite device.

***fpc fpc-slot***—Install the Junos OS software onto the satellite device with the specified FPC slot ID in the Junos Fusion.

**device-alias** *device-alias*—Install the Junos OS software onto the satellite device with the alias name in the Junos Fusion.

**no-confirm**—(Optional) Install the Junos OS software onto the satellite device immediately without further confirmation prompting.

**Required Privilege Level** system-control

**Related Documentation**

- [Configuring or Expanding a Junos Fusion Enterprise](#)
- [Configuring Junos Fusion Provider Edge on page 41](#)

**List of Sample Output**

[request chassis satellite install /var/tmp/jinstall-ex-4300-14.1X53-D16.1-domestic-signed.tgz fpc-slot 101 \(EX4300 switch as satellite device\) on page 118](#)

[request chassis satellite install /var/tmp/install-media-pxe-qfx-5-14.1X53-D16.2.tgz fpc-slot 102 \(QFX5100 switch as satellite device\) on page 118](#)

## Sample Output

[request chassis satellite install /var/tmp/jinstall-ex-4300-14.1X53-D16.1-domestic-signed.tgz fpc-slot 101 \(EX4300 switch as satellite device\)](#)

```
user@aggregation-device> request chassis satellite install
/var/tmp/jinstall-ex-4300-14.1X53-D16.1-domestic-signed.tgz fpc-slot 101

Response from device:
  Conversion Started
```

[request chassis satellite install /var/tmp/install-media-pxe-qfx-5-14.1X53-D16.2.tgz fpc-slot 102 \(QFX5100 switch as satellite device\)](#)

```
user@aggregation-device> request chassis satellite install
/var/tmp/install-media-pxe-qfx-5-14.1X53-D16.2.tgz fpc-slot 102

Response from device:
  Conversion Started
```

## request chassis satellite interface

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>request chassis satellite interface <i>interface-name</i><br/>device-mode satellite</code>   |
| <b>Release Information</b>      | Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.<br>Command introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.<br>Command introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.   |
| <b>Description</b>              | <p>Change the device mode for a device.</p> <p>This command is used to change a device into a satellite device for a Junos Fusion. After interconnecting a device to an aggregation device in a Junos Fusion, enter this command from the aggregation device to begin the manual satellite device conversion procedure.</p> <p>Other configuration steps, such as configuring the cascade port and creating a satellite software upgrade group, must be completed before this command can be used to convert a device into a satellite device. See <a href="#">“Configuring Junos Fusion Provider Edge” on page 41</a> or <i>Configuring or Expanding a Junos Fusion Enterprise</i>.</p> |
| <b>Options</b>                  | <i>interface-name</i> —Specify the name of the cascade port interface on the aggregation device that connects to the device that will be converted into a satellite device.  |
| <b>Required Privilege Level</b> | system-control   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li> <li>• <i>Configuring or Expanding a Junos Fusion Enterprise</i></li> </ul>   |
| <b>List of Sample Output</b>    | <a href="#">request chassis satellite interface xe-0/0/1 device-mode satellite on page 119</a>   |

### Sample Output

#### request chassis satellite interface xe-0/0/1 device-mode satellite

```
user@aggregation-device> request chassis satellite interface xe-0/0/1 device-mode satellite
```

## request chassis satellite login

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>request chassis satellite login &lt;fpc-slot <i>fpc-slot</i>&gt; &lt;interface-name <i>interface-name</i>&gt;</pre>  |
| <b>Release Information</b>      | Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.<br>Command introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.<br>Command introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.  |
| <b>Description</b>              | <p>Log in to the satellite device from the aggregation device.</p> <p>This command is typically used to log in to the satellite device by expert users for debugging purposes. You can perform all configuration and administration tasks in a Junos Fusion from the aggregation device.</p>      |
| <b>Options</b>                  | <p><b>fpc <i>fpc-slot</i></b>—Log in to the satellite device with the specified FPC slot ID.</p> <p><b>interface-name <i>interface-name</i></b>—Log in to the satellite device connected to the specified interface. The <i>interface-name</i> is the cascade port on the aggregation device.</p> |
| <b>Required Privilege Level</b> | system-control  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring or Expanding a Junos Fusion Enterprise</i></li><li>• <a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li></ul>   |
| <b>List of Sample Output</b>    | <a href="#">request chassis satellite login fpc-slot 101 on page 120</a>  |

### Sample Output

#### request chassis satellite login fpc-slot 101

```
user@aggregation-device> request chassis satellite login fpc-slot 101
```

## request chassis satellite reboot

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | request chassis satellite reboot<br><fpc-slot <i>fpc-slot</i> ><br><range <i>range</i> >   |
| <b>Release Information</b>      | Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.<br>Command introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.<br>Command introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.   |
| <b>Description</b>              | Reboot the satellite device or devices from the aggregation device in a Junos Fusion.  |
| <b>Options</b>                  | <b>fpc <i>fpc-slot</i></b> —Reboot the satellite device with the specified FPC slot identifier.<br><b>range <i>range</i></b> —Reboot all satellite devices in a range of FPC slot identifiers.<br><br>For instance, you can reboot the satellite devices using FPC slot identifiers 101, 102, and 103 by entering a <i>range</i> of <b>101-103</b> . |
| <b>Required Privilege Level</b> | system-control   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring or Expanding a Junos Fusion Enterprise</a></li> <li>• <a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li> </ul>  |
| <b>List of Sample Output</b>    | <a href="#">request chassis satellite reboot fpc 101 on page 121</a><br><a href="#">request chassis satellite reboot range 101-103 on page 121</a>   |

### Sample Output

#### request chassis satellite reboot fpc 101

```
user@aggregation-device> request chassis satellite reboot fpc 101
```

### Sample Output

#### request chassis satellite reboot range 101-103

```
user@aggregation-device> request chassis satellite reboot range 101-103
```

## request chassis satellite restart

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>request chassis satellite restart<br/>[fpc-slot <i>fpc-slot</i>   range <i>range</i>]<br/>&lt;<i>process-name</i>&gt;</code>  |
| <b>Release Information</b>      | Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.<br>Command introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.<br>Command introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.  |
| <b>Description</b>              | <p>Restart a process on a satellite device or devices from the aggregation device in a Junos Fusion.</p> <p>You would typically restart a process in a Junos Fusion for troubleshooting or debugging purposes.</p> <p>This command is intended for use by expert users for debugging purposes.</p>  |
| <b>Options</b>                  | <p><b>fpc <i>fpc-slot</i></b>—Restart the specified process on the satellite device in the specified FPC slot ID only.</p> <p><b>range</b>—Restart the process on the satellite devices in the specified range of FPC slot IDs only.</p> <p>For instance, if you want to reboot the satellite devices using FPC slot IDs 101, 102, and 103, you can enter a <i>range</i> of <b>101-103</b>.</p> <p><b>process-name</b>—Restart the specified process on the specified FPC slot ID or range of FPC slot IDs.</p> |
| <b>Required Privilege Level</b> | system-control  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring or Expanding a Junos Fusion Enterprise</a></li><li>• <a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li></ul>  |

## request chassis satellite shell-command

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>request chassis satellite shell-command</code><br><code>[fpc-slot <i>fpc-slot</i>  <i>range</i> ]</code><br><code>&lt;<i>remote-command</i>&gt;</code>   |
| <b>Release Information</b>      | Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.<br>Command introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.<br>Command introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.   |
| <b>Description</b>              | Run a UNIX shell command for a satellite device from the aggregation device in a Junos Fusion.   |
| <b>Options</b>                  | <p><b>fpc <i>fpc-slot</i></b>—Run the shell command on the satellite device using the specified FPC slot identifier only.</p> <p><b><i>range</i></b>—Run the shell command on the satellite devices in the specified range of FPC slot identifiers only.</p> <p>For instance, you can run the shell command on the satellite devices in FPC slot identifiers 101, 102, and 103 by entering a <i>range</i> of <b>101-103</b>.</p> <p><b><i>remote-command</i></b>—Specify the UNIX shell command to run on the satellite device or devices.</p> |
| <b>Required Privilege Level</b> | system-control   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Configuring or Expanding a Junos Fusion Enterprise</i></li> <li><a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li> </ul>   |

## request system software add

- List of Syntax**
- [Syntax on page 124](#)
  - [Syntax \(EX Series Switches\) on page 124](#)
  - [Syntax \(TX Matrix Router\) on page 124](#)
  - [Syntax \(TX Matrix Plus Router\) on page 125](#)
  - [Syntax \(MX Series Router\) on page 125](#)
  - [Syntax \(QFX Series\) on page 125](#)
  - [Syntax \(OCX Series\) on page 126](#)
  - [Syntax \(Junos OS Evolved\) on page 126](#)

**Syntax**

```
request system software add package-name
<best-effort-load>
<delay-restart>
<device-alias alias-name>
<force>
<no-copy>
<no-validate>
<re0 | re1>
<reboot>
<satellite slot-id>
<set [package-name1 package-name2]>
<unlink>
<upgrade-group [all | upgrade-group-name]>
<upgrade-with-config>
<satellite slot-id>
<validate>
<version version-string>
```

**Syntax (EX Series Switches)**

```
request system software add package-name
<best-effort-load>
<delay-restart>
<force>
<no-copy>
<no-validate>
<re0 | re1>
<reboot>
<set [package-name1 package-name2]>
<upgrade-with-config>
<validate>
<validate-on-host hostname>
<validate-on-routing-engine routing-engine>
```

**Syntax (TX Matrix Router)**

```
request system software add package-name
<best-effort-load>
<delay-restart>
<force>
<lcc number | scc>
<no-copy>
```



```

<no-validate>
<re0 | re1>
<reboot>
<set [package-name1 package-name2]>
<unlink>
<upgrade-with-config>
<validate>
<validate-on-host hostname>
<validate-on-routing-engine routing-engine>

```

**Syntax (TX Matrix Plus  
Router)**

```

request system software add package-name
<best-effort-load>
<delay-restart>
<force>
<lcc number | sfc number>
<no-copy>
<no-validate>
<re0 | re1>
<reboot>
<set [package-name1 package-name2]>
<unlink>
<upgrade-with-config>
<validate>
<validate-on-host hostname>
<validate-on-routing-engine routing-engine>

```

**Syntax (MX Series  
Router)**

```

request system software add package-name
<best-effort-load>
<delay-restart>
<device-alias alias-name>
<force>
<member member-id>
<no-copy>
<no-validate>
<re0 | re1>
<reboot>
<satellite slot-id>
<set [package-name1 package-name2]>
<upgrade-group [all [upgrade-group-name]]>
<unlink>
<upgrade-with-config>
<validate>
<version version-string>
<validate-on-host hostname>
<validate-on-routing-engine routing-engine>

```

**Syntax (QFX Series)**

```

request system software add package-name
<best-effort-load>
<component all>
<delay-restart>

```

```

<force>
<force-host>
<no-copy>
<partition>
<reboot>
<unlink>
<upgrade-with-config>

```

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

```

<best-effort-load>
<delay-restart>
<force>
<force-host>
<no-copy>
<no-validate>
<reboot>
<unlink>
<upgrade-with-config>
<validate>

```

**Syntax (Junos OS Evolved)** `request system software add package-name`

```

<force>
<no-validate>
<reboot>
<restart>

```

**Release Information** Command introduced before Junos OS Release 7.4.  
**best-effort-load** and **unlink** options added in Junos OS Release 7.4.  
 Command introduced in Junos OS Release 9.0 for EX Series switches.  
**sfc** option introduced in Junos OS Release 9.6 for the TX Matrix Plus router.  
 Command introduced in Junos OS Release 11.1 for the QFX Series.  
**set [*package-name1 package-name2*]** option added in Junos OS Release 11.1 for EX Series switches. Added in Junos OS Release 12.2 for M Series, MX Series, and T Series routers.



**NOTE:** On EX Series switches, the **set [*package-name1 package-name2*]** option allows you to install only two software packages on a mixed EX4200 and EX4500 Virtual Chassis, whereas, on M Series, MX Series, and T Series routers, the **set [*package-name1 package-name2 package-name3*]** option allows you to install multiple software packages and software add-on packages at the same time.

**upgrade-with-config** and **upgrade-with-config-format *format*** options added in Junos OS Release 12.3 for M Series routers, MX Series routers, and T Series routers, EX Series Ethernet switches, and QFX Series devices.  
 Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**device-alias**, **satellite**, **upgrade-group**, and **version** options introduced in Junos OS Release 14.2R3 for Junos Fusion.

**validate-on-host** and **validate-on-routing-engine** options added in Junos OS Release 15.1F3 for PTX5000 routers and MX240, MX480, and MX960 routers.

**upgrade-with-config-format** *format* option deleted in Junos OS Release 16.1 for M Series routers, MX Series routers, and T Series routers, EX Series Ethernet switches, and QFX Series devices.

The following options are deprecated in Junos OS Evolved Release 18.3R1: **best-effort-load**, **delay-restart**, **no-copy**, **on-primary**, (**re0** | **re1**), **set**, **unlink**, **validate**, **validate-on-host**, and **validate-on-routing-engine**.

**Description** For Junos OS Evolved, the **request system software add** command has a built-in feature not to start the upgrade if a reboot is pending after an upgrade or rollback.



**NOTE:** We recommend that you always download the software image to `/var/tmp` only. On EX Series and QFX Series switches, you must use the `/var/tmp` directory. Other directories are not supported.

Install a software package or bundle on the router or switch.

For information on valid filename and URL formats, see *Format for Specifying Filenames and URLs in Junos OS CLI Commands*.



**CAUTION:** Any configuration changes performed after inputting the **request system software add** command will be lost when the system reboots with an upgraded version of Junos OS.



**NOTE:** Starting from Junos OS Release 17.2R1, PTX10008 routers do not support the **request system software add** command. Starting from Junos OS Release 17.4R1, PTX10016 routers do not support the **request system software add** command. Use the **request vmhost software add** command instead of the **request system software add** command on the PTX10008 and PTX10016 routers to install or upgrade the Junos OS software package or bundle on the router. See *request vmhost software add*.



**NOTE:** When graceful Routing Engine switchover (GRES) is enabled on a device, you must perform a unified in-service software upgrade (ISSU) operation to update the software running on the device. With GRES enabled, if you attempt to perform a software upgrade by entering the `request system software add package-name` command, an error message is displayed stating that only in-service software upgrades are supported when GRES is configured. In such a case, you must either remove the GRES configuration before you attempt the upgrade or perform a unified ISSU.



**NOTE:** Starting with Junos OS Release 15.1F3, the statement `request system software add` installs a software package for the guest OS only for the PTX5000 router with RE-DUO-C2600-16G, and for MX240, MX480, and MX960 routers with RE-S-1800X4-32G-S.

Starting with Junos OS Release 15.1F5, the statement `request system software add` installs a software package for the guest OS only for the MX2010 and MX2020 routers with REMX2K-1800-32G-S.

On these routers, in order to install both Junos software and host software packages, use the `request vmhost software add` command.

**Options**    *package-name*—Location from which the software package or bundle is to be installed.



**NOTE:** In Junos OS, *package-name* can be wither the URL of a remote location or the pathname of a local package. But Junos OS Evolved does not support a remote iso for upgrade, so “URL” is removed from the help string in the CLI.

For example:

- */var/tmp/package-name*—For a software package or bundle that is being installed from a local directory on the router or switch.
- *protocol://hostname/pathname/package-name*—For a software package or bundle that is to be downloaded and installed from a remote location. Replace *protocol* with one of the following:
  - **ftp**—File Transfer Protocol.  
Use **ftp://hostname/pathname/package-name**. To specify authentication credentials, use **ftp://<username>:<password>@hostname/pathname/package-name**. To have the system prompt you for the password, specify **prompt** in place of the

password. If a password is required, and you do not specify the password or **prompt**, an error message is displayed.

- **http**—Hypertext Transfer Protocol.  
Use `http://hostname/pathname/package-name`. To specify authentication credentials, use `http://<username>:<password>@hostname/pathname/package-name`. If a password is required and you omit it, you are prompted for it.
- **scp**—Secure copy (not available for limited editions).  
Use `scp://hostname/pathname/package-name`. To specify authentication credentials, use `scp://<username>:<password>@hostname/pathname/package-name`.



#### NOTE:

- The *pathname* in the protocol is the relative path to the user's home directory on the remote system and not the root directory.
- Do not use the `scp` protocol in the `request system software add` command to download and install a software package or bundle from a remote location. The previous statement does not apply to the QFabric switch. The software upgrade is handled by the management process (`mgd`), which does not support `scp`.  
Use the `file copy` command to copy the software package or bundle from the remote location to the `/var/tmp` directory on the hard disk:  
`file copy scp://source/package-name /var/tmp`  
Then install the software package or bundle using the `request system software add` command:  
`request system software add /var/tmp/package-name`

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

**component all**—(QFabric systems only) (Optional) Install the software package on all of the QFabric components.

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

**device-alias *alias-name***—(Junos Fusion only) (Optional) Install the satellite software package onto the specified satellite device using the satellite device's alias name.

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

**force-host**—(Optional) Force the addition of the host software package or bundle (ignore warnings) on the QFX5100 device.

**lcc *number*** —(TX Matrix routers and TX Matrix Plus routers only) (Optional) In a routing matrix based on the TX Matrix router, install a software package or bundle on a T640 router that is connected to the TX Matrix router. In a routing matrix based on the TX Matrix Plus router, install a software package or bundle on a router that is connected to the TX Matrix Plus router.

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

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

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

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

**satellite *slot-id***—(Junos Fusion only) (Optional) Install the satellite software package onto the specified satellite device using the satellite devices FPC slot identifier.

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

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

**no-copy**—(Optional) Install a software package or bundle, but do not save copies of the package or bundle files.

**no-validate**—(Optional) When loading a software package or bundle with a different release, suppress the default behavior of the **validate** option.



**NOTE:** Software packages from unidentified providers cannot be loaded. To authorize providers, include the **provider-id** statement at the [edit system extensions provider] hierarchy level.

---

**re0 | re1**—(Optional) On routers or switches that support dual or redundant Routing Engines, load a software package or bundle on the Routing Engine in slot 0 (re0) or the Routing Engine in slot 1 (re1).

**reboot**—(Optional) After adding the software package or bundle, reboot the system. On a QFabric switch, the software installation is not complete until you reboot the component for which you have installed the software.

**set [*package-name1* *package-name2*]**—(Mixed EX4200 and EX4500 Virtual Chassis, M Series, MX Series, and T Series routers only) (Optional) Install multiple packages at same time:

- In the case of mixed EX4200 and EX4500 Virtual Chassis, install two software packages—a package for an EX4200 switch and the same release of the package for an EX4500 switch—to upgrade all member switches in a mixed EX4200 and EX4500 Virtual Chassis.
- In the case of M Series, MX Series, and T Series routers, install multiple (two or more) software packages and software add-on packages at the same time. The variable *package-name* can either be a list of installation packages, each separated by a blank space, or the full URL to the directory or tar file containing the list of installation packages.

In each case, *installation-package* can either be a list of installation packages, each separated by a blank space, or 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.

**unlink**—(Optional) On M Series, T Series, and MX Series routers, use the unlink option to remove the software package from this directory after a successful upgrade is completed.

**upgrade-group [ all [*upgrade-group-name*] ]**—(Junos Fusion only) (Required to configure a Junos Fusion using autoconversion or manual conversion) Associate a satellite software image with a satellite software upgrade group. The satellite software package is associated with the specified satellite software upgrade group using the *upgrade-group-name*, or for all satellite software upgrade groups in a Junos Fusion when the all keyword is specified.

A satellite software upgrade group is a group of satellite devices in a Junos Fusion that are designated to upgrade to the same satellite software version using the same satellite software package. See [“Understanding Software in a Junos Fusion Provider Edge” on page 18](#), [Understanding Software in a Junos Fusion Enterprise](#), and [“Managing Satellite Software Upgrade Groups in a Junos Fusion” on page 85](#).

**upgrade-with-config**—(Optional) Install one or more configuration files.



**NOTE:** Configuration files specified with this option must have the extension .text or .xml and have the extension specified. Using the extension .txt will not work.

**validate**—(Optional) Validate the software package or bundle against the current configuration as a prerequisite to adding the software package or bundle. This is the default behavior when the software package or bundle being added is a different release.



**NOTE:** The **validate** option only works on systems that do not have **graceful-switchover (GRES)** enabled. To use the **validate** option on a system with GRES, either disable GRES for the duration of the installation, or install using the command **request system software in-service-upgrade**, which requires nonstop active routing (NSR) to be enabled when using GRES.

**validate-on-host *hostname***—(Optional) Validate the software package by comparing it to the running configuration on a remote Junos OS host. Specify a host, replacing ***hostname*** with the remote hostname. You can optionally provide the username that will be used to log in to the remote host by specifying the hostname in the format **user@hostname**.

**validate-on-routing-engine *routing-engine***—(Optional) Validate the software bundle or package by comparing it to the running configuration on a Junos OS Routing Engine on the same chassis. Specify a Routing Engine, replacing ***routing-engine*** with the routing engine name.

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



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

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

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



```

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

```

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

Likewise, when you issue the **request system software add *package-name*** command on a TX Matrix Plus master Routing Engine, all the T1600 or T4000 master Routing Engines that are connected to it are upgraded to the same version of software. If you issue the same command on the TX Matrix Plus backup Routing Engine, all the T1600 or T4000 backup Routing Engines that are connected to it are upgraded to the same version of software.

Before installing software on a device that has one or more custom YANG data models added to it, back up and remove the configuration data corresponding to the custom YANG data models from the active configuration. For more information see *Managing YANG Packages and Configurations During a Software Upgrade or Downgrade*.

**Required Privilege Level** maintenance

**Related Documentation**

- *Format for Specifying Filenames and URLs in Junos OS CLI Commands*
- [request system software delete on page 138](#)
- [request system software rollback on page 143](#)
- [request system storage cleanup on page 148](#)
- *Installing Software Packages on QFX Series Devices*
- *Upgrading Software on a QFabric System*
- [Managing Satellite Software Upgrade Groups in a Junos Fusion on page 85](#)
- *request system software add (Maintenance)*
- [Routing Matrix with a TX Matrix Plus Router Solutions Page](#)

**List of Sample Output**

[request system software add validate on page 134](#)  
[request system software add /var/tmp/ no-validate on page 134](#)  
[request system software add no-copy no-validate reboot on page 135](#)  
[request system software add validate-on-host on page 135](#)  
[request system software add \(Mixed EX4200 and EX4500 Virtual Chassis\) on page 137](#)  
[request system software add component all \(QFabric Systems\) on page 137](#)  
[request system software add upgrade-group \(Junos Fusion\) on page 137](#)

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

## Sample Output

### request system software add validate

```
user@host> request system software add validate /var/tmp/jinstall-7.2R1.7-domestic-signed.tgz
Checking compatibility with configuration
Initializing...
Using jbase-7.1R2.2
Using /var/tmp/jinstall-7.2R1.7-domestic-signed.tgz
Verified jinstall-7.2R1.7-domestic.tgz signed by PackageProduction_7_2_0
Using /var/validate/tmp/jinstall-signed/jinstall-7.2R1.7-domestic.tgz
Using /var/validate/tmp/jinstall/jbundle-7.2R1.7-domestic.tgz
Checking jbundle requirements on /
Using /var/validate/tmp/jbundle/jbase-7.2R1.7.tgz
Using /var/validate/tmp/jbundle/jkernel-7.2R1.7.tgz
Using /var/validate/tmp/jbundle/jcrypto-7.2R1.7.tgz
Using /var/validate/tmp/jbundle/jpfe-7.2R1.7.tgz
Using /var/validate/tmp/jbundle/jdocs-7.2R1.7.tgz
Using /var/validate/tmp/jbundle/jroute-7.2R1.7.tgz
Validating against /config/juniper.conf.gz
mgd: commit complete
Validation succeeded
Validating against /config/rescue.conf.gz
mgd: commit complete
Validation succeeded
Installing package '/var/tmp/jinstall-7.2R1.7-domestic-signed.tgz' ...
Verified jinstall-7.2R1.7-domestic.tgz signed by PackageProduction_7_2_0
Adding jinstall...

WARNING: This package will load JUNOS 7.2R1.7 software.
WARNING: It will save JUNOS configuration files, and SSH keys
WARNING: (if configured), but erase all other files and information
WARNING: stored on this machine. It will attempt to preserve dumps
WARNING: and log files, but this can not be guaranteed. This is the
WARNING: pre-installation stage and all the software is loaded when
WARNING: you reboot the system.

Saving the config files ...
Installing the bootstrap installer ...

WARNING: A REBOOT IS REQUIRED TO LOAD THIS SOFTWARE CORRECTLY. Use the
WARNING: 'request system reboot' command when software installation is
WARNING: complete. To abort the installation, do not reboot your system,
WARNING: instead use the 'request system software delete jinstall'
WARNING: command as soon as this operation completes.

Saving package file in /var/sw/pkg/jinstall-7.2R1.7-domestic-signed.tgz ...
Saving state for rollback ...
```

### request system software add /var/tmp/ no-validate

```
user@host> request system software add no-validate
/var/tmp/junos-install-mx-x86-32-15.1R1.9.tgz

Installing package '/var/tmp/junos-install-mx-x86-32-15.1R1.9.tgz' ...
Verified manifest signed by PackageProductionEc_2015
Verified manifest signed by PackageProductionRSA_2015
```

```

Verified contents.iso
Verified issu-indb.tgz
Verified junos-x86-32.tgz
Verified kernel
Verified metatags
Verified package.xml
Verified pkgtools.tgz
camcontrol: not found
camcontrol: not found
Verified manifest signed by PackageProductionEc_2015
Saving the config files ...
NOTICE: uncommitted changes have been saved in
/var/db/config/juniper.conf.pre-install
Saving package file in
/var/sw/pkg/junos-install-x86-32-domestic-20150618.043753_builder_junos_151_r1.tgz
...
Saving state for rollback ...

```

#### request system software add no-copy no-validate reboot

```

user@host> request system software add no-copy no-validate junos-install-srx-x86-64-17.3R1.tgz
reboot

Verified junos-install-srx-x86-64-17.3R1 signed by PackageProductionEc_2017 method
ECDSA256+SHA256
Verified manifest signed by PackageProductionEc_2017 method ECDSA256+SHA256
Checking PIC combinations
Verified fips-mode signed by PackageProductionEc_2017 method ECDSA256+SHA256
Adding fips-mode-x86-32-20170728.153050_builder_junos_173_r1 ...
Verified jail-runtime signed by PackageProductionEc_2017 method ECDSA256+SHA256
Adding jail-runtime-x86-32-20170725.352915_builder_stable_10 ...
Verified jdocs signed by PackageProductionEc_2017 method ECDSA256+SHA256
Adding jdocs-x86-32-20170728.153050_builder_junos_173_r1 ...
Verified jfirmware signed by PackageProductionEc_2017 method ECDSA256+SHA256
Adding jfirmware-x86-32-17.3R1 ...
Verified jpfe-X signed by PackageProductionEc_2017 method ECDSA256+SHA256
Adding jpfe-X-x86-32-20170728.153050_builder_junos_173_r1 ...
Verified jpfe-X960 signed by PackageProductionEc_2017 method ECDSA256+SHA256
Adding jpfe-X960-x86-32-20170728.153050_builder_junos_173_r1 ...
Verified jpfe-common signed by PackageProductionEc_2017 method ECDSA256+SHA256
Adding jpfe-common-x86-32-20170728.153050_builder_junos_173_r1 ...
Verified jpfe-fips signed by PackageProductionEc_2017 method ECDSA256+SHA256
Verified jpfe-wrlinux signed by PackageProductionEc_2017 method ECDSA256+SHA256
Adding jpfe-wrlinux-x86-32-20170728.153050_builder_junos_173_r1 ...
Verified jsd-jet-1 signed by PackageProductionEc_2017 method ECDSA256+SHA256
Adding jsd-x86-32-17.3R1-jet-1 ...

```

#### request system software add validate-on-host

```

user@host> request system software add validate-on-host user@xyz
:/var/tmp/jinstall-15.1-20150516_ib_15_2_psd.0-domestic-signed.tgz

user@host> request system software add validate-on-host user@xyz
:/var/tmp/jinstall-15.1-20150516_ib_15_2_psd.0-domestic-signed.tgz
Extracting JUNOS version from package...
Connecting to remote host xyz...
Password:
Sending configuration to xyz...
Validating configuration on xyz...

```

```
PACKAGETYPE: not found
Checking compatibility with configuration
Initializing...
Using jbase-15.1-20150516_ib_15_2_psd.0
Verified manifest signed by PackageDevelopmentEc_2015
Using jruntime-15.1-20150516_ib_15_2_psd.0
Verified manifest signed by PackageDevelopmentEc_2015
Using jkernel-15.1-20150516_ib_15_2_psd.0
Verified manifest signed by PackageDevelopmentEc_2015
Using jroute-15.1-20150516_ib_15_2_psd.0
Verified manifest signed by PackageDevelopmentEc_2015
Using jcrypto-15.1-20150516_ib_15_2_psd.0
Verified manifest signed by PackageDevelopmentEc_2015
Using jweb-15.1-20150516_ib_15_2_psd.0
Verified manifest signed by PackageDevelopmentEc_2015
Using /var/packages/jtools-15.1-20150516_ib_15_2_psd.0
Verified manifest signed by PackageDevelopmentEc_2015
Using /var/tmp/config.tgz
Hardware Database regeneration succeeded
Validating against /config/juniper.conf.gz
mgd: warning: schema: init: 'logical-systems-vlans' contains-node 'juniper-config
vlans': not found
mgd: commit complete
Validation succeeded
Installing package
'/var/tmp/jinstall-15.1-20150516_ib_15_2_psd.0-domestic-signed.tgz' ...
Verified jinstall-15.1-20150516_ib_15_2_psd.0-domestic.tgz signed by
PackageDevelopmentEc_2015
Adding jinstall...

WARNING: The software that is being installed has limited support.
WARNING: Run 'file show /etc/notices/unsupported.txt' for details.

WARNING: This package will load JUNOS 15.1-20150516_ib_15_2_psd.0 software.
WARNING: It will save JUNOS configuration files, and SSH keys
WARNING: (if configured), but erase all other files and information
WARNING: stored on this machine. It will attempt to preserve dumps
WARNING: and log files, but this can not be guaranteed. This is the
WARNING: pre-installation stage and all the software is loaded when
WARNING: you reboot the system.

Saving the config files ...
NOTICE: uncommitted changes have been saved in
/var/db/config/juniper.conf.pre-install
Installing the bootstrap installer ...

WARNING: A REBOOT IS REQUIRED TO LOAD THIS SOFTWARE CORRECTLY. Use the
WARNING: 'request system reboot' command when software installation is
WARNING: complete. To abort the installation, do not reboot your system,
WARNING: instead use the 'request system software delete jinstall'
WARNING: command as soon as this operation completes.

Saving package file in
/var/sw/pkg/jinstall-15.1-20150516_ib_15_2_psd.0-domestic-signed.tgz ...
Saving state for rollback ...
```

## Sample Output

### request system software add (Mixed EX4200 and EX4500 Virtual Chassis)

```
user@switch> request system software add set
[/var/tmp/jinstall-ex-4200-11.1R1.1-domestic-signed.tgz
/var/tmp/jinstall-ex-4500-11.1R1.1-domestic-signed.tgz]
...
```

### request system software add component all (QFabric Systems)

```
user@switch> request system software add /pbdata/packages/jinstall-qfabric-12.2X50-D1.3.rpm
component all
...
```

### request system software add upgrade-group (Junos Fusion)

```
user@aggregation-device> request system software add /var/tmp/satellite-3.0R1.1-signed.tgz
upgrade-group group1
```

## request system software delete

- List of Syntax**    [Syntax on page 138](#)  
                           [Syntax \(TX Matrix Router\) on page 138](#)  
                           [Syntax \(Junos OS Evolved \) on page 138](#)

**Syntax**    `request system software delete software-package`  
                   `<force>`  
                   `<reboot>`  
                   `<set [package-name package-name]>`  
                   `<upgrade-group [all |upgrade-group-name]>`  
                   `<version version-string>`

**Syntax (TX Matrix Router)**    `request system software delete software-package`  
   `<force>`  
   `<lcc number | scc>`  
   `<reboot>`  
   `<set [package-name package-name]>`

**Syntax (Junos OS Evolved )**    `request system software delete`  
   `<force>`  
   `<reboot>`

**Release Information**    Command introduced before Junos OS Release 7.4.  
                                   Command introduced in Junos OS Release 9.0 for EX Series switches.  
                                   **sfc** option introduced in Junos OS Release 9.6 for the TX Matrix Plus router.  
                                   Command introduced in Junos OS Release 11.1 for the QFX Series.  
                                   **set [*package-name package-name*]** option added in Junos OS Release 12.2 for M Series, MX Series, and T Series routers.  
                                   **reboot** option introduced in Junos OS Release 12.3.  
                                   Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.  
                                   **upgrade-group**, and **version** options introduced in Junos OS Release 14.2R3 for Junos Fusion.

**Description**    Remove a software package or bundle from the router or switch.



**CAUTION:** Before removing a software package or bundle, make sure that you have already placed the new software package or bundle that you intend to load onto the router or switch.

**Options**    ***package-name***—(Only for Junos OS Evolved) Name of the Junos OS Evolved package running on the device. You can see this package name by using the **request system software list** command.

**software-package**—(Not available on Junos OS Evolved) Software package or bundle name.

You can delete any or all of the following software bundles or packages:

- **jbase**—(Optional) Junos base software suite
- **jcrypto**—(Optional, in domestic version only) Junos security software
- **jdocs**—(Optional) Junos online documentation file
- **jkernel**—(Optional) Junos kernel software suite
- **jpfe**—(Optional) Junos Packet Forwarding Engine support
- **jroute**—(Optional) Junos routing software suite
- **junos**—(Optional) Junos base software



**NOTE:** On EX Series switches, some of the package names are different than those listed. To see the list of packages that you can delete on an EX Series switch, enter the command **show system software**.

**force**—(Optional) Ignore warnings and force removal of the software.

**lcc number**—(TX Matrix routers and TX Matrix Plus routers only) (Optional) In a routing matrix, delete a software package or bundle on a T640 router indicated by **lcc number** that is connected to the TX Matrix router. In a routing matrix, delete a software package or bundle on a router indicated by **lcc number** that is connected to the TX Matrix Plus router.

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

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**re0 | re1**—(Optional) On routers or switches that support dual or redundant Routing Engines, delete a software package or bundle on the Routing Engine in slot 0 (**re0**) or the Routing Engine in slot 1 (**re1**).

**reboot**—As of Junos OS 12.3 and greater, automatically reboot upon completing the **request system software delete** command.

**scc**—(TX Matrix routers only) (Optional) Remove an extension or upgrade package from the TX Matrix router (or switch-card chassis).

**set [package-name package-name]**—(M Series, MX Series, and T Series routers only) (Optional) Install multiple software packages or software add-on packages at the same time.

**sfc number**—(TX Matrix Plus routers only) (Optional) Remove an extension or upgrade package from the TX Matrix Plus router. Replace *number* with 0.

**upgrade-group [ all |upgrade-group-name]**—(Junos Fusion only) Delete the satellite software image association with the specified satellite software upgrade group.

A satellite software upgrade group is a group of satellite devices in the same Junos Fusion that are designated to upgrade to the same satellite software version using the same satellite software package.

**version version-string**—(Junos Fusion only) (Optional) Delete a satellite software package association with a satellite software upgrade group by selecting the satellite software package's version.

**Additional Information** Before upgrading the software on the router or switch, when you have a known stable system, issue the **request system snapshot** command to back up the software, including the configuration, to the /altroot and /altconfig file systems (on routers) or the /, /altroot, /config, /var, and /var/tmp file systems (on switches). After you have upgraded the software on the router or switch and are satisfied that the new packages are successfully installed and running, issue the **request system snapshot** command again to back up the new software to the /altroot and /altconfig file systems (on routers) or the /, /altroot, /config, /var, and /var/tmp file systems (on switches). After you run the **request system snapshot** command, you cannot return to the previous version of the software, because the running and backup copies of the software are identical.

**Required Privilege Level** maintenance

**Related Documentation**

- [request system software add on page 124](#)
- [request system software rollback on page 143](#)
- [request system software validate](#)
- [Routing Matrix with a TX Matrix Plus Router Solutions Page](#)

**List of Sample Output** [request system software delete jdocs on page 141](#)  
[request system software delete \(Junos OS Evolved\) on page 141](#)

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



## Sample Output

### request system software delete jdocs

The following example displays the system software packages before and after the **jdocs** package is deleted through the **request system software delete** command:

```
user@host> show system software
Information for jbase:

Comment:
JUNOS Base OS Software Suite [7.2R1.7]

Information for jcrypto:

Comment:
JUNOS Crypto Software Suite [7.2R1.7]

Information for jdocs:

Comment:
JUNOS Online Documentation [7.2R1.7]

Information for jkernel:

Comment:
JUNOS Kernel Software Suite [7.2R1.7]

...
```

```
user@host> show system software
Information for jbase:

Comment:
JUNOS Base OS Software Suite [7.2R1.7]

Information for jcrypto:

Comment:
JUNOS Crypto Software Suite [7.2R1.7]

Information for jkernel:

Comment:
JUNOS Kernel Software Suite [7.2R1.7]

...
```

### request system software delete (Junos OS Evolved)

```
user@host> request system software delete
junos-evo-install-qfx-fixed-x86-64-18.3I20180911102422
```

```
Removing version 'junos-evo-install-qfx-fixed-x86-64-18.3I20180911102422'.  
Software ... done.  
Data ... done.  
Version 'junos-evo-evo-qfx-fixed-x86-64-18.3I20180911102422' removed successfully.
```

## request system software rollback

|                                       |  |
|---------------------------------------|--|
| <b>List of Syntax</b>                 | <a href="#">Syntax on page 143</a><br><a href="#">Syntax (EX Series Switches) on page 143</a><br><a href="#">Syntax (TX Matrix Router) on page 143</a><br><a href="#">Syntax (TX Matrix Plus Router) on page 143</a><br><a href="#">Syntax (MX Series Router) on page 143</a><br><a href="#">Syntax (Junos OS Evolved) on page 143</a> |
| <b>Syntax</b>                         | request system software rollback   |
| <b>Syntax (EX Series Switches)</b>    | request system software rollback<br><all-members><br><local><br><member <i>member-id</i> ><br><reboot>   |
| <b>Syntax (TX Matrix Router)</b>      | request system software rollback<br><lcc <i>number</i>   scc><br><reboot>  |
| <b>Syntax (TX Matrix Plus Router)</b> | request system software rollback<br><lcc <i>number</i>   sfc <i>number</i> ><br><reboot>   |
| <b>Syntax (MX Series Router)</b>      | request system software rollback<br><all-members><br><device-alias <i>alias-name</i> ><br><local><br><member <i>member-id</i> ><br><reboot><br><satellite <i>slot-id</i> ><br><upgrade-group [all   <i>upgrade-group-name</i> ]>   |
| <b>Syntax (Junos OS Evolved)</b>      | request system software rollback<br><no-validate><br><package-name <i>version</i> ><br><reboot><br><validate><br><with-old-snapshot-config>  |
| <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>sfc</b> option introduced in Junos OS Release 9.6 for the TX Matrix Plus router.   |

Command introduced in Junos OS Release 11.1 for the QFX Series.

Command behavior changed in Junos OS Release 12.1.

**reboot** option introduced in Junos OS Release 12.3.

**device-alias**, **satellite**, and **upgrade-group** options introduced in Junos OS Release 14.2R3 for Junos Fusion.

**force** option deprecated in Junos OS Release 15.1 for Junos OS with Upgraded FreeBSD.



**NOTE:** To determine which platforms run Junos OS with Upgraded FreeBSD, see the table listing the platforms currently running Junos OS with upgraded FreeBSD in *Release Information for Junos OS with Upgraded FreeBSD*.

---

**validate** and **no-validate** options introduced for Junos OS Evolved Release 18.3R1.

**package-name version** option introduced for Junos OS Evolved Release 18.3R1.

**with-old-snapshot-config** option introduced for Junos OS Evolved Release 18.3R1.

**Description** This command reverts to the last successfully installed package before the **request system software (add | delete)** command. It uses the copy stored in the `/var/sw/pkg` directory.

#### *Additional Information*

- On Junos Fusion, the **request system software rollback** command can be used to roll back the version of satellite software associated with a satellite software upgrade group. Rolling back the version of satellite software associated with a satellite software upgrade group triggers a satellite software upgrade.
- On M Series and T Series routers, if **request system software add <jinstall> reboot** was used for the previous installation, then **request system software rollback** has no effect. In this case, use **jinstall** to reinstall the required package.
- On M Series and T Series routers, if **request system software add <sdk1>** was used for the previous installation, then **request system software rollback** removes the last installed SDK package (**sdk1** in this example).
- On SRX Series devices with dual root systems, when **request system software rollback** is run, the system switches to the alternate root. Each root can have a different version of Junos OS. Roll back takes each root back to the previously installed image.
- On QFX3500 and QFX3600 devices in a mixed Virtual Chassis, when the **request system software rollback** command is issued, the system does not rollback to the image stored in the alternate partition.
- On QFX5100 switches, the **reboot** option has been removed. To reboot the switch after a software rollback, issue the **request system reboot** command as a separate, secondary command.
- On Junos OS Evolved, the **reboot** command is required in order to complete the rollback.

- Options**
- all-members**—(EX4200 switches and MX Series routers only) (Optional) Attempt to roll back to the previous set of packages on all members of the Virtual Chassis configuration.
  - device-alias *alias-name***—(Junos Fusion only) (Optional) Rollback the satellite software package onto the specified satellite device using the satellite devices FPC slot identifier.
  - lcc *number***—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, attempt to roll back to the previous set of packages on a T640 router connected to the TX Matrix router. On a TX Matrix Plus router, attempt to roll back to the previous set of packages on a connected router connected to the TX Matrix Plus router.  
  
Replace *number* with the following values depending on the LCC configuration:
    - 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
    - 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
    - 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
    - 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
  - local**—(EX4200 switches and MX Series routers only) (Optional) Attempt to roll back to the previous set of packages on the local Virtual Chassis member.
  - member *member-id***—(EX4200 switches and MX Series routers only) (Optional) Attempt to roll back to the previous set of packages on the specified member of the Virtual Chassis configuration. For EX4200 switches, replace *member-id* with a value from 0 through 9. For an MX Series Virtual Chassis, replace *member-id* with a value of 0 or 1.
  - no-validate | validate**—(Only for Junos OS Evolved) Check compatibility with current configuration, yes or no.
  - none**—For all versions of Junos OS up to and including Junos OS 11.4, revert to the set of software as of the last successful **request system software add**. As of Junos OS 12.1 and later, revert to the last known good state before the most recent **request system software (add | delete)** command.
  - package-name *version***—(Junos OS Evolved only) Select any installed version for the rollback. The **request system software rollback** command uses the version instead of the package-name. you can see the available versions by using the **show system software list** command. If a version is not specified, the system rolls back to the default rollback version (the one with the '<' before it on the **show system software list** command output). You can specify any previous Junos OS Evolved release as long as it is not the one that is currently running or the rollback version.

**reboot**—(Optional) For Junos OS 12.3 and later, the system reboots automatically to complete the rollback. However, for Junos OS Evolved, you must explicitly specify the **reboot** option to complete the rollback.

**satellite slot-id**—(Junos Fusion only) (Optional) Roll back the satellite software package onto the specified satellite device using the satellite devices FPC slot identifier.

**scc**—(TX Matrix routers only) (Optional) Attempt to roll back to the previous set of packages on the TX Matrix router (or switch-card chassis).

**sfc number**—(TX Matrix Plus routers only) (Optional) Attempt to roll back to the previous set of packages on the TX Matrix Plus router. Replace *number* with 0.

**upgrade-group [ all | *upgrade-group-name* ]**—(Junos Fusion only) Roll back the satellite software image associated with the specified satellite software upgrade group, or for all satellite software upgrade groups in the Junos Fusion when **all** is entered.

**validate | no-validate**—(Junos OS Evolved only).

**with-old-snapshot-config**—(Optional) (Junos OS Evolved only) Rolls back system to the specified version with the old snapshot of the configuration used in that version. Otherwise, the rollback, by default, takes the current configuration.

**Required Privilege Level**

maintenance

**Related Documentation**

- *request system software abort*
- [request system software add on page 124](#)
- [request system software delete on page 138](#)
- *request system software validate*
- *request system configuration rescue delete*
- *request system configuration rescue save*
- [Routing Matrix with a TX Matrix Plus Router Solutions Page](#)

**List of Sample Output** [request system software rollback on page 147](#)

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

## Sample Output

### request system software rollback

```
user@host> request system software rollback
Verified SHA1 checksum of ./jbase-7.2R1.7.tgz
Verified SHA1 checksum of ./jdocs-7.2R1.7.tgz
Verified SHA1 checksum of ./jroute-7.2R1.7.tgz
Installing package './jbase-7.2R1.7.tgz' ...
Available space: 35495 require: 7335
Installing package './jdocs-7.2R1.7.tgz' ...
Available space: 35339 require: 3497
Installing package './jroute-7.2R1.7.tgz' ...
Available space: 35238 require: 6976
NOTICE: uncommitted changes have been saved in
/var/db/config/juniper.conf.pre-install
Reloading /config/juniper.conf.gz ...
Activating /config/juniper.conf.gz ...
mgd: commit complete
Restarting mgd ...
Restarting aprobed ...
Restarting apsd ...
Restarting cosd ...
Restarting fsad ...
Restarting fud ...
Restarting gcdrd ...
Restarting ilmid ...
Restarting irsd ...
Restarting l2tpd ...
Restarting mib2d ...
Restarting nasd ...
Restarting pppoed ...
Restarting rdd ...
Restarting rmopd ...
Restarting rtspd ...
Restarting sampled ...
Restarting serviced ...
Restarting snmpd ...
Restarting spd ...
Restarting vrrpd ...

WARNING: cli has been replaced by an updated version:
CLI release 7.2R1.7 built by builder on 2005-04-22 02:03:44 UTC
Restart cli using the new version ? [yes,no] (yes) yes

Restarting cli ...
user@host
```

## request system storage cleanup

**List of Syntax**    [Syntax on page 148](#)  
                           [Syntax \(EX Series Switches\) on page 148](#)  
                           [Syntax \(MX Series Router\) on page 148](#)  
                           [Syntax \(QFX Series\) on page 148](#)  
                           [Syntax \(SRX Series\) on page 148](#)  
                           [Syntax \(Junos OS Evolved\) on page 149](#)

**Syntax**    request system storage cleanup  
                   <dry-run>  
                   <no-confirm>  
                   <re0 | re1 | routing-engine (backup | both | local | master | other)>

**Syntax (EX Series Switches)**    request system storage cleanup  
   <all-members>  
   <dry-run>  
   <local>  
   <member *member-id*>  
   <no-confirm>  
   <re0 | re1 | routing-engine (backup | both | local | master | other)>  
   <satellite [slot-id *slot-id* | device-alias *alias-name*]>

**Syntax (MX Series Router)**    request system storage cleanup  
   <all-members>  
   <dry-run>  
   <local>  
   <member *member-id*>  
   <no-confirm>  
   <re0 | re1 | routing-engine (backup | both | local | master | other)>  
   <satellite [slot-id *slot-id* | device-alias *alias-name*]>

**Syntax (QFX Series)**    request system storage cleanup  
                                   <component (*serial number* | *UUID* | all)>  
                                   <director-group *name*>  
                                   <dry-run>  
                                   <infrastructure *name*>  
                                   <interconnect-device *name*>  
                                   <name-tag *name-tag*>  
                                   <no-confirm>  
                                   <node-group *name*>  
                                   <prune>  
                                   <qfabric (component *name*) | dry-run | name-tag | repository>  
                                   <repository (core | log)>  
                                   <re0 | re1 | routing-engine (backup | both | local | master | other)>

**Syntax (SRX Series)**    request system storage cleanup



|                           |   |
|---------------------------|---|
|                           | <pre>&lt;dry-run&gt; &lt;no-confirm&gt; &lt;re0   re1   routing-engine (backup   both   local   master   other)&gt;</pre>   |
| Syntax (Junos OS Evolved) | request system storage cleanup (dry-run   force-deep   no-confirm)  |
| Release Information       | <p>Command introduced in Junos OS Release 7.4.</p> <p><b>dry-run</b> option introduced in Junos OS Release 7.6.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 9.2 for SRX Series.</p> <p>Command introduced in Junos OS Release 11.1 for the QFX Series.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p> <p><b>satellite</b> option introduced in Junos OS Release 14.2R3.</p> <p><b>no-confirm</b> and (<b>re0   re1   routing-engine (backup   both   local   master   other)</b>) options introduced in Junos OS 17.3R1.</p> <p><b>force-deep</b> options introduced in Junos OS Evolved Release 18.3R1.</p>   |
| Description               | <p>Free storage space on the router or switch by rotating log files and proposing a list of files for deletion. User input is required for file deletion. On a QFabric system, you can delete debug files located on individual devices or on the entire QFabric system.</p> <p>The Junos OS Evolved implementation of the <b>request system storage cleanup</b> command is slightly different from the implementation on Junos OS:</p> <ul style="list-style-type: none"> <li>The user is prompted to specify the <b>dry-run</b> option:</li> </ul> <pre>Please check the list of files to be deleted using the dry-run option. Continue anyway without checking? [yes,no] (yes)</pre> <p>The command cleans up any ISO files on the system, rotates syslogs, clears trace file. It does not remove user-created files</p> <ul style="list-style-type: none"> <li>To delete any user-generated files as well, use the <b>force-deep</b> option.</li> <li>In Junos OS Evolved, the system computes the available space and emits o/p on console for reference.</li> </ul> |
| Options                   | <b>all-members</b> —(EX4200 switches and MX Series routers only) (Optional) Delete files on the Virtual Chassis master Routing Engine only.   |



**NOTE:** To delete files on the other members of the Virtual Chassis configuration, log in to each backup Routing Engine and delete the files using the **request system storage cleanup local** command.

**component** (*UUID | serial number | all*)—(QFabric systems only) (Optional) Delete files located on individual QFabric system devices or on the entire QFabric system.

**director-group name**—(QFabric systems only) (Optional) Delete files on the Director group.

**dry-run**—(Optional) List files proposed for deletion (without deleting them).

**force-deep**—(Junos OS Evolved only) (Optional) Clear temporary user-generated files in */home/user* and */var/tmp* as well as any ISO files on the system, rotates syslogs, clears trace file. User is prompted to use the **dry-run** option.

**infrastructure name**—(QFabric systems only) (Optional) Delete files on the fabric control Routing Engine and fabric manager Routing Engine.

**interconnect-device name**—(QFabric systems only) (Optional) Delete files on the Interconnect device.

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

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

**name-tag name-tag**—(QFabric systems only) (Optional) Delete debug files that match a specific regular expression.

**node-group name**—(QFabric systems only) (Optional) Delete files on the Node group.

**no-confirm**—(Optional) Do not ask for confirmation before doing the cleanup.

**prune**—(QFabric systems only) (Optional) Delete debug files located in either the core or log debug repositories of a QFabric system device.

**qfabric component name**—(QFabric systems only) (Optional) Delete debug files located in the debug repositories of a QFabric system device.

**(re0 | re1 | routing-engine (backup | both | local | master | other))**—(Optional) Request operation on system storage on RE0, RE1, or on specified Routing Engine by these classifications: backup, both, local, master, or other.

When Routing Engine is specified, the below message is shown before listing the files and deleting them.

```
Please check the list of files to be deleted using the dry-run option. i.e.  
request system storage cleanup dry-run  
Do you want to proceed ? [yes,no] (no)
```

**repository (core | log)**—(QFabric systems only) (Optional) Specify the repository on the QFabric system device for which you want to delete debug files.

**satellite** [**slot-id** *slot-id* | **device-alias** *alias-name*](Junos Fusion only) (Optional)  
Specify the satellite device in the Junos Fusion by FPC ID or device alias name for which you want to delete debug files.

**Additional Information** If logging is configured and being used, the **dry-run** option rotates the log files. In that case, the output displays the message “Currently rotating log files, please wait.” If no logging is currently under way, the output displays only a list of files to delete.

**Required Privilege Level** maintenance

**List of Sample Output** [request system storage cleanup dry-run on page 152](#)  
[request system storage cleanup on page 152](#)  
[request system storage cleanup \(Junos OS Evolved\) on page 153](#)  
[request system storage cleanup dry-run \(Junos OS Evolved\) on page 153](#)  
[request system storage cleanup force-deep \(Junos OS Evolved\) on page 154](#)  
[request system storage cleanup director-group \(QFabric Systems\) on page 156](#)  
[request system storage cleanup infrastructure device-name \(QFabric Systems\) on page 158](#)  
[request system storage cleanup interconnect-device device-name \(QFabric Systems\) on page 159](#)  
[request system storage cleanup node-group group-name \(QFabric Systems\) on page 160](#)  
[request system storage cleanup qfabric component device-name \(QFabric Systems\) on page 161](#)  
[request system storage cleanup qfabric component device-name repository core \(QFabric Systems\) on page 161](#)  
[request system storage cleanup qfabric component all \(QFabric Systems\) on page 161](#)

**Output Fields** [Table 7 on page 151](#) describes the output fields for the **request system storage cleanup** command. Output fields are listed in the approximate order in which they appear.

*Table 7: request system storage cleanup Output Fields*

| Field Name                      | Field Description   |
|---------------------------------|---|
| <b>List of files to delete:</b> | Shows list of files available for deletion.   |
| <b>Size</b>                     | Size of the core-dump file.   |
| <b>Date</b>                     | Last core-dump file modification date and time.   |
| <b>Name</b>                     | Name of the core-dump file.   |
| <b>Directory to delete:</b>     | Shows list of directories available for deletion.   |
| <b>Repository scope:</b>        | Repository where core-dump files and log files are stored. The core-dump files are located in the <b>core</b> repository, and the log files are located in the <b>log</b> repository. The default <b>Repository scope</b> is shared since both the <b>core</b> and <b>log</b> repositories are shared by all of the QFabric system devices. |

Table 7: request system storage cleanup Output Fields (continued)

| Field Name  | Field Description                                   |
|---|---|
| Repository head:                                      | Name of the top-level repository location.          |
| Repository name:                                      | Name of the repository: <b>core</b> or <b>log</b> . |
| Creating list of debug artifacts to be removed under: | Shows location of files available for deletion.     |
| List of debug artifacts to be removed under:          | Shows list of files available for deletion.         |

## Sample Output

### request system storage cleanup dry-run

```
user@host> request system storage cleanup dry-run
```

Currently rotating log files, please wait.  
This operation can take up to a minute.

List of files to delete:

| Size  | Date         | Name   |
|-------|--------------|--|
| 11.4K | Mar 8 15:00  | /var/log/messages.1.gz                         |
| 7245B | Feb 5 15:00  | /var/log/messages.3.gz                         |
| 11.8K | Feb 22 13:00 | /var/log/messages.2.gz                         |
| 3926B | Mar 16 13:57 | /var/log/messages.0.gz                         |
| 3962B | Feb 22 12:47 | /var/log/sampled.1.gz                          |
| 4146B | Mar 8 12:20  | /var/log/sampled.0.gz                          |
| 4708B | Dec 21 11:39 | /var/log/sampled.2.gz                          |
| 7068B | Jan 16 18:00 | /var/log/messages.4.gz                         |
| 13.7K | Dec 27 22:00 | /var/log/messages.5.gz                         |
| 890B  | Feb 22 17:22 | /var/tmp/sampled.pkts                          |
| 65.8M | Oct 26 09:10 | /var/sw/pkg/jinstall-7.4R1.7-export-signed.tgz |
| 63.1M | Oct 26 09:13 | /var/sw/pkg/jbundle-7.4R1.7.tgz                |

### request system storage cleanup

```
user@host> request system storage cleanup
```

Currently rotating log files, please wait.  
This operation can take up to a minute.

List of files to delete:

| Size  | Date         | Name                   |
|-------|--------------|------------------------|
| 11.4K | Mar 8 15:00  | /var/log/messages.1.gz |
| 7245B | Feb 5 15:00  | /var/log/messages.3.gz |
| 11.8K | Feb 22 13:00 | /var/log/messages.2.gz |
| 3926B | Mar 16 13:57 | /var/log/messages.0.gz |
| 11.6K | Mar 8 15:00  | /var/log/messages.5.gz |
| 7254B | Feb 5 15:00  | /var/log/messages.6.gz |
| 12.9K | Feb 22 13:00 | /var/log/messages.8.gz |

```

3726B Mar 16 13:57 /var/log/messages.7.gz
3962B Feb 22 12:47 /var/log/sampled.1.gz
4146B Mar 8 12:20 /var/log/sampled.0.gz
4708B Dec 21 11:39 /var/log/sampled.2.gz
7068B Jan 16 18:00 /var/log/messages.4.gz
13.7K Dec 27 22:00 /var/log/messages.5.gz
890B Feb 22 17:22 /var/tmp/sampled.pkts
65.8M Oct 26 09:10 /var/sw/pkg/jinstall-7.4R1.7-export-signed.tgz
63.1M Oct 26 09:13 /var/sw/pkg/jbundle-7.4R1.7.tgz

```

Delete these files ? [yes,no] (yes)

### request system storage cleanup (Junos OS Evolved)

```
user@host> request system storage cleanup
```

Please check the list of files to be deleted using the dry-run option.  
Continue anyway without checking? [yes,no] (no)

### request system storage cleanup dry-run (Junos OS Evolved)

```
user@host> request system storage cleanup dry-run
```

```
-----
node: re0
-----
```

```
=== Other candidate logs, traces, core files which would be removed ===
```

```
total 0
```

```

-rw-r--r-- 1 root root 0 Jun 14 11:38 /var/log/access.log
-rw-r--r-- 1 root root 1243 Jun 14 11:55 /var/log/agentd-trace.log
-rw-r--r-- 1 root root 638 Jun 14 11:54 /var/log/alarm-mgmt-trace.log
-rw-r--r-- 1 root root 3319611 Jun 14 13:40 /var/log/alarm-mgmt.log
-rw-r--r-- 1 root root 620 Jun 14 11:55 /var/log/alarmd-trace.log
-rw-r--r-- 1 root root 3436048 Jun 14 13:40 /var/log/alarmd.log
-rw-r--r-- 1 root root 621 Jun 14 11:55 /var/log/arpd-trace.log
-rw-r--r-- 1 root root 6595285 Jun 14 15:14 /var/log/arpd.log
-rw-r--r-- 1 root root 645 Jun 14 11:55 /var/log/bios-manager-trace.log
-rw-r--r-- 1 root root 3165769 Jun 14 13:40 /var/log/bios-manager.log
-rw-r--r-- 1 root root 2152 Jun 14 11:55 /var/log/ccdbq.log
-rw-r--r-- 1 root root 687637 Jun 14 13:40 /var/log/ccdinfra.log
-rw-r--r-- 1 root root 1861 Jun 14 11:55 /var/log/ccdre-trace.log
-rw-r--r-- 1 root root 611 Jun 14 11:55 /var/log/cfmd-trace.log
-rw-r--r-- 1 root root 3256076 Jun 14 13:40 /var/log/cfmd.log
-rw-r--r-- 1 root root 627 Jun 14 11:54 /var/log/charonctl-trace.log
-rw-r--r-- 1 root root 3138411 Jun 14 13:40 /var/log/charonctl.log
-rw-r--r-- 1 root root 180 Jun 14 11:54 /var/log/charonctl_trace.log
-rw-r--r-- 1 root root 85557 Jun 14 11:47
/var/log/cli-mgd-interaction.log.1497465690
-rw-r--r-- 1 root root 23603 Jun 14 11:47
/var/log/cli-mgd-interaction.log.1497466033
. . .
-rw-r--r-- 1 root root 11520 Jun 15 14:19 /var/log/wtmp
-rw-r--r-- 1 root root 12938555 Jun 15 14:24 /var/log/zookeeper--server-re0.log
-rw-r--r-- 1 root root 926 Jun 14 11:53 /var/log/zookeeper--server-re0.out

```

```
/var/log/journal:
```

```
total 4
```

```
drwxr-xr-x 2 root root 4096 Jun 14 11:37 ecd9ed14512f11e7953f0050569fd61f
```

```

/var/log/junosvm:
total 0

/var/log/lttng-traces:
total 8
drwxr-x--- 3 root root 4096 Jun 14 11:54 re0
drwxr-x--- 3 root root 4096 Jun 14 11:54 re1

/var/log/lttng-traces-re1:
total 8
drwxr-x--- 3 root root 4096 Jun 14 11:39 re0
drwxr-x--- 3 root root 4096 Jun 14 11:39 re1

/var/log/traces:
total 26472
drwxr-xr-x 2 root root 4096 Jun 14 11:43 fpc0.ccdpfe-t1.0
drwxr-xr-x 2 root root 4096 Jun 14 11:59 fpc0.ccdpfe-t1.1
drwxr-xr-x 2 root root 4096 Jun 14 11:59 fpc0.ccdpfe-t1.10
drwxr-xr-x 2 root root 4096 Jun 14 11:59 fpc0.ccdpfe-t1.11
drwxr-xr-x 2 root root 4096 Jun 14 11:59 fpc0.ccdpfe-t1.12
drwxr-xr-x 2 root root 4096 Jun 14 11:59 fpc0.ccdpfe-t1.13
drwxr-xr-x 2 root root 4096 Jun 14 11:59 fpc0.ccdpfe-t1.14
. . .
drwxr-xr-x 2 root root 4096 Jun 14 18:42 re1.trace_client.2
drwxr-xr-x 2 root root 4096 Jun 15 01:31 re1.trace_client.3
drwxr-xr-x 2 root root 4096 Jun 15 08:21 re1.trace_client.4
drwxr-xr-x 2 root root 4096 Jun 14 11:39 re1.trace_conf.0
drwxr-xr-x 2 root root 4096 Jun 14 11:54 re1.trace_conf.1
drwxr-xr-x 2 root root 4096 Jun 14 11:39 re1.trace_server.0
drwxr-xr-x 2 root root 4096 Jun 14 11:54 re1.trace_server.1
drwxr-xr-x 2 root root 4096 Jun 14 20:59 re1.trace_server.2
drwxr-xr-x 2 root root 4096 Jun 15 06:06 re1.trace_server.3

/var/log/watchdog:
total 0
=== Removes any ISO files in /data partition ===
find: '/var/lib/ftp/in/*': No such file or directory
=== Current list of software versions installed ===
=== Software versions except current and rollback would be removed ===
List of installed version(s) :

[1] -> junos-evo-install-qfx-x86-64-16.2I20170614010254_evo-builder - [2017-06-14
11:36:21]

    '-' running version
    '>' next boot version
    '<' rollback boot version

```

### request system storage cleanup force-deep (Junos OS Evolved)

```

user@host> request system storage cleanup force-deep

Please check the list of files to be deleted using the dry-run option.
Continue anyway without checking? [yes,no] (no) yes

-----
node: re0
-----
.....

```

```

===== Start cleanup now =====
=== Start removing other logs, traces, core files ===
Clearing core files
Clearing FPC logs
Clearing logical-systems logs
=== Clearing journal logs ===
Clearing log: /var/log/RE_journal.log
Clearing log: /var/log/RE_journal_boot.log
Clearing log: /var/log/alarm-mgmd
Clearing log: /var/log/appDemo_stdout
Clearing log: /var/log/charonctl_trace.log
Clearing log: /var/log/configd-streamer.log
Clearing log: /var/log/core_mgr.log
Clearing log: /var/log/cscript.log
Clearing log: /var/log/eth_linkmon.log
Clearing log: /var/log/evo-cda-zx.log
Clearing log: /var/log/evoinit.log
Clearing log: /var/log/fibd-proxy.log
Clearing log: /var/log/i2ctrace.log
Clearing log: /var/log/i2ctrace_spmbo.log
Clearing log: /var/log/i2ctrace_spmbl.log
Clearing log: /var/log/icmpd.log
Clearing log: /var/log/ifinfo.log
Clearing log: /var/log/imgd_svr.log
Clearing log: /var/log/install
Clearing log: /var/log/interactive-commands
Clearing log: /var/log/jsd
Clearing log: /var/log/lastlog
Clearing log: /var/log/mcelog.log
Clearing log: /var/log/messages
Clearing log: /var/log/mgd-api
Clearing log: /var/log/mgmt-ethd-helper.log
Clearing log: /var/log/mib2d
Clearing log: /var/log/na-grpcd
Clearing log: /var/log/objmon_sync.json
Clearing log: /var/log/packetio-cout.log
Clearing log: /var/log/picd.log
Clearing log: /var/log/platform_mon.log
Clearing log: /var/log/policer.log
Clearing log: /var/log/postinstall.log
Clearing log: /var/log/ptp_fpga.log
Clearing log: /var/log/reboot_node.log
Clearing log: /var/log/rollback.log
Clearing log: /var/log/security
Clearing log: /var/log/semctl.log
Clearing log: /var/log/set_mgmt_mac.log
Clearing log: /var/log/shutdown_complete.log
Clearing log: /var/log/sinet.log
Clearing log:
/var/log/smartd-attr-SFSA200GM3AA4T0_C_HC_636_JUN-000060139624B1000020.log
Clearing log:
/var/log/smartd-attr-SFSA200GM3AA4T0_C_HC_636_JUN-000060139624B1000022.log
Clearing log: /var/log/snmpd
Clearing log: /var/log/ss.log
Clearing log: /var/log/ssh-key-utils.log
Clearing log: /var/log/sshd_lua.log
Clearing log: /var/log/sysconfig.log
Clearing log: /var/log/sysman.conf
Clearing log: /var/log/system-events
Clearing log: /var/log/upgrade_master.log

```

```

Clearing log: /var/log/uswitch.log
Clearing log: /var/log/uswitch.log.prev
Clearing log: /var/log/validator_debug.log
Clearing log: /var/log/wtmp
Clearing log: /var/log/zookeeper--server-re.log
Clearing log: /var/log/zookeeper--server-re.out
Clearing log: /var/log/ztp.log
=== Clearing all traces ===
=== Clearing SI traces ===
=== Removing other logs, traces, core files completed ===
=== Started removing any ISO files in /data
=== Removing any ISO files in /data completed
=== Start Software versions cleanup ===
Removing older software versions except current and rollback
=== Software versions cleanup completed ===
===== Cleanup done =====
Current space available in /soft: 12372572 K
Current space available in /data: 2638752 K
Cannot delete junos-evo-install-qfx-fixed-x86-64-18.3I20180906130134_mkamil - It
is the rollback version
Cannot delete junos-evo-install-qfx-fixed-x86-64-18.3-20180906.3 - It is the
current version
Removing version junos-evo-install-qfx-x86-64-16.2I20180516093649...
Done.

```

### request system storage cleanup director-group (QFabric Systems)

```
user@switch> request system storage cleanup director-group
```

List of files to delete:

|      | Size                | Date                                | Name |
|------|---------------------|-------------------------------------|------|
| 4.0K | 2011-11-07 05:16:29 | /tmp/2064.sfcauth                   |      |
| 4.0K | 2011-11-07 05:07:34 | /tmp/30804.sfcauth                  |      |
| 4.0K | 2011-11-07 04:13:41 | /tmp/26792.sfcauth                  |      |
| 4.0K | 2011-11-07 04:13:39 | /tmp/26432.sfcauth                  |      |
| 0    | 2011-11-07 07:45:40 | /tmp/cluster_cleanup.log            |      |
| 1.3M | 2011-11-07 07:39:11 | /tmp/cn_monitor.20111107-052401.log |      |
| 4.0K | 2011-11-07 07:36:29 | /tmp/clustat.28019.log              |      |
| 4.0K | 2011-11-07 07:36:29 | /tmp/clustat_x.28019.log            |      |
| 9.6M | 2011-11-07 05:30:24 | /tmp/sfc.2.log                      |      |
| 4.0K | 2011-11-07 05:28:11 | /tmp/mgd-init.1320672491.log        |      |
| 248K | 2011-11-07 05:19:24 | /tmp/cn_monitor.20111107-045111.log |      |
| 4.0K | 2011-11-07 05:17:18 | /tmp/clustat.3401.log               |      |
| 4.0K | 2011-11-07 05:17:18 | /tmp/clustat_x.3401.log             |      |
| 8.0K | 2011-11-07 04:58:25 | /tmp/mgd-init.1320670633.log        |      |
| 0    | 2011-11-07 04:54:01 | /tmp/mysql_db_install_5.1.37.log    |      |
| 4.0K | 2011-11-07 04:52:08 | /tmp/cn_send.log                    |      |
| 0    | 2011-11-07 04:52:00 | /tmp/init_eth0.log                  |      |
| 4.0K | 2011-11-07 04:49:35 | /tmp/install_interfaces.sh.log      |      |
| 4.0K | 2011-11-07 04:48:15 | /tmp/bootstrap.sh.log               |      |
| 160K | 2011-11-07 04:47:43 | /tmp/bootstrap_cleanup.log          |      |
| 38M  | 2011-11-07 04:42:42 | /tmp/cn_monitor.20111104-110308.log |      |
| 4.0K | 2011-11-07 04:38:47 | /tmp/clustat.30913.log              |      |
| 4.0K | 2011-11-07 04:38:47 | /tmp/clustat_x.30913.log            |      |
| 4.0K | 2011-11-07 04:38:03 | /tmp/dcf_upgrade.sh.remove.log      |      |
| 4.0K | 2011-11-07 04:38:03 | /tmp/peer_update.log                |      |
| 4.0K | 2011-11-07 04:38:02 | /tmp/dcf_upgrade.log                |      |
| 4.0K | 2011-11-07 04:38:02 | /tmp/perl_mark_upgrade.log          |      |



```

8.0K 2011-11-07 04:13:42 /tmp/install_dcf_rpm.log
4.0K 2011-11-07 04:13:06 /tmp/00_cleanup.sh.1320667986.log
0 2011-11-07 04:13:06 /tmp/ccif_patch_4410_4450.sh.1320667986.log
4.0K 2011-11-07 04:13:06 /tmp/pcf-tools.sh.1320667986.log
0 2011-11-07 04:13:06 /tmp/initial.sh.1320667986.log
0 2011-11-07 04:13:06 /tmp/inventory.sh.1320667986.log
4.0K 2011-11-07 04:13:06 /tmp/qf-db.sh.1320667986.log
4.0K 2011-11-07 04:13:06 /tmp/sfc.sh.1320667986.log
8.0K 2011-11-07 04:13:05 /tmp/jinstall-qfabric.log
8.0K 2011-11-04 11:10:24 /tmp/mgd-init.1320430192.log
4.0K 2011-11-04 11:07:03 /tmp/mysql_dcf_db_install.log
8.0K 2011-11-04 10:55:07 /tmp/ccif_patch_4410_4450.sh.1320429307.log
8.0K 2011-11-04 10:55:07 /tmp/initial.sh.1320429307.log
4.0K 2011-11-04 10:55:07 /tmp/inventory.sh.1320429307.log
8.0K 2011-11-04 10:55:07 /tmp/sfc.sh.1320429307.log
4.0K 2011-11-04 10:54:09 /tmp/ks-script-Ax0tz5.log
4.0K 2011-11-07 04:13:06 /tmp//sfc.sh.1320667986.log
8.0K 2011-11-04 10:55:07 /tmp//sfc.sh.1320429307.log

```

Directory to delete:

```

45M 2011-11-08 10:57:43 /tmp/sfc-captures

```

List of files to delete:

|      | Size       | Date     | Name                                |
|------|------------|----------|-------------------------------------|
| 4.0K | 2011-11-08 | 05:47:47 | /tmp/5713.sfcauth                   |
| 4.0K | 2011-11-08 | 05:14:32 | /tmp/14494.sfcauth                  |
| 4.0K | 2011-11-08 | 05:11:47 | /tmp/9978.sfcauth                   |
| 4.0K | 2011-11-08 | 05:09:37 | /tmp/6128.sfcauth                   |
| 4.0K | 2011-11-08 | 05:04:28 | /tmp/29703.sfcauth                  |
| 4.0K | 2011-11-07 | 11:59:10 | /tmp/7811.sfcauth                   |
| 4.0K | 2011-11-07 | 11:36:08 | /tmp/32415.sfcauth                  |
| 4.0K | 2011-11-07 | 11:30:30 | /tmp/22406.sfcauth                  |
| 4.0K | 2011-11-07 | 11:24:37 | /tmp/12131.sfcauth                  |
| 4.0K | 2011-11-07 | 10:48:42 | /tmp/12687.sfcauth                  |
| 4.0K | 2011-11-07 | 09:27:20 | /tmp/31082.sfcauth                  |
| 4.0K | 2011-11-07 | 07:33:58 | /tmp/14633.sfcauth                  |
| 4.0K | 2011-11-07 | 05:08:25 | /tmp/15447.sfcauth                  |
| 4.0K | 2011-11-07 | 04:12:29 | /tmp/26874.sfcauth                  |
| 4.0K | 2011-11-07 | 04:12:27 | /tmp/26713.sfcauth                  |
| 4.0K | 2011-11-07 | 03:49:17 | /tmp/17691.sfcauth                  |
| 4.0K | 2011-11-05 | 01:32:23 | /tmp/5716.sfcauth                   |
| 4.0K | 2011-11-07 | 08:00:17 | /tmp/sfcsnmpd.log                   |
| 4.0K | 2011-11-07 | 07:57:50 | /tmp/cluster_cleanup.log            |
| 824K | 2011-11-07 | 07:38:37 | /tmp/cn_monitor.20111107-053643.log |
| 4.0K | 2011-11-07 | 07:36:30 | /tmp/clustat.18399.log              |
| 4.0K | 2011-11-07 | 07:36:30 | /tmp/clustat_x.18399.log            |
| 4.0K | 2011-11-07 | 07:35:47 | /tmp/command_lock.log               |
| 4.0K | 2011-11-07 | 05:39:54 | /tmp/mgd-init.1320673194.log        |
| 92K  | 2011-11-07 | 05:19:25 | /tmp/cn_monitor.20111107-050412.log |
| 4.0K | 2011-11-07 | 05:17:20 | /tmp/clustat.30115.log              |
| 4.0K | 2011-11-07 | 05:17:20 | /tmp/clustat_x.30115.log            |
| 8.0K | 2011-11-07 | 05:08:07 | /tmp/mgd-init.1320671241.log        |
| 4.0K | 2011-11-07 | 05:04:57 | /tmp/cn_send.log                    |
| 0    | 2011-11-07 | 05:04:52 | /tmp/init_eth0.log                  |
| 4.0K | 2011-11-07 | 05:02:38 | /tmp/install_interfaces.sh.log      |
| 4.0K | 2011-11-07 | 05:01:19 | /tmp/bootstrap.sh.log               |
| 160K | 2011-11-07 | 05:00:47 | /tmp/bootstrap_cleanup.log          |
| 28M  | 2011-11-07 | 04:42:27 | /tmp/cn_monitor.20111104-112954.log |
| 4.0K | 2011-11-07 | 04:38:49 | /tmp/clustat.6780.log               |

```

4.0K  2011-11-07 04:38:49 /tmp/clustat_x.6780.log
4.0K  2011-11-07 04:38:05 /tmp/issue_event.log
4.0K  2011-11-07 04:38:05 /tmp/peer_upgrade_reboot.log
12K   2011-11-07 04:38:05 /tmp/primary_update.log
4.0K  2011-11-07 04:38:04 /tmp/dcf_upgrade.sh.remove.log
4.0K  2011-11-07 04:38:04 /tmp/peer_rexec_upgrade.log
4.0K  2011-11-07 04:13:42 /tmp/peer_install_dcf_rpm.log
4.0K  2011-11-07 04:11:57 /tmp/dcf-tools.sh.1320667917.log
0     2011-11-07 04:11:57 /tmp/initial.sh.1320667917.log
0     2011-11-07 04:11:57 /tmp/inventory.sh.1320667917.log
4.0K  2011-11-07 04:11:57 /tmp/qf-db.sh.1320667917.log
4.0K  2011-11-07 04:11:57 /tmp/sfc.sh.1320667917.log
4.0K  2011-11-07 04:11:56 /tmp/00_cleanup.sh.1320667916.log
0     2011-11-07 04:11:56 /tmp/ccif_patch_4410_4450.sh.1320667916.log
8.0K  2011-11-07 04:11:56 /tmp/jinstall-qfabric.log
4.0K  2011-11-07 04:11:33 /tmp/dcf_upgrade.log
8.0K  2011-11-04 11:53:12 /tmp/mgd-init.1320432782.log
8.0K  2011-11-04 11:06:17 /tmp/ccif_patch_4410_4450.sh.1320429977.log
8.0K  2011-11-04 11:06:17 /tmp/initial.sh.1320429977.log
4.0K  2011-11-04 11:06:17 /tmp/inventory.sh.1320429977.log
8.0K  2011-11-04 11:06:17 /tmp/sfc.sh.1320429977.log
4.0K  2011-11-04 11:05:19 /tmp/ks-script_tnWeb.log
4.0K  2011-11-07 04:11:57 /tmp//sfc.sh.1320667917.log
8.0K  2011-11-04 11:06:17 /tmp//sfc.sh.1320429977.log

```

Directory to delete:

```
49M   2011-11-08 10:45:20 /tmp/sfc-captures
```

### request system storage cleanup infrastructure device-name (QFabric Systems)

```
user@switch> request system storage cleanup infrastructure FC
```

```
re0:
```

List of files to delete:

| Size   | Date        | Name   |
|--------|-------------|--|
| 139B   | Nov 8 19:03 | /var/log/default-log-messages.0.gz   |
| 5602B  | Nov 8 19:03 | /var/log/messages.0.gz   |
| 28.4K  | Nov 8 10:15 | /var/log/messages.1.gz   |
| 35.2K  | Nov 7 13:45 | /var/log/messages.2.gz   |
| 207B   | Nov 7 16:02 | /var/log/wtmp.0.gz   |
| 27B    | Nov 7 12:14 | /var/log/wtmp.1.gz   |
| 184.4M | Nov 7 12:16 | /var/sw/pkg/jinstall-dc-re-11.3I20111104_1216_dc-builder-domestic-signed.tgz |
| 124.0K | Nov 7 15:59 | /var/tmp/gres-tp/env.dat   |
| 0B     | Nov 7 12:57 | /var/tmp/gres-tp/lock  |
| 155B   | Nov 7 16:02 | /var/tmp/krt_gencfg_filter.txt   |
| 0B     | Nov 7 12:35 | /var/tmp/last_ccif_update  |
| 1217B  | Nov 7 12:15 | /var/tmp/loader.conf.preinstall  |
| 184.4M | Nov 6 07:11 | /var/tmp/mchassis-install.tgz  |
| 10.8M  | Nov 7 12:16 | /var/tmp/preinstall/bootstrap-install-11.3I20111104_1216_dc-builder.tar      |
| 57.4K  | Nov 7 12:16 | /var/tmp/preinstall/configs-11.3I20111104_1216_dc-builder.tgz                |
| 259B   | Nov 7 12:16 | /var/tmp/preinstall/install.conf   |
| 734.3K | Nov 4 13:46 | /var/tmp/preinstall/jboot-dc-re-11.3I20111104_1216_dc-builder.tgz            |
| 177.8M | Nov 7 12:16 |  |

```

/var/tmp/preinstall/jbundle-dc-re-11.3I20111104_1216_dc-builder-domestic.tgz
124B Nov 7 12:15 /var/tmp/preinstall/metatags
1217B Nov 7 12:16 /var/tmp/preinstall_boot_loader.conf
0B Nov 7 16:02 /var/tmp/rtssdb/if-rtssdb

```

### request system storage cleanup interconnect-device device-name (QFabric Systems)

```
user@switch> request system storage cleanup interconnect IC
```

```
re1:
```

```
-----
List of files to delete:
```

|  | Size    | Date        | Name                               |
|--|---------|-------------|------------------------------------|
|  | 11B     | Nov 7 15:55 | /var/jail/tmp/alarmd.ts            |
|  | 128B    | Nov 8 19:06 | /var/log/default-log-messages.0.gz |
|  | 9965B   | Nov 8 19:06 | /var/log/messages.0.gz             |
|  | 15.8K   | Nov 8 12:30 | /var/log/messages.1.gz             |
|  | 15.8K   | Nov 8 11:00 | /var/log/messages.2.gz             |
|  | 15.7K   | Nov 8 07:30 | /var/log/messages.3.gz             |
|  | 15.8K   | Nov 8 04:00 | /var/log/messages.4.gz             |
|  | 15.7K   | Nov 8 00:30 | /var/log/messages.5.gz             |
|  | 18.7K   | Nov 7 21:00 | /var/log/messages.6.gz             |
|  | 17.6K   | Nov 7 19:00 | /var/log/messages.7.gz             |
|  | 58.3K   | Nov 7 16:00 | /var/log/messages.8.gz             |
|  | 20.3K   | Nov 7 15:15 | /var/log/messages.9.gz             |
|  | 90B     | Nov 7 15:41 | /var/log/wtmp.0.gz                 |
|  | 57B     | Nov 7 12:41 | /var/log/wtmp.1.gz                 |
|  | 124.0K  | Nov 7 15:42 | /var/tmp/gres-tp/env.dat           |
|  | 0B      | Nov 7 12:40 | /var/tmp/gres-tp/lock              |
|  | 0B      | Nov 7 12:41 | /var/tmp/if-rtssdb/env.lck         |
|  | 12.0K   | Nov 7 15:41 | /var/tmp/if-rtssdb/env.mem         |
|  | 132.0K  | Nov 7 15:55 | /var/tmp/if-rtssdb/shm_usr1.mem    |
|  | 2688.0K | Nov 7 15:41 | /var/tmp/if-rtssdb/shm_usr2.mem    |
|  | 2048.0K | Nov 7 15:41 | /var/tmp/if-rtssdb/trace.mem       |
|  | 730B    | Nov 7 19:57 | /var/tmp/juniper.conf+.gz          |
|  | 155B    | Nov 7 15:53 | /var/tmp/krt_gencfg_filter.txt     |
|  | 0B      | Nov 7 15:41 | /var/tmp/rtssdb/if-rtssdb          |

```
re0:
```

```
-----
List of files to delete:
```

|  | Size  | Date        | Name                               |
|--|-------|-------------|------------------------------------|
|  | 11B   | Nov 7 15:55 | /var/jail/tmp/alarmd.ts            |
|  | 121B  | Nov 8 19:06 | /var/log/default-log-messages.0.gz |
|  | 16.7K | Nov 8 19:06 | /var/log/messages.0.gz             |
|  | 22.2K | Nov 8 17:45 | /var/log/messages.1.gz             |
|  | K     | Nov 8 17:00 | /var/log/messages.2.gz             |
|  | 21.6K | Nov 8 16:00 | /var/log/messages.3.gz             |
|  | 17.9K | Nov 8 14:30 | /var/log/messages.4.gz             |
|  | 19.4K | Nov 8 13:30 | /var/log/messages.5.gz             |
|  | 18.2K | Nov 8 12:30 | /var/log/messages.6.gz             |
|  | 20.4K | Nov 8 11:30 | /var/log/messages.7.gz             |
|  | 21.4K | Nov 8 10:15 | /var/log/messages.8.gz             |
|  | 21.0K | Nov 8 09:00 | /var/log/messages.9.gz             |
|  | 19.9K | Nov 8 08:13 | /var/log/snmp-traps.0.gz           |
|  | 203B  | Nov 8 15:36 | /var/log/wtmp.0.gz                 |

```

57B Nov 7 12:41 /var/log/wtmp.1.gz
124.0K Nov 7 15:42 /var/tmp/gres-tp/env.dat
0B Nov 7 12:40 /var/tmp/gres-tp/lock
0B Nov 7 12:41 /var/tmp/if-rtbdb/env.lck
12.0K Nov 7 15:41 /var/tmp/if-rtbdb/env.mem
132.0K Nov 7 15:55 /var/tmp/if-rtbdb/shm_usr1.mem
2688.0K Nov 7 15:41 /var/tmp/if-rtbdb/shm_usr2.mem
2048.0K Nov 7 15:41 /var/tmp/if-rtbdb/trace.mem
727B Nov 7 15:54 /var/tmp/juniper.conf+.gz
155B Nov 7 15:55 /var/tmp/krt_gencfg_filter.txt
0B Nov 7 15:41 /var/tmp/rtbdb/if-rtbdb

```

### request system storage cleanup node-group group-name (QFabric Systems)

```
user@switch> request system storage cleanup node-group NW-NG
```

```
BBAK0372:
```

```
-----
List of files to delete:
```

|  | Size    | Date        | Name                               |
|--|---------|-------------|------------------------------------|
|  | 126B    | Nov 8 19:07 | /var/log/default-log-messages.0.gz |
|  | 179B    | Nov 7 13:32 | /var/log/install.0.gz              |
|  | 22.9K   | Nov 8 19:07 | /var/log/messages.0.gz             |
|  | 26.5K   | Nov 8 17:30 | /var/log/messages.1.gz             |
|  | 20.5K   | Nov 8 13:15 | /var/log/messages.2.gz             |
|  | 33.2K   | Nov 7 17:45 | /var/log/messages.3.gz             |
|  | 35.5K   | Nov 7 15:45 | /var/log/messages.4.gz             |
|  | 339B    | Nov 8 17:10 | /var/log/wtmp.0.gz                 |
|  | 58B     | Nov 7 12:40 | /var/log/wtmp.1.gz                 |
|  | 124.0K  | Nov 8 17:08 | /var/tmp/gres-tp/env.dat           |
|  | 0B      | Nov 7 12:39 | /var/tmp/gres-tp/lock              |
|  | 0B      | Nov 7 12:59 | /var/tmp/if-rtbdb/env.lck          |
|  | 12.0K   | Nov 8 17:09 | /var/tmp/if-rtbdb/env.mem          |
|  | 2688.0K | Nov 8 17:09 | /var/tmp/if-rtbdb/shm_usr1.mem     |
|  | 132.0K  | Nov 8 17:09 | /var/tmp/if-rtbdb/shm_usr2.mem     |
|  | 2048.0K | Nov 8 17:09 | /var/tmp/if-rtbdb/trace.mem        |
|  | 1082B   | Nov 8 17:09 | /var/tmp/juniper.conf+.gz          |
|  | 155B    | Nov 7 17:39 | /var/tmp/krt_gencfg_filter.txt     |
|  | 0B      | Nov 8 17:09 | /var/tmp/rtbdb/if-rtbdb            |

```
EE3093:
```

```
-----
List of files to delete:
```

|  | Size  | Date        | Name                               |
|--|-------|-------------|------------------------------------|
|  | 11B   | Nov 8 17:33 | /var/jail/tmp/alarmd.ts            |
|  | 119B  | Nov 8 19:08 | /var/log/default-log-messages.0.gz |
|  | 180B  | Nov 7 17:41 | /var/log/install.0.gz              |
|  | 178B  | Nov 7 13:32 | /var/log/install.1.gz              |
|  | 2739B | Nov 8 19:08 | /var/log/messages.0.gz             |
|  | 29.8K | Nov 8 18:45 | /var/log/messages.1.gz             |
|  | 31.8K | Nov 8 17:15 | /var/log/messages.2.gz             |
|  | 20.6K | Nov 8 16:00 | /var/log/messages.3.gz             |
|  | 15.4K | Nov 8 10:15 | /var/log/messages.4.gz             |
|  | 15.4K | Nov 8 02:15 | /var/log/messages.5.gz             |
|  | 25.5K | Nov 7 20:45 | /var/log/messages.6.gz             |
|  | 48.0K | Nov 7 17:45 | /var/log/messages.7.gz             |

```

32.8K Nov  7 13:45 /var/log/messages.8.gz
684B Nov  8 17:02 /var/log/wtmp.0.gz
58B Nov  7 12:40 /var/log/wtmp.1.gz
124.0K Nov  7 17:34 /var/tmp/gres-tp/env.dat
  0B Nov  7 12:40 /var/tmp/gres-tp/lock
  0B Nov  7 12:59 /var/tmp/if-rtbdb/env.lck
12.0K Nov  7 17:39 /var/tmp/if-rtbdb/env.mem
2688.0K Nov  7 17:39 /var/tmp/if-rtbdb/shm_usr1.mem
132.0K Nov  7 17:40 /var/tmp/if-rtbdb/shm_usr2.mem
2048.0K Nov  7 17:39 /var/tmp/if-rtbdb/trace.mem
155B Nov  7 17:40 /var/tmp/krt_gencfg_filter.txt
  0B Nov  7 17:39 /var/tmp/rtbdb/if-rtbdb

```

### request system storage cleanup qfabric component device-name (QFabric Systems)

```
user@switch> request system storage cleanup qfabric component Test
```

```

Repository type: regular
Repository head: /pbstorage
Creating list of debug artifacts to be removed under: /pbstorage/rdumps/Test
Removing debug artifacts ... (press control C to abort)
Removing /pbstorage/rdumps/Test/cosd.core.0.0.05162011123308.gz ... done
Removing /pbstorage/rdumps/Test/cosd.core.1.0.05162011123614.gz ... done
Removing /pbstorage/rdumps/Test/cosd.core.2.0.05162011123920.gz ... done
Removing /pbstorage/rdumps/Test/livecore.05132011163930.gz ... done
Removing /pbstorage/rdumps/Test/tnetd.core.0.1057.05162011124500.gz ... done
Removing /pbstorage/rdumps/Test/vmcore.05132011120528.gz ... done
Removing /pbstorage/rdumps/Test/vmcore.kz ... done
Creating list of debug artifacts to be removed under: /pbstorage/rlogs/Test
Removing debug artifacts ... (press control C to abort)
Removing /pbstorage/rlogs/Test/kdumpinfo.05132011120528 ... done
Removing /pbstorage/rlogs/Test/kernel.tarball.0.1039.051220111234415.tgz ... done
Removing /pbstorage/rlogs/Test/kernel.tarball.1.1039.05132011175544.tgz ... done
Removing /pbstorage/rlogs/Test/tnetd.tarball.0.1057.05162011175453.tgz ... done

```

### request system storage cleanup qfabric component device-name repository core (QFabric Systems)

```
user@switch> request system storage cleanup qfabric component Test repository core
```

```

Repository scope: shared
Repository head: /pbdata/export
Repository name: core
Creating list of debug artifacts to be removed under: /pbdata/export/rdumps/Test
NOTE: core repository under /pbdata/export/rdumps/Test empty

```

### request system storage cleanup qfabric component all (QFabric Systems)

```
user@switch> request system storage cleanup qfabric component all
```

```

Repository scope: shared
Repository head: /pbdata/export
Creating list of debug artifacts to be removed under: /pbdata/export/rdumps
NOTE: core repository under /pbdata/export/rdumps/all empty
Creating list of debug artifacts to be removed under: /pbdata/export/rlogs
List of debug artifacts to clean up ... (press control C to abort)
/pbdata/export/rlogs/73747cd8-0710-11e1-b6a4-00e081c5297e/install-11072011125819.log
/pbdata/export/rlogs/77116f18-0710-11e1-a2a0-00e081c5297e/install-11072011125819.log
/pbdata/export/rlogs/BBAK0372/install-11072011121538.log
/pbdata/export/rlogs/BBAK0394/install-11072011121532.log

```

```
/pbdata/export/rlogs/EE3093/install-11072011121536.log  
/pbdata/export/rlogs/WS001/YN5999/install-11072011121644.log  
/pbdata/export/rlogs/WS001/YW3803/install-11072011122429.log  
/pbdata/export/rlogs/cd78871a-0710-11e1-878e-00e081c5297e/install-11072011125932.log  
/pbdata/export/rlogs/d0afda1e-0710-11e1-a1d0-00e081c5297e/install-11072011125930.log  
/pbdata/export/rlogs/d0afda1e-0710-11e1-a1d0-00e081c5297e/install-11072011133211.log  
/pbdata/export/rlogs/d0afda1e-0710-11e1-a1d0-00e081c5297e/install-11072011155302.log  
/pbdata/export/rlogs/d31ab7a6-0710-11e1-ad1b-00e081c5297e/install-11072011125931.log  
/pbdata/export/rlogs/d4d0f254-0710-11e1-90c3-00e081c5297e/install-11072011125932.log
```

## show chassis alarms

|                       |  |
|-----------------------|--|
| <b>List of Syntax</b> | <a href="#">Syntax on page 163</a>   |
|                       | <a href="#">Syntax (TX Matrix Routers) on page 163</a>   |
|                       | <a href="#">Syntax (TX Matrix Plus Routers) on page 163</a>  |
|                       | <a href="#">Syntax (MX Series Routers) on page 163</a>   |
|                       | <a href="#">Syntax (MX104, MX2010, MX2020, and MX2008 Universal Routing Platforms) on page 163</a> |
|                       | <a href="#">Syntax (MX10003, MX204, and MX10008) on page 163</a>                                   |
|                       | <a href="#">Syntax (QFX Series) on page 163</a>  |
|                       | <a href="#">Syntax (OCX Series) on page 163</a>  |
|                       | <a href="#">Syntax (PTX Series Packet Transport Routers) on page 164</a>                           |
|                       | <a href="#">Syntax (ACX Series Universal Metro Routers) on page 164</a>                            |
|                       | <a href="#">Syntax (EX9251, EX9253 Switches) on page 164</a>                                       |

|   |   |
|---|---|
| <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 (MX104, MX2010, MX2020, and MX2008 Universal Routing Platforms)</b> | show chassis alarms<br><satellite [slot-id <i>slot-id</i> ]>                            |
| <b>Syntax (MX10003, MX204, and MX10008)</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 (OCX Series)</b>  | show chassis alarms   |

|  |  |
|--|--|
| Syntax (PTX Series Packet Transport Routers) | show chassis alarms  |
| Syntax (ACX Series Universal Metro Routers)  | show chassis alarms  |
| Syntax (EX9251, EX9253 Switches)             | show chassis alarms  |
| Release Information                          | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>sfc</b> option introduced in Junos OS Release 9.6 for the TX Matrix Plus router.</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 Metro Routers.</p> <p>Command introduced in Junos OS Release 12.3 for MX 2010 and MX2020 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 13.2 for MX104 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p> <p><b>satellite</b> option introduced in Junos OS Release 14.2R3 for Junos Fusion.</p> <p>Command introduced in Junos OS Release 17.2 for MX2008 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 17.2 for PTX10008 Routers.</p> <p>Command introduced in Junos OS Release 17.3 for MX150 Router Appliance.</p> <p>Command introduced in Junos OS Release 17.3 for MX10003 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 17.4 for MX204 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 18.1R1 for EX9251 Switches.</p> <p>Command introduced in Junos OS Release 18.2 for EX9253 Switches.</p> <p>Command introduced in Junos OS Release 18.2R1 for MX10008 Universal Routing Platforms.</p> |
| Description                                  | Display information about the conditions that have been configured to trigger alarms.  |
| Options                                      | <p><b>none</b>—Display information about the conditions that have been configured to trigger alarms.</p> <p><b>all-members</b>—(MX Series routers only) (Optional) Display information about alarm conditions for all the member routers of the Virtual Chassis configuration.</p> <p><b>interconnect-device <i>name</i></b>—(QFabric systems only) (Optional) Display information about alarm conditions for the Interconnect device.</p> <p><b>lcc <i>number</i></b>—(TX Matrix router and TX Matrix Plus router only) (Optional) Line-card chassis number.</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 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.

**satellite [*slot-id slot-id*]**—(Junos Fusion only) (Optional) Display information about alarm conditions for the specified satellite device in a Junos Fusion, or for all satellite devices in the Junos Fusion if no satellite devices are specified.

**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** Chassis alarms are preset. You cannot modify them.

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.



**NOTE:** MX10003 routers do not support craft interface.

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 SONET 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_ILLEGALSIZE_ERR | 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 |

| Chip Type: R Chip             | Code |
|-------------------------------|------|
| CMALARM_RCHIP_SRAM_PARITY_ERR | 512  |

| Chip Type: R Chip                | Code |
|----------------------------------|------|
| 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 =  $(\text{Error Code})/2$



**NOTE:** Starting in Junos OS Release 18.2R1, on MX Series routers, the **show chassis alarms** output does not display error codes for PFE-related errors. You can use the following commands to view more details of the errors that caused the alarms:

- **show chassis errors active**
- **show chassis errors active detail**

**Required Privilege Level** view

**Related Documentation**

- *Configuring an RMON Alarm Entry and Its Attributes*
- *Chassis Conditions That Trigger Alarms*

|                              |   |
|------------------------------|---|
| <b>List of Sample Output</b> | <a href="#">show chassis alarms (Alarms Active) on page 171</a>   |
|                              | <a href="#">show chassis alarms (No Alarms Active) on page 171</a>  |
|                              | <a href="#">show chassis alarms (Fan Tray) on page 171</a>  |
|                              | <a href="#">show chassis alarms (MX150) on page 171</a>   |
|                              | <a href="#">show chassis alarms (MX104 Router) on page 171</a>  |
|                              | <a href="#">show chassis alarms (MX2010 Router) on page 172</a>   |
|                              | <a href="#">show chassis alarms (MX2020 Router) on page 172</a>   |
|                              | <a href="#">show chassis alarms (MX10003 Router) on page 172</a>  |
|                              | <a href="#">show chassis alarms (MX204 Router) on page 172</a>  |
|                              | <a href="#">show chassis alarms (MX2008 Router) on page 173</a>   |
|                              | <a href="#">show chassis alarms (MX960, MX480, and MX240 Routers showing Major CB Failure) on page 173</a>                          |
|                              | <a href="#">show chassis alarms (PTX10008 Router) on page 173</a>   |
|                              | <a href="#">show chassis alarms (T4000 Router) on page 173</a>  |
|                              | <a href="#">show chassis alarms (Unreachable Destinations Present on a T Series Router) on page 174</a>                             |
|                              | <a href="#">show chassis alarms (FPC Offline Due to Unreachable Destinations on a T Series Router) on page 174</a>                  |
|                              | <a href="#">show chassis alarms (SCG Absent on a T Series Router) on page 174</a>   |
|                              | <a href="#">show chassis alarms (Alarms Active on a TX Matrix Router) on page 174</a>   |
|                              | <a href="#">show chassis alarms (TX Matrix Plus router with 3D SIBs) on page 175</a>  |
|                              | <a href="#">show chassis alarms (Alarms on a T4000 Router After the enhanced-mode Statement is Enabled) on page 177</a>             |
|                              | <a href="#">show chassis alarms (Backup Routing Engine) on page 177</a>   |
|                              | <a href="#">show chassis alarms (EX Series Switch) on page 177</a>  |
|                              | <a href="#">show chassis alarms (Alarms Active on the QFX Series and OCX Series Switches) on page 177</a>                           |
|                              | <a href="#">show chassis alarms node-device (Alarms Active on the QFabric System) on page 178</a>                                   |
|                              | <a href="#">show chassis alarms (Alarms Active on the QFabric System) on page 178</a>   |
|                              | <a href="#">show chassis alarms (Alarms Active on an EX8200 Switch) on page 178</a>   |
|                              | <a href="#">show chassis alarms (EX9251 Switch) on page 178</a>   |
|                              | <a href="#">show chassis alarms (EX9253 Switch) on page 179</a>   |
|                              | <a href="#">show chassis alarms (Alarms Active on a PTX5000 Packet Transport Router) on page 179</a>                                |
|                              | <a href="#">show chassis alarms (Mix of PDUs Alarm on a PTX5000 Packet Transport Router with FPC2-PTX-P1A) on page 179</a>          |
|                              | <a href="#">show chassis alarms (PDU Converter Failed Alarm on a PTX5000 Packet Transport Router with FPC2-PTX-P1A) on page 179</a> |
|                              | <a href="#">show chassis alarms (No Power for System Alarm on a PTX5000 Packet Transport Router with FPC2-PTX-P1A) on page 180</a>  |
|                              | <a href="#">show chassis alarms (Alarms Active on an ACX2000 Universal Metro Router) on page 180</a>                                |
|                              | <a href="#">show chassis alarms (Active Alarm to Indicate Status of the Bad SCB Clock on MX Series) on page 180</a>                 |
|                              | <a href="#">show chassis alarms (Alarms active on a PTX1000 Packet Transport Router) on page 180</a>                                |
|                              | <a href="#">show chassis alarms (MX10003 Router) on page 181</a>  |
|                              | <a href="#">show chassis alarms (Alarms active on a MX10008 Router) on page 182</a>   |

**Output Fields** Table 8 on page 171 lists the output fields for the **show chassis alarms** command. Output fields are listed in the approximate order in which they appear.

*Table 8: 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 (MX150)

```
user@host > show chassis alarms
1 alarms currently active
Alarm time      Class  Description
2016-06-04 01:49:43 PDT Major Fan Tray 1 Fan 0 failed
```

### show chassis alarms (MX104 Router)

```
user@host > show chassis alarms
```

```

1 alarms currently active
Alarm time      Class  Description
2013-06-05 14:43:31 IST  Minor Backup RE Active

```

#### 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 (MX10003 Router)

```

user@host> show chassis alarms

9 alarms currently active
Alarm time      Class  Description
2017-07-13 21:50:31 PDT  Major FPC 1 Temperature Hot
2017-07-13 21:50:04 PDT  Minor FPC 1 PIC 1 Invalid port profile configuration
2017-07-13 21:49:13 PDT  Minor FPC 1 PIC 0 Invalid port profile configuration
2017-07-13 21:48:54 PDT  Major FPC 0 Temperature Hot
2017-07-13 21:43:54 PDT  Minor CB 1 Voltage Sensor ADS7830_0x4B Sensor Failed
2017-07-13 21:43:54 PDT  Minor CB 0 Voltage Sensor ADS7830_0x4B Sensor Failed
2017-07-13 21:43:31 PDT  Minor Loss of communication with Backup RE

```

Starting in Junos OS Release 19.2R1, the MX10003 routers do not raise an alarm if a Power Entry Module (PEM) slot is empty. However, when the number of operational PEMs goes below 2, the router raises a major alarm. This alarm is cleared when the required number of PEMs are made available.

#### show chassis alarms (MX204 Router)

```

user@host> show chassis alarms

1 alarms currently active
Alarm time      Class  Description
2017-11-05 22:13:03 PST  Major PEM 0 Not Present

```



**show chassis alarms (MX2008 Router)**

```
user@host>show chassis alarms
```

```
No alarms currently active
```

**show chassis alarms (MX960, MX480, and MX240 Routers showing Major CB Failure)**

A major CB 0 failure alarm occurs in the event of a bad CB (unknown or mismatched CBs do not trigger this alarm in Junos Release OS 12.3R9 and later). Following GRES or recovery, if the hardware issue persists, the traffic moves to the good CB and continues. If the alarm was triggered by something transient like a power zone budget on GRES, bringing the CB back online can clear the alarm. Otherwise, replace the bad CB. Note that fabric link speed is not impacted by an offline SCB. The alarm might be raised on CB0, CB1, and CB2.

```
user@host> show chassis alarms
```

```
6 alarms currently active
```

| Alarm time              | Class | Description                   |
|-------------------------|-------|-------------------------------|
| 2014-10-31 16:49:41 EDT | Major | PEM 3 Not OK                  |
| 2014-10-31 16:49:41 EDT | Major | PEM 2 Not OK                  |
| 2014-10-31 16:49:31 EDT | Major | CB 0 Failure                  |
| 2014-10-31 16:49:31 EDT | Minor | CB 0 Fabric Chip 0 Not Online |
| 2014-10-31 16:49:31 EDT | Minor | CB 0 Fabric Chip 1 Not Online |
| 2014-10-31 16:49:31 EDT | Minor | Backup RE Active              |

**show chassis alarms (PTX10008 Router)**

```
user@host>show chassis alarms
```

```
12 alarms currently active
```

| Alarm time              | Class | Description                              |
|-------------------------|-------|--|
| 2017-05-09 01:38:55 PDT | Minor | Loss of communication with Backup RE     |
| 2017-05-05 06:49:57 PDT | Major | FPC 5 LCPU Temp Sensor Access Failed     |
| 2017-05-05 06:49:57 PDT | Major | FPC 5 PE2 Temp Sensor Hot                |
| 2017-05-05 06:49:57 PDT | Major | FPC 5 PE1 Temp Sensor Hot                |
| 2017-05-05 06:49:57 PDT | Major | FPC 5 PE0 Temp Sensor Hot                |
| 2017-05-05 06:49:57 PDT | Major | FPC 5 Exhaust-C Temp Sensor Hot          |
| 2017-05-05 06:49:57 PDT | Major | FPC 5 Exhaust-B Temp Sensor Hot          |
| 2017-05-05 06:49:57 PDT | Major | FPC 5 Exhaust-A Temp Sensor Hot          |
| 2017-05-05 06:49:57 PDT | Major | FPC 5 Intake-B Temp Sensor Access Failed |
| 2017-05-05 06:49:57 PDT | Major | FPC 5 Intake-A Temp Sensor Access Failed |
| 2017-05-05 06:49:57 PDT | Major | Fan Tray 0 Fan 5 running at lower speed  |
| 2017-05-05 06:49:57 PDT | Major | Fan Tray 0 Fan 4 running at lower speed  |

**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
2014-04-08 14:35:13 IST   Minor  FPM 0 SFC Config Size Changed
2014-04-08 14:32:58 IST   Major  Fan Tray Failure
2014-04-08 14:31:53 IST   Major  SIB F13 6 Fault
2014-04-08 14:31:43 IST   Major  SIB F13 11 Fault
2014-04-08 14:31:08 IST   Minor  Check SIB F13 12 CXP 14 Fbr Cbl
2014-04-08 14:31:08 IST   Minor  Check SIB F13 12 CXP 8 Fbr Cbl
2014-04-08 14:31:08 IST   Minor  Check SIB F13 12 CXP 3 Fbr Cbl
2014-04-08 14:31:08 IST   Major  SIB F13 12 CXP 15 fault
2014-04-08 14:31:08 IST   Minor  SIB F13 12 CXP 14 LOL
2014-04-08 14:31:08 IST   Minor  Check SIB F13 12 CXP 14
2014-04-08 14:31:08 IST   Major  SIB F13 12 CXP 10 fault
2014-04-08 14:31:08 IST   Minor  SIB F13 12 CXP 8 LOL
2014-04-08 14:31:08 IST   Minor  Check SIB F13 12 CXP 8
2014-04-08 14:31:08 IST   Major  SIB F13 12 CXP 7 fault
2014-04-08 14:31:08 IST   Major  SIB F13 12 CXP 4 fault
2014-04-08 14:31:08 IST   Minor  SIB F13 12 CXP 3 LOL
2014-04-08 14:31:08 IST   Minor  Check SIB F13 12 CXP 3
2014-04-08 14:31:08 IST   Minor  Check SIB F13 6 CXP 14 Fbr Cbl
2014-04-08 14:31:08 IST   Minor  Check SIB F13 6 CXP 12 Fbr Cbl
2014-04-08 14:31:08 IST   Minor  Check SIB F13 6 CXP 8 Fbr Cbl
2014-04-08 14:31:08 IST   Minor  Check SIB F13 6 CXP 6 Fbr Cbl
2014-04-08 14:31:08 IST   Minor  Check SIB F13 6 CXP 4 Fbr Cbl
2014-04-08 14:31:08 IST   Minor  Check SIB F13 6 CXP 2 Fbr Cbl
2014-04-08 14:31:08 IST   Minor  Check SIB F13 6 CXP 0 Fbr Cbl
2014-04-08 14:31:08 IST   Minor  SIB F13 6 CXP 14 LOL
2014-04-08 14:31:08 IST   Minor  Check SIB F13 6 CXP 14
2014-04-08 14:31:08 IST   Minor  SIB F13 6 CXP 12 LOL
2014-04-08 14:31:08 IST   Minor  Check SIB F13 6 CXP 12
2014-04-08 14:31:08 IST   Major  SIB F13 6 CXP 10 fault
2014-04-08 14:31:08 IST   Minor  SIB F13 6 CXP 8 LOL

```

```

2014-04-08 14:31:08 IST Minor Check SIB F13 6 CXP 8
2014-04-08 14:31:08 IST Minor SIB F13 6 CXP 6 LOL
2014-04-08 14:31:08 IST Minor Check SIB F13 6 CXP 6
2014-04-08 14:31:08 IST Minor SIB F13 6 CXP 4 LOL
2014-04-08 14:31:08 IST Minor Check SIB F13 6 CXP 4
2014-04-08 14:31:08 IST Minor SIB F13 6 CXP 2 LOL
2014-04-08 14:31:08 IST Minor Check SIB F13 6 CXP 2
2014-04-08 14:31:08 IST Minor SIB F13 6 CXP 0 LOL
2014-04-08 14:31:08 IST Minor Check SIB F13 6 CXP 0
2014-04-08 14:31:08 IST Minor SIB F13 12 CXP 14 XC HSL Link Error
2014-04-08 14:29:27 IST Minor LCC 0 Minor Errors
2014-04-08 14:28:37 IST Major LCC 0 Major Errors
2014-04-08 14:28:37 IST Major LCC 2 Major Errors
2014-04-08 14:28:37 IST Minor LCC 2 Minor Errors
2014-04-08 14:28:24 IST Major SIB F2S 4/6 Absent
2014-04-08 14:28:24 IST Major SIB F2S 4/4 Absent
2014-04-08 14:28:24 IST Major SIB F2S 4/2 Absent
2014-04-08 14:28:24 IST Major SIB F2S 4/0 Absent
2014-04-08 14:28:24 IST Major SIB F2S 3/6 Absent
2014-04-08 14:28:24 IST Major SIB F2S 3/4 Absent
2014-04-08 14:28:24 IST Major SIB F2S 3/2 Absent
2014-04-08 14:28:24 IST Major SIB F2S 3/0 Absent
2014-04-08 14:28:24 IST Major SIB F13 9 Absent
2014-04-08 14:28:24 IST Major SIB F13 8 Absent
2014-04-08 14:28:24 IST Major SIB F13 7 Absent
2014-04-08 14:28:24 IST Major SIB F13 4 Absent
2014-04-08 14:28:24 IST Major SIB F13 1 Absent
2014-04-08 14:28:22 IST Major PEM 0 Input Failure
2014-04-08 14:28:22 IST Major PEM 0 Not OK

```

lcc0-re0:

-----

12 alarms currently active

| Alarm time              | Class | Description                                 |
|-------------------------|-------|---|
| 2014-04-08 14:36:08 IST | Minor | CB 1 M/S Switch Changed                     |
| 2014-04-08 14:36:08 IST | Minor | CB 1 CHASSIS ID Changed                     |
| 2014-04-08 14:35:43 IST | Minor | CB 0 M/S Switch Changed                     |
| 2014-04-08 14:35:43 IST | Minor | CB 0 CHASSIS ID Changed                     |
| 2014-04-08 14:29:30 IST | Minor | SIB 4 Not Online                            |
| 2014-04-08 14:29:30 IST | Minor | SIB 3 Not Online                            |
| 2014-04-08 14:29:30 IST | Minor | SIB 2 Not Online                            |
| 2014-04-08 14:29:24 IST | Major | Rear Fan Tray Failure                       |
| 2014-04-08 14:29:24 IST | Major | Front Bottom Fan Tray Improper for Platform |
| 2014-04-08 14:29:24 IST | Major | Front Top Fan Tray Improper for Platform    |
| 2014-04-08 14:28:37 IST | Major | SIB 4 Absent                                |
| 2014-04-08 14:28:37 IST | Major | SIB 3 Absent                                |

lcc2-re0:

-----

12 alarms currently active

| Alarm time              | Class | Description                                 |
|-------------------------|-------|---|
| 2014-04-08 14:36:02 IST | Minor | CB 1 M/S Switch Changed                     |
| 2014-04-08 14:36:02 IST | Minor | CB 1 CHASSIS ID Changed                     |
| 2014-04-08 14:35:42 IST | Minor | CB 0 M/S Switch Changed                     |
| 2014-04-08 14:34:42 IST | Minor | CB 0 CHASSIS ID Changed                     |
| 2014-04-08 14:29:29 IST | Minor | SIB 0 CXP 7 Unsupported Optics              |
| 2014-04-08 14:29:27 IST | Major | Front Bottom Fan Tray Improper for Platform |
| 2014-04-08 14:29:27 IST | Major | Front Top Fan Tray Improper for Platform    |
| 2014-04-08 14:29:25 IST | Minor | SIB 4 Not Online                            |
| 2014-04-08 14:29:25 IST | Minor | SIB 3 Not Online                            |

```

2014-04-08 14:28:47 IST Major PEM 0 Not OK
2014-04-08 14:28:36 IST Major SIB 2 Absent
2014-04-08 14:28:36 IST Minor Host 0 Boot from alternate media

```

```
lcc6-re0:
```

```
-----
2 alarms currently active
```

| Alarm time              | Class | Description                   |
|-------------------------|-------|-------------------------------|
| 2013-11-06 04:03:56 PST | Minor | SIB 1 CXP 0 XC HSL Link Error |
| 2013-11-06 03:49:32 PST | Major | PEM 1 Not OK                  |

### 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 (EX Series Switch)

```
user@switch> show chassis alarms
```

```
4 alarms currently active
```

| Alarm time              | Class | Description                      |
|-------------------------|-------|----------------------------------|
| 2014-03-12 15:36:09 UTC | Minor | Require a Fan Tray upgrade       |
| 2014-03-12 15:00:02 UTC | Major | PEM 0 Input Failure              |
| 2014-03-12 15:00:02 UTC | Major | PEM 0 Not OK                     |
| 2014-03-12 14:59:51 UTC | Minor | Host 1 Boot from alternate media |

### show chassis alarms (Alarms Active on the QFX Series and OCX Series Switches)

```
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 Test

node-device ED3694
3 alarms currently active
Alarm time           Class  Description
2011-08-24 16:04:15 UTC Major  Test:fte-0/1/2: Link down
2011-08-24 16:04:14 UTC Major  Test:fte-0/1/0: Link down
2011-08-24 14:21:14 UTC Major  Test PEM 0 is not supported/powered

```

**show chassis alarms (Alarms Active on the QFabric System)**

```

user@switch> show chassis alarms

IC-1:
-----
1 alarms currently active
Alarm time           Class  Description
2011-08-24 16:04:15 UTC Minor  Backup RE Active

Test:
-----
3 alarms currently active
Alarm time           Class  Description
2011-08-24 16:04:15 UTC Major  Test:fte-0/1/2: Link down
2011-08-24 16:04:14 UTC Major  Test:fte-0/1/0: Link down
2011-08-24 14:21:14 UTC Major  Test PEM 0 is not supported/powered

SNG-0:
-----

NW-NG-0:
-----
1 alarms currently active
Alarm time           Class  Description
2011-08-24 15:49:27 UTC Major  Test PEM 0 is not supported/powered

```

**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 (EX9251 Switch)**

```

user@switch> show chassis alarms

```

```

2 alarms currently active
Alarm time      Class  Description
2018-03-08 05:13:10 PST Major PEM 0 Not Powered
2018-03-08 05:13:10 PST Major Fan Tray 2 is not present

```

### show chassis alarms (EX9253 Switch)

```
user@switch> show chassis alarms
```

```

6 alarms currently active
Alarm time      Class  Description
2018-03-07 01:09:01 PST Major Power Budget:Insufficient Power
2018-03-06 23:56:34 PST Minor Loss of communication with Backup RE
2018-02-15 00:48:10 PST Minor PEM 3 Not Present
2018-02-15 00:48:10 PST Minor PEM 2 Not Present
2018-02-15 00:48:07 PST Major PEM 4 Not Powered
2018-02-15 00:48:07 PST Major PEM 1 Not Powered

```

### show chassis alarms (Alarms Active on a PTX5000 Packet Transport Router)

```
user@host> 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 (Mix of PDUs Alarm on a PTX5000 Packet Transport Router with FPC2-PTX-PIA)

All PDUs installed on a PTX5000 router must be of the same type. The **Mix of PDUs** or **Power Manager Non Operational** alarm is raised when different types of PDUs are installed on a PTX5000 router.

```
user@host> show chassis alarms
```

```

15 alarms currently active
Alarm time      Class  Description
2013-03-19 23:03:53 PDT Minor No Redundant Power
2013-03-19 23:03:48 PDT Minor Mix of PDUs
2013-03-19 23:03:47 PDT Minor PDU 1 PSM 3 Absent
2013-03-19 23:03:47 PDT Minor PDU 1 PSM 2 Absent
2013-03-19 23:03:47 PDT Minor PDU 1 PSM 1 Absent
2013-03-19 23:03:47 PDT Minor PDU 1 PSM 0 Absent
2013-03-19 23:03:46 PDT Major No CG Online

```

### show chassis alarms (PDU Converter Failed Alarm on a PTX5000 Packet Transport Router with FPC2-PTX-PIA)

The **PDU Converter Failed** alarm is raised when one or more 36 V booster converter of a DC PDU fails. If two or more 36 V booster converter fails, fan trays fail and the router

might get over heated. Therefore, when this alarm is raised, check the PDU and replace it, if required.

```
user@host> show chassis alarms
```

```
11 alarms currently active
Alarm time      Class Description
2013-12-11 22:14:13 PST Minor No Redundant Power for System
2013-12-11 22:14:10 PST Major PDU 0 PSM 7 Not OK
2013-12-11 22:14:10 PST Major PDU 0 PSM 6 Not OK
2013-12-11 22:14:10 PST Major PDU 0 PSM 5 Not OK
2013-12-11 22:14:10 PST Major PDU 0 PSM 4 Not OK
2013-12-11 22:14:10 PST Major PDU 0 PSM 3 Not OK
2013-12-11 22:14:10 PST Major PDU 0 PSM 2 Not OK
2013-12-11 22:14:10 PST Major PDU 0 PSM 1 Not OK
2013-12-11 22:14:10 PST Major PDU 0 PSM 0 Not OK
2013-12-11 22:14:10 PST Major PDU 0 Not OK
2013-12-11 22:14:01 PST Major PDU 0 Converter Failed
```

#### show chassis alarms (No Power for System Alarm on a PTX5000 Packet Transport Router with FPC2-PTX-P1A)

```
user@host> show chassis alarms
```

```
8 alarms currently active
Alarm time      Class Description
2013-11-19 01:58:41 PST Major No Power for System
2013-11-19 01:58:37 PST Major PDU 0 PSM 1 Not OK
2013-11-19 01:56:46 PST Major PDU 0 PSM 2 Not OK
2013-11-19 01:54:26 PST Major PDU 0 PSM 3 Not OK
2013-11-19 01:53:30 PST Major PDU 1 PSM 3 Not OK
2013-11-19 01:53:29 PST Major PDU 1 PSM 2 Not OK
2013-11-19 01:53:29 PST Major PDU 1 PSM 1 Not OK
2013-11-19 01:53:29 PST Major PDU 1 PSM 0 Not OK
```

#### show chassis alarms (Alarms Active on an ACX2000 Universal Metro 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 alarms (Active Alarm to Indicate Status of the Bad SCB Clock on MX Series)

```
user@host> show chassis alarms
```

```
1 alarm currently active
Alarm time      Class Description
2013-08-06 07:48:35 PDT Major CB 0 19.44 MHz clock failure
```

#### show chassis alarms (Alarms active on a PTX1000 Packet Transport Router)

```
user@host> show chassis alarms
```



```

2 alarms currently active
Alarm time      Class  Description
2004-08-10 00:55:49 UTC  Major  PEM 1 Not Present
2004-08-10 00:55:49 UTC  Major  PEM 0 Not Present

```

### show chassis alarms (MX10003 Router)

If LCMD is down on the backup RE, then the following alarm is seen on the Master.

```

user@host> show chassis alarms

1 alarm currently active
Alarm time      Class  Description
2017-05-09 13:26:27 PDT  Major  VMHost RE 1 host application failed

```

If LCMD is down on the master, then following alarms are displayed.

```

user@host> show chassis alarms

3 alarms currently active
Alarm time      Class  Description
2017-05-10 14:12:21 PDT  Major  VMHost RE 0 host application failed
2017-05-10 14:12:16 PDT  Minor  LCM Peer Absent
2017-05-09 13:26:27 PDT  Major  VMHost RE 1 host application failed

```

If the LCMD process is crashing on the master, the system will switchover after one minute provided the backup RE LCMD connection is stable. The system will not switchover under the following conditions: if the backup RE LCMD connection is unstable or if the current master just gained mastership. When the master has just gained mastership, the switchover happens only after four minutes.

The LCM peer connection un-stable alarm is raised when the LCMD-CHASD IPC communication flaps three times within a small interval of two to three minutes. Once LCM peer connection un-stable alarm is raised, the connection status is monitored for two minutes.

```

user@host> show chassis alarms

7 alarms currently active
Alarm time      Class  Description
2017-05-29 10:12:17 PDT  Minor  LCM Peer Connection un-stable
2017-05-29 09:04:17 PDT  Minor  PEM 8 Not Powered
2017-05-29 09:04:17 PDT  Minor  PEM 9 Not Powered
2017-05-29 09:04:17 PDT  Minor  PEM 7 Not Powered
2017-05-29 09:04:17 PDT  Minor  PEM 3 Not Powered
2017-05-29 09:04:17 PDT  Minor  PEM 0 Not Powered
2017-05-29 09:04:08 PDT  Minor  Loss of communication with Backup RE

```

If there are no more connection flaps within this two minutes time interval, the LCM peer connection un-stable alarm is cleared.

```

6 alarms currently active
Alarm time      Class  Description
2017-05-29 09:04:17 PDT  Minor  PEM 8 Not Powered
2017-05-29 09:04:17 PDT  Minor  PEM 9 Not Powered
2017-05-29 09:04:17 PDT  Minor  PEM 7 Not Powered
2017-05-29 09:04:17 PDT  Minor  PEM 3 Not Powered

```

```
2017-05-29 09:04:17 PDT Minor PEM 0 Not Powered
2017-05-29 09:04:08 PDT Minor Loss of communication with Backup RE
```

A major alarm is raised even if there is on one PLL lock error, and this alarm can be cleared only through an FPC restart.

```
user@host> show chassis alarms
```

```
4 alarms currently active
Alarm time          Class Description
2017-02-16 09:06:06 PDT Major FPC 0 Major Errors
2017-02-16 09:08:40 PDT Major FPC 1 Major Errors
2017-02-16 09:11:47 PST Minor Fan Tray 3 Pair 1 Outer Fan running at over speed
2017-02-16 09:11:47 PST Minor Fan Tray 3 Pair 1 Inner Fan running at over speed
```

#### show chassis alarms (Alarms active on a MX10008 Router)

```
user@host> show chassis alarms
```

```
13 alarms currently active
Alarm time          Class Description
2018-07-17 05:48:08 PDT Major FPC 2 I2C Failure
2018-07-17 05:47:02 PDT Minor Mixed Master and Backup RE types
2018-07-17 05:47:01 PDT Major Fan Tray 0 Fan 5 Failed
2018-07-17 05:47:01 PDT Major Fan Tray 0 Fan 4 Failed
2018-07-17 05:47:01 PDT Minor PEM 5 Not Powered
2018-07-17 05:47:01 PDT Minor PEM 5 Feed 2 has no input source
2018-07-17 05:47:01 PDT Minor PEM 5 Feed 1 has no input source
2018-07-17 05:47:01 PDT Minor PEM 4 Not Powered
2018-07-17 05:47:01 PDT Minor PEM 4 Feed 2 has no input source
2018-07-17 05:47:01 PDT Minor PEM 4 Feed 1 has no input source
2018-07-17 05:47:01 PDT Minor PEM 3 Not Powered
2018-07-17 05:47:01 PDT Minor PEM 3 Feed 2 has no input source
2018-07-17 05:47:01 PDT Minor PEM 3 Feed 1 has no input source
```

## show chassis environment

|                       |   |
|-----------------------|---|
| <b>List of Syntax</b> | Syntax on page 183  |
|                       | Syntax (T320, T640, T1600, and T4000 Routers) on page 183                   |
|                       | Syntax (TX Matrix Routers) on page 183                                      |
|                       | Syntax (TX Matrix Plus Routers) on page 183                                 |
|                       | Syntax (MX Series Routers) on page 184                                      |
|                       | Syntax (MX104 Universal Routing Platforms) on page 184                      |
|                       | Syntax (MX150 Router Appliance) on page 184                                 |
|                       | Syntax (MX2010, MX2020, and MX2008 Universal Routing Platforms) on page 184 |
|                       | Syntax (MX10003 and MX204 Universal Routing Platforms) on page 184          |
|                       | Syntax (EX8200 Switches) on page 184  |
|                       | Syntax (EX Series Switches except EX8200) on page 185                       |
|                       | Syntax (QFX Series) on page 185   |
|                       | Syntax (OCX Series) on page 185   |
|                       | Syntax (PTX Series Packet Transport Routers) on page 185                    |
|                       | Syntax (ACX Series Universal Metro Routers) on page 185                     |
|                       | Syntax (ACX5048 and ACX5096 Routers) on page 185                            |
|                       | Syntax (ACX500 Routers) on page 185   |

|               |                          |
|---------------|--------------------------|
| <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> > |
|--|--|

|   |   |
|---|---|
| Syntax (MX Series Routers)                                      | <pre>show chassis environment &lt;all-members&gt; &lt;local&gt; &lt;member <i>member-id</i>&gt;</pre>   |
| Syntax (MX104 Universal Routing Platforms)                      | <pre>show chassis environment &lt;cb&gt; &lt;pem <i>pem-slot-number</i>&gt; &lt;routing-engine <i>re-slot-number</i>&gt;</pre>  |
| Syntax (MX150 Router Appliance)                                 | <pre>show chassis environment &lt;pem <i>pem-slot-number</i>&gt; &lt;routing-engine <i>re-slot-number</i>&gt;</pre>   |
| Syntax (MX2010, MX2020, and MX2008 Universal Routing Platforms) | <pre>show chassis environment &lt;adc <i>adc-slot-number</i>&gt; &lt;all-members&gt; &lt;cb <i>cb-slot-number</i>&gt; &lt;fan <i>fantray-slot-number</i>&gt; &lt;fpc <i>fpc-slot-number</i>&gt; &lt;fpm&gt; &lt;local&gt; &lt;member <i>member-id</i>&gt; &lt;monitored&gt; &lt;psm <i>psm-slot-number</i>&gt; &lt;routing-engine <i>re-slot-number</i>&gt; &lt;sfb <i>sfb-slot-number</i>&gt; &lt;satellite [<i>fpc-slot slot-id</i> [<i>device-alias alias-name</i>]]&gt;</pre> |
| Syntax (MX10003 and MX204 Universal Routing Platforms)          | <pre>show chassis environment &lt;cb <i>cb-slot-number</i>&gt; &lt;fpc <i>fpc-slot-number</i>&gt; &lt;pem <i>pem-slot-number</i>&gt; &lt;routing-engine <i>re-slot-number</i>&gt;</pre>   |
| Syntax (EX8200 Switches)  | <pre>show chassis environment &lt;all-members&gt; &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;psu <i>psu-slot-number</i>&gt; &lt;routing-engine <i>re-slot-number</i>&gt;</pre>   |

|  |   |
|--|---|
| Syntax (EX Series Switches except EX8200)    | <pre>show chassis environment &lt;all-members&gt; &lt;fpc fpc-slot-number&gt; &lt;local&gt; &lt;member member-id&gt; &lt;power-supply-unit&gt; &lt;routing-engine&gt; &lt;satellite [fpc-slot slot-id  device-alias alias-name]&gt;</pre>   |
| Syntax (QFX Series)                          | <pre>show chassis environment &lt;cb slot-number &lt;interconnect-device name&gt;&gt; &lt;fpc slot-number &lt;interconnect-device name&gt;&gt; &lt;interconnect-device name &lt;slot-number&gt; &lt;node-device name&gt; &lt;pem slot-number (interconnect-device name slot-number)   (node-device name)&gt; &lt;routing-engine name &lt;interconnect-device name slot-number&gt;&gt;</pre> |
| Syntax (OCX Series)                          | <pre>show chassis environment</pre>   |
| Syntax (PTX Series Packet Transport Routers) | <pre>show chassis environment &lt;cb cb-slot-number&gt; &lt;ccg ccg-slot-number &gt; &lt;fpc fpc-slot-number&gt; &lt;fpm&gt; &lt;monitored&gt; &lt;pdu pdu-slot-number&gt; &lt;routing-engine re-slot-number&gt; &lt;sib sib-slot-number&gt;</pre>  |
| Syntax (ACX Series Universal Metro Routers)  | <pre>show chassis environment &lt;cb cb-slot-number&gt; &lt;pem pem-slot-number&gt; &lt;routing-engine re-slot-number&gt;</pre>   |
| Syntax (ACX5048 and ACX5096 Routers)         | <pre>show chassis environment &lt;fpc slot-number&gt; &lt;pem&gt; &lt;routing-engine&gt;</pre>  |
| Syntax (ACX500 Routers)                      | <pre>show chassis environment &lt;cb cb-slot-number&gt; &lt;routing-engine re-slot-number&gt;</pre>   |
| Release Information                          | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p>  |

**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.  
**monitored** option added in Junos OS Release 12.1x48 for PTX Series Packet Transport Routers.  
Command introduced in Junos OS Release 12.1 for T4000 Core Routers.  
Command introduced in Junos OS Release 12.2 for ACX Series Universal Metro Routers.  
Command introduced in Junos OS Release 12.3 for MX 2020 and MX2010 Universal Routing Platforms.  
**pem** option introduced in Junos OS Release 12.3 for ACX4000 Universal Metro Routers.  
**satellite** option introduced in Junos OS Release 14.2R3.  
**all-members**, **local**, and **member** *member-id* options introduced in Junos OS Release 15.1 for MX2010 and MX2020 routers.  
Command introduced in Junos OS Release 15.1X54-D20 for ACX5048 and ACX5096 Routers.  
Command introduced in Junos OS Release 17.2 for MX2008 Universal Routing Platforms.  
Command introduced in Junos OS Release 17.3 for MX150 Router Appliance.  
Command introduced in Junos OS Release 17.2 for PTX10008 Routers.  
Command introduced in Junos OS Release 17.3 for MX10003 Universal Routing Platforms.  
Command introduced in Junos OS Release 17.4 for MX204 Universal Routing Platforms.  
Command introduced in Junos OS Release 18.1R1 for EX9251 Switches.  
Command introduced in Junos OS Release 18.2 for EX9253 Switches.  
Command introduced in Junos OS Release 18.2R1 for MX10008 Routers.

**Description** Display environmental information about the router or switch chassis, including the temperature and information about the fans, power supplies, and Routing Engine.

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.

Starting with Junos OS Release 14.1, the **show chassis environment cb cb-slot-number | ccg ccg-slot-number | fpc fpc-slot-number | fpm | monitored | pdu pdu-slot-number | routing-engine re-slot-number | sib sib-slot-number** operational mode command output displays environmental information for the new DC power supply module (PSM) and power distribution unit (PDU) that are added to provide power to the high-density FPC (FPC2-PTX-PIA) and other components in a PTX5000 Packet Transport Router.

**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**—(MX2010, MX2020, and MX2008 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 and MX2008 routers, replace **adc-slot-number** with a value from 0 through 9.

**cb cb-slot-number**—(ACX Series Universal Metro Routers, EX Series switches, M120, M320, and M40e routers, MX Series routers, MX2020 routers, MX2010 routers, MX2008 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.

**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.

**fan fantray-slot-number**—(MX2010, MX2020, and MX2008 routers only) (Optional) Display chassis environmental information for the fan trays. Replace **fantray-slot-number** with a value from 0 through 3.

**fpc fpc-slot**—(EX Series switches, M120, M320, and M40e routers, MX Series routers, MX2010 routers, MX2020 routers, MX2008 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 and MX2008 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 the hardware documentation for your switch 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, MX2008 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.

**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 only) (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* with a value of **0** or **1**. For EX Series switches, see *member* for member ID values.

**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.

**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 Metro Routers, M120, M320, and M40e routers, MX Series routers, MX104 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***—(MX2010, MX2020, and MX2008 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 and MX2008 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.



**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](#).

**satellite [fpc-slot slot-id | device-alias alias-name]**—(Junos Fusion only)(Optional) Display chassis environmental information for the specified satellite device in a Junos Fusion, or for all satellite devices in the Junos Fusion if no satellite devices are specified.

**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**—(MX2010, MX2020, and MX2008 routers only) (Optional) Display chassis environmental information for the switch fabric board. 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 on page 268](#)
- *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 on page 328](#)
- *show chassis environment psm*
- *show chassis environment psu*
- [show chassis environment routing-engine on page 343](#)
- *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 \(M7i Router\) on page 193](#)  
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**Output Fields** [Table 9 on page 192](#) lists the output fields for the **show chassis environment** command. Output fields are listed in the approximate order in which they appear.

Table 9: 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). <ul style="list-style-type: none"> <li>• On PTX Series Packet Transport Routers and MX2010, MX2020, and MX2008 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>• EX2200 switches have a side-to-rear cooling system. The <b>Local Intake</b> temperature is measured by the sensor on the right side of the chassis, and the <b>Remote Intake</b> temperature is measured by the sensor on the left side of the chassis.</li> </ul> </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>.<br/>On PTX Series Packet Transport Routers and MX2010, MX2020, and MX2008 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, MX2020, and MX2008 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, MX2020, and MX2008 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> <p>(MX104 Routers) Information about the chassis components: Routing Engines, Control Board (CB), Power Entry Module (PEM), and Compact Forwarding Engine Board (AFEB).</p> <p>(QFabric Systems) Information about the chassis component: Control Boards, Routing Engines, Flexible PIC Concentrators (FPCs), and Power Entry Modules (PEMs), Node Devices, and Interconnect Devices.</p> <p>(QFX Series) Information about the chassis component: Flexible PIC Concentrators (FPCs), and Power Entry Modules (PEMs).</p>   |

Table 9: show chassis environment Output Fields (continued)

| Field Name         | Field Description   |
|--------------------|---|
| <b>Status</b>      | <p>(MX104, MX2010, MX2020, and MX2008 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>(MX104, MX2010, MX2020, and MX2008 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 (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 |
| Fans  | Routing Engine 1 | Testing |                             |
|       | 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                        |
| 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&gt; 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 (MX150)

user@host&gt; show chassis environment

| Class | Item                 | Status | Measurement                  |
|-------|----------------------|--------|------------------------------|
| Power | FPC 0 Power Supply 0 | OK     |                              |
| Temp  | FPC 0 Sensor 1       | OK     | 42 degrees C / 107 degrees F |
|       | FPC 0 Sensor 2       | OK     | 39 degrees C / 102 degrees F |
|       | FPC 0 Coretemp       | OK     | 75 degrees C / 167 degrees F |
| Fans  | FPC 0 Fan Tray 0     | OK     | Spinning at normal speed     |
|       | FPC 0 Fan Tray 1     | OK     | Spinning at normal speed     |

**show chassis environment (MX104 Router)**

```
user@host> show chassis environment
```

| Class | Item                  | Status | Measurement                  |
|-------|-----------------------|--------|------------------------------|
| Temp  | PEM 0                 | OK     | 34 degrees C / 93 degrees F  |
|       | PEM 1                 | Absent |                              |
|       | ABB 0 Intake          | OK     | 33 degrees C / 91 degrees F  |
|       | ABB 0 Exhaust A       | OK     | 42 degrees C / 107 degrees F |
|       | ABB 0 Exhaust B       | OK     | 43 degrees C / 109 degrees F |
|       | ABB 1 Intake          | Absent |                              |
|       | ABB 1 Exhaust A       | Absent |                              |
|       | ABB 1 Exhaust B       | Absent |                              |
|       | Routing Engine 0      | OK     | 34 degrees C / 93 degrees F  |
|       | Routing Engine 0 CPU  | OK     | 46 degrees C / 114 degrees F |
|       | Routing Engine 1      | Absent |                              |
|       | Routing Engine 1 CPU  | Absent |                              |
|       | AFEB 0 AFEB Processor | OK     | 33 degrees C / 91 degrees F  |
|       | Fan 1                 | OK     | Spinning at normal speed     |
| Fans  | Fan 2                 | OK     | Spinning at normal speed     |
|       | Fan 3                 | OK     | Spinning at normal speed     |
|       | Fan 4                 | OK     | Spinning at normal speed     |
|       | Fan 5                 | OK     | Spinning at normal speed     |

**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 SCBE)

```
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 SCBE)

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 SCBE)

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 (MX960 Router with MPC5EQ)

```
user@host> show chassis environment
```

| Class | Item                 | Status  | Measurement                  |
|-------|----------------------|---------|------------------------------|
| Temp  | PEM 0                | OK      | 50 degrees C / 122 degrees F |
|       | PEM 1                | OK      | 45 degrees C / 113 degrees F |
|       | PEM 2                | OK      | 45 degrees C / 113 degrees F |
|       | PEM 3                | Absent  |                              |
|       | Routing Engine 0     | OK      | 31 degrees C / 87 degrees F  |
|       | Routing Engine 0 CPU | OK      | 30 degrees C / 86 degrees F  |
|       | Routing Engine 1     | Present |                              |
|       | Routing Engine 1 CPU | Present |                              |
|       | CB 0 Intake          | OK      | 29 degrees C / 84 degrees F  |
|       | CB 0 Exhaust A       | OK      | 29 degrees C / 84 degrees F  |
|       | CB 0 Exhaust B       | OK      | 34 degrees C / 93 degrees F  |
|       | CB 0 ACBC            | OK      | 32 degrees C / 89 degrees F  |
|       | CB 0 XF A            | OK      | 49 degrees C / 120 degrees F |
|       | CB 0 XF B            | OK      | 45 degrees C / 113 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 | 27 degrees C / 80 degrees F  |
| CB 1 ACBC                 | OK | 26 degrees C / 78 degrees F  |
| CB 1 XF A                 | OK | 32 degrees C / 89 degrees F  |
| CB 1 XF B                 | OK | 32 degrees C / 89 degrees F  |
| CB 2 Intake               | OK | 28 degrees C / 82 degrees F  |
| CB 2 Exhaust A            | OK | 27 degrees C / 80 degrees F  |
| CB 2 Exhaust B            | OK | 33 degrees C / 91 degrees F  |
| CB 2 ACBC                 | OK | 30 degrees C / 86 degrees F  |
| CB 2 XF A                 | OK | 48 degrees C / 118 degrees F |
| CB 2 XF B                 | OK | 46 degrees C / 114 degrees F |
| FPC 0 Intake              | OK | 38 degrees C / 100 degrees F |
| FPC 0 Exhaust A           | OK | 48 degrees C / 118 degrees F |
| FPC 0 Exhaust B           | OK | 49 degrees C / 120 degrees F |
| FPC 0 XL TSen             | OK | 48 degrees C / 118 degrees F |
| FPC 0 XL Chip             | OK | 50 degrees C / 122 degrees F |
| FPC 0 XL_XR0 TSen         | OK | 48 degrees C / 118 degrees F |
| FPC 0 XL_XR0 Chip         | OK | 53 degrees C / 127 degrees F |
| FPC 0 XL_XR1 TSen         | OK | 48 degrees C / 118 degrees F |
| FPC 0 XL_XR1 Chip         | OK | 54 degrees C / 129 degrees F |
| FPC 0 XQ TSen             | OK | 48 degrees C / 118 degrees F |
| FPC 0 XQ Chip             | OK | 52 degrees C / 125 degrees F |
| FPC 0 XQ_XR0 TSen         | OK | 48 degrees C / 118 degrees F |
| FPC 0 XQ_XR0 Chip         | OK | 62 degrees C / 143 degrees F |
| FPC 0 XQ_XR1 TSen         | OK | 48 degrees C / 118 degrees F |
| FPC 0 XQ_XR1 Chip         | OK | 62 degrees C / 143 degrees F |
| FPC 0 XM 0 TSen           | OK | 53 degrees C / 127 degrees F |
| FPC 0 XM 0 Chip           | OK | 63 degrees C / 145 degrees F |
| FPC 0 XM 1 TSen           | OK | 53 degrees C / 127 degrees F |
| FPC 0 XM 1 Chip           | OK | 46 degrees C / 114 degrees F |
| FPC 0 PLX PCIe Switch TSe | OK | 53 degrees C / 127 degrees F |
| FPC 0 PLX PCIe Switch Chi | OK | 66 degrees C / 150 degrees F |
| FPC 1 Intake              | OK | 31 degrees C / 87 degrees F  |
| FPC 1 Exhaust A           | OK | 38 degrees C / 100 degrees F |
| FPC 1 Exhaust B           | OK | 49 degrees C / 120 degrees F |
| FPC 1 LU 0 TSen           | OK | 41 degrees C / 105 degrees F |
| FPC 1 LU 0 Chip           | OK | 47 degrees C / 116 degrees F |
| FPC 1 LU 1 TSen           | OK | 41 degrees C / 105 degrees F |
| FPC 1 LU 1 Chip           | OK | 42 degrees C / 107 degrees F |
| FPC 1 LU 2 TSen           | OK | 41 degrees C / 105 degrees F |
| FPC 1 LU 2 Chip           | OK | 46 degrees C / 114 degrees F |
| FPC 1 LU 3 TSen           | OK | 41 degrees C / 105 degrees F |
| FPC 1 LU 3 Chip           | OK | 51 degrees C / 123 degrees F |
| FPC 1 XM 0 TSen           | OK | 41 degrees C / 105 degrees F |
| FPC 1 XM 0 Chip           | OK | 49 degrees C / 120 degrees F |
| FPC 1 XF 0 TSen           | OK | 41 degrees C / 105 degrees F |
| FPC 1 XF 0 Chip           | OK | 63 degrees C / 145 degrees F |
| FPC 1 PLX Switch TSen     | OK | 41 degrees C / 105 degrees F |
| FPC 1 PLX Switch Chip     | OK | 43 degrees C / 109 degrees F |
| FPC 3 Intake              | OK | 31 degrees C / 87 degrees F  |
| FPC 3 Exhaust A           | OK | 37 degrees C / 98 degrees F  |
| FPC 3 Exhaust B           | OK | 43 degrees C / 109 degrees F |
| FPC 3 LU 0 TSen           | OK | 42 degrees C / 107 degrees F |
| FPC 3 LU 0 Chip           | OK | 43 degrees C / 109 degrees F |
| FPC 3 LU 1 TSen           | OK | 42 degrees C / 107 degrees F |
| FPC 3 LU 1 Chip           | OK | 46 degrees C / 114 degrees F |
| FPC 3 LU 2 TSen           | OK | 42 degrees C / 107 degrees F |
| FPC 3 LU 2 Chip           | OK | 40 degrees C / 104 degrees F |
| FPC 3 LU 3 TSen           | OK | 42 degrees C / 107 degrees F |
| FPC 3 LU 3 Chip           | OK | 41 degrees C / 105 degrees F |
| FPC 3 MQ 0 TSen           | OK | 37 degrees C / 98 degrees F  |

|                           |    |                              |
|---------------------------|----|------------------------------|
| FPC 3 MQ 0 Chip           | OK | 37 degrees C / 98 degrees F  |
| FPC 3 MQ 1 TSen           | OK | 37 degrees C / 98 degrees F  |
| FPC 3 MQ 1 Chip           | OK | 40 degrees C / 104 degrees F |
| FPC 3 MQ 2 TSen           | OK | 37 degrees C / 98 degrees F  |
| FPC 3 MQ 2 Chip           | OK | 36 degrees C / 96 degrees F  |
| FPC 3 MQ 3 TSen           | OK | 37 degrees C / 98 degrees F  |
| FPC 3 MQ 3 Chip           | OK | 38 degrees C / 100 degrees F |
| FPC 4 Intake              | OK | 34 degrees C / 93 degrees F  |
| FPC 4 Exhaust A           | OK | 45 degrees C / 113 degrees F |
| FPC 4 Exhaust B           | OK | 47 degrees C / 116 degrees F |
| FPC 4 XL TSen             | OK | 44 degrees C / 111 degrees F |
| FPC 4 XL Chip             | OK | 47 degrees C / 116 degrees F |
| FPC 4 XL_XR0 TSen         | OK | 44 degrees C / 111 degrees F |
| FPC 4 XL_XR0 Chip         | OK | 48 degrees C / 118 degrees F |
| FPC 4 XL_XR1 TSen         | OK | 44 degrees C / 111 degrees F |
| FPC 4 XL_XR1 Chip         | OK | 47 degrees C / 116 degrees F |
| FPC 4 XQ TSen             | OK | 44 degrees C / 111 degrees F |
| FPC 4 XQ Chip             | OK | 47 degrees C / 116 degrees F |
| FPC 4 XQ_XR0 TSen         | OK | 44 degrees C / 111 degrees F |
| FPC 4 XQ_XR0 Chip         | OK | 57 degrees C / 134 degrees F |
| FPC 4 XQ_XR1 TSen         | OK | 44 degrees C / 111 degrees F |
| FPC 4 XQ_XR1 Chip         | OK | 58 degrees C / 136 degrees F |
| FPC 4 XM 0 TSen           | OK | 51 degrees C / 123 degrees F |
| FPC 4 XM 0 Chip           | OK | 61 degrees C / 141 degrees F |
| FPC 4 XM 1 TSen           | OK | 51 degrees C / 123 degrees F |
| FPC 4 XM 1 Chip           | OK | 47 degrees C / 116 degrees F |
| FPC 4 PLX PCIe Switch TSe | OK | 51 degrees C / 123 degrees F |
| FPC 4 PLX PCIe Switch Chi | OK | 60 degrees C / 140 degrees F |
| FPC 5 Intake              | OK | 34 degrees C / 93 degrees F  |
| FPC 5 Exhaust A           | OK | 45 degrees C / 113 degrees F |
| FPC 5 Exhaust B           | OK | 47 degrees C / 116 degrees F |
| FPC 5 XL TSen             | OK | 45 degrees C / 113 degrees F |
| FPC 5 XL Chip             | OK | 47 degrees C / 116 degrees F |
| FPC 5 XL_XR0 TSen         | OK | 45 degrees C / 113 degrees F |
| FPC 5 XL_XR0 Chip         | OK | 49 degrees C / 120 degrees F |
| FPC 5 XL_XR1 TSen         | OK | 45 degrees C / 113 degrees F |
| FPC 5 XL_XR1 Chip         | OK | 49 degrees C / 120 degrees F |
| FPC 5 XQ TSen             | OK | 45 degrees C / 113 degrees F |
| FPC 5 XQ Chip             | OK | 48 degrees C / 118 degrees F |
| FPC 5 XQ_XR0 TSen         | OK | 45 degrees C / 113 degrees F |
| FPC 5 XQ_XR0 Chip         | OK | 60 degrees C / 140 degrees F |
| FPC 5 XQ_XR1 TSen         | OK | 45 degrees C / 113 degrees F |
| FPC 5 XQ_XR1 Chip         | OK | 58 degrees C / 136 degrees F |
| FPC 5 XM 0 TSen           | OK | 50 degrees C / 122 degrees F |
| FPC 5 XM 0 Chip           | OK | 48 degrees C / 118 degrees F |
| FPC 5 XM 1 TSen           | OK | 50 degrees C / 122 degrees F |
| FPC 5 XM 1 Chip           | OK | 47 degrees C / 116 degrees F |
| FPC 5 PLX PCIe Switch TSe | OK | 50 degrees C / 122 degrees F |
| FPC 5 PLX PCIe Switch Chi | OK | 59 degrees C / 138 degrees F |
| FPC 7 Intake              | OK | 32 degrees C / 89 degrees F  |
| FPC 7 Exhaust A           | OK | 32 degrees C / 89 degrees F  |
| FPC 7 Exhaust B           | OK | 33 degrees C / 91 degrees F  |
| FPC 7 LU 0 TSen           | OK | 49 degrees C / 120 degrees F |
| FPC 7 LU 0 Chip           | OK | 44 degrees C / 111 degrees F |
| FPC 7 LU 1 TSen           | OK | 49 degrees C / 120 degrees F |
| FPC 7 LU 1 Chip           | OK | 47 degrees C / 116 degrees F |
| FPC 7 LU 2 TSen           | OK | 49 degrees C / 120 degrees F |
| FPC 7 LU 2 Chip           | OK | 39 degrees C / 102 degrees F |
| FPC 7 LU 3 TSen           | OK | 49 degrees C / 120 degrees F |
| FPC 7 LU 3 Chip           | OK | 43 degrees C / 109 degrees F |

|                           |    |                              |
|---------------------------|----|------------------------------|
| FPC 7 XM 0 TSen           | OK | 49 degrees C / 120 degrees F |
| FPC 7 XM 0 Chip           | OK | 57 degrees C / 134 degrees F |
| FPC 7 XM 1 TSen           | OK | 49 degrees C / 120 degrees F |
| FPC 7 XM 1 Chip           | OK | 48 degrees C / 118 degrees F |
| FPC 7 PLX Switch TSen     | OK | 49 degrees C / 120 degrees F |
| FPC 7 PLX Switch Chip     | OK | 45 degrees C / 113 degrees F |
| FPC 8 Intake              | OK | 36 degrees C / 96 degrees F  |
| FPC 8 Exhaust A           | OK | 51 degrees C / 123 degrees F |
| FPC 8 Exhaust B           | OK | 46 degrees C / 114 degrees F |
| FPC 8 XL TSen             | OK | 46 degrees C / 114 degrees F |
| FPC 8 XL Chip             | OK | 47 degrees C / 116 degrees F |
| FPC 8 XL_XR0 TSen         | OK | 46 degrees C / 114 degrees F |
| FPC 8 XL_XR0 Chip         | OK | 53 degrees C / 127 degrees F |
| FPC 8 XL_XR1 TSen         | OK | 46 degrees C / 114 degrees F |
| FPC 8 XL_XR1 Chip         | OK | 52 degrees C / 125 degrees F |
| FPC 8 XQ TSen             | OK | 46 degrees C / 114 degrees F |
| FPC 8 XQ Chip             | OK | 46 degrees C / 114 degrees F |
| FPC 8 XQ_XR0 TSen         | OK | 46 degrees C / 114 degrees F |
| FPC 8 XQ_XR0 Chip         | OK | 59 degrees C / 138 degrees F |
| FPC 8 XQ_XR1 TSen         | OK | 46 degrees C / 114 degrees F |
| FPC 8 XQ_XR1 Chip         | OK | 57 degrees C / 134 degrees F |
| FPC 8 XM 0 TSen           | OK | 52 degrees C / 125 degrees F |
| FPC 8 XM 0 Chip           | OK | 61 degrees C / 141 degrees F |
| FPC 8 XM 1 TSen           | OK | 52 degrees C / 125 degrees F |
| FPC 8 XM 1 Chip           | OK | 47 degrees C / 116 degrees F |
| FPC 8 PLX PCIe Switch TSe | OK | 52 degrees C / 125 degrees F |
| FPC 8 PLX PCIe Switch Chi | OK | 63 degrees C / 145 degrees F |
| FPC 9 Intake              | OK | 31 degrees C / 87 degrees F  |
| FPC 9 Exhaust A           | OK | 34 degrees C / 93 degrees F  |
| FPC 9 Exhaust B           | OK | 35 degrees C / 95 degrees F  |
| FPC 9 QX 0 TSen           | OK | 42 degrees C / 107 degrees F |
| FPC 9 QX 0 Chip           | OK | 45 degrees C / 113 degrees F |
| FPC 9 LU 0 TCAM TSen      | OK | 42 degrees C / 107 degrees F |
| FPC 9 LU 0 TCAM Chip      | OK | 41 degrees C / 105 degrees F |
| FPC 9 LU 0 TSen           | OK | 42 degrees C / 107 degrees F |
| FPC 9 LU 0 Chip           | OK | 43 degrees C / 109 degrees F |
| FPC 9 MQ 0 TSen           | OK | 42 degrees C / 107 degrees F |
| FPC 9 MQ 0 Chip           | OK | 43 degrees C / 109 degrees F |
| FPC 9 QX 1 TSen           | OK | 38 degrees C / 100 degrees F |
| FPC 9 QX 1 Chip           | OK | 40 degrees C / 104 degrees F |
| FPC 9 LU 1 TCAM TSen      | OK | 38 degrees C / 100 degrees F |
| FPC 9 LU 1 TCAM Chip      | OK | 38 degrees C / 100 degrees F |
| FPC 9 LU 1 TSen           | OK | 38 degrees C / 100 degrees F |
| FPC 9 LU 1 Chip           | OK | 41 degrees C / 105 degrees F |
| FPC 9 MQ 1 TSen           | OK | 38 degrees C / 100 degrees F |
| FPC 9 MQ 1 Chip           | OK | 41 degrees C / 105 degrees F |
| FPC 10 Intake             | OK | 35 degrees C / 95 degrees F  |
| FPC 10 Exhaust A          | OK | 51 degrees C / 123 degrees F |
| FPC 10 Exhaust B          | OK | 46 degrees C / 114 degrees F |
| FPC 10 XL TSen            | OK | 42 degrees C / 107 degrees F |
| FPC 10 XL Chip            | OK | 44 degrees C / 111 degrees F |
| FPC 10 XL_XR0 TSen        | OK | 42 degrees C / 107 degrees F |
| FPC 10 XL_XR0 Chip        | OK | 47 degrees C / 116 degrees F |
| FPC 10 XL_XR1 TSen        | OK | 42 degrees C / 107 degrees F |
| FPC 10 XL_XR1 Chip        | OK | 48 degrees C / 118 degrees F |
| FPC 10 XQ TSen            | OK | 42 degrees C / 107 degrees F |
| FPC 10 XQ Chip            | OK | 46 degrees C / 114 degrees F |
| FPC 10 XQ_XR0 TSen        | OK | 42 degrees C / 107 degrees F |
| FPC 10 XQ_XR0 Chip        | OK | 57 degrees C / 134 degrees F |
| FPC 10 XQ_XR1 TSen        | OK | 42 degrees C / 107 degrees F |

|                |                            |    |                              |
|----------------|----------------------------|----|------------------------------|
|                | FPC 10 XQ_XR1 Chip         | OK | 53 degrees C / 127 degrees F |
|                | FPC 10 XM 0 TSen           | OK | 51 degrees C / 123 degrees F |
|                | FPC 10 XM 0 Chip           | OK | 61 degrees C / 141 degrees F |
|                | FPC 10 XM 1 TSen           | OK | 51 degrees C / 123 degrees F |
|                | FPC 10 XM 1 Chip           | OK | 49 degrees C / 120 degrees F |
|                | FPC 10 PLX PCIe Switch TSe | OK | 51 degrees C / 123 degrees F |
|                | FPC 10 PLX PCIe Switch Chi | OK | 61 degrees C / 141 degrees F |
|                | FPC 11 Intake              | OK | 33 degrees C / 91 degrees F  |
|                | FPC 11 Exhaust A           | OK | 33 degrees C / 91 degrees F  |
|                | FPC 11 Exhaust B           | OK | 34 degrees C / 93 degrees F  |
|                | FPC 11 LU 0 TSen           | OK | 50 degrees C / 122 degrees F |
|                | FPC 11 LU 0 Chip           | OK | 48 degrees C / 118 degrees F |
|                | FPC 11 LU 1 TSen           | OK | 50 degrees C / 122 degrees F |
|                | FPC 11 LU 1 Chip           | OK | 50 degrees C / 122 degrees F |
|                | FPC 11 LU 2 TSen           | OK | 50 degrees C / 122 degrees F |
|                | FPC 11 LU 2 Chip           | OK | 41 degrees C / 105 degrees F |
|                | FPC 11 LU 3 TSen           | OK | 50 degrees C / 122 degrees F |
|                | FPC 11 LU 3 Chip           | OK | 48 degrees C / 118 degrees F |
|                | FPC 11 XM 0 TSen           | OK | 50 degrees C / 122 degrees F |
|                | FPC 11 XM 0 Chip           | OK | 57 degrees C / 134 degrees F |
|                | FPC 11 XM 1 TSen           | OK | 50 degrees C / 122 degrees F |
|                | FPC 11 XM 1 Chip           | OK | 52 degrees C / 125 degrees F |
|                | FPC 11 PLX Switch TSen     | OK | 50 degrees C / 122 degrees F |
|                | FPC 11 PLX Switch Chip     | OK | 45 degrees C / 113 degrees F |
| Fans           | Top Fan Tray Temp          | OK | 42 degrees C / 107 degrees F |
|                | Top Tray Fan 1             | OK | Spinning at high speed       |
| Top Tray Fan 2 |                            | OK | Spinning at high speed       |
|                | Top Tray Fan 3             | OK | Spinning at high speed       |
|                | Top Tray Fan 4             | OK | Spinning at high speed       |
|                | Top Tray Fan 5             | OK | Spinning at high speed       |
|                | Top Tray Fan 6             | OK | Spinning at high speed       |
|                | Top Tray Fan 7             | OK | Spinning at high speed       |
|                | Top Tray Fan 8             | OK | Spinning at high speed       |
|                | Top Tray Fan 9             | OK | Spinning at high speed       |
|                | Top Tray Fan 10            | OK | Spinning at high speed       |
|                | Top Tray Fan 11            | OK | Spinning at high speed       |
|                | Top Tray Fan 12            | OK | Spinning at high speed       |
|                | Bottom Fan Tray Temp       | OK | 33 degrees C / 91 degrees F  |
|                | Bottom Tray Fan 1          | OK | Spinning at high speed       |
|                | Bottom Tray Fan 2          | OK | Spinning at high speed       |
|                | Bottom Tray Fan 3          | OK | Spinning at high speed       |
|                | Bottom Tray Fan 4          | OK | Spinning at high speed       |
|                | Bottom Tray Fan 5          | OK | Spinning at high speed       |
|                | Bottom Tray Fan 6          | OK | Spinning at high speed       |
|                | Bottom Tray Fan 7          | OK | Spinning at high speed       |
|                | Bottom Tray Fan 8          | OK | Spinning at high speed       |
|                | Bottom Tray Fan 9          | OK | Spinning at high speed       |
|                | Bottom Tray Fan 10         | OK | Spinning at high speed       |
|                | Bottom Tray Fan 11         | OK | Spinning at high speed       |
|                | Bottom Tray Fan 12         | OK | Spinning at high 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                     |
|      | 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 (MX2020 Router with MPC5EQ and MPC6E)

| Class | Item   | Status | Measurement                 |
|-------|--------|--------|-----------------------------|
| Temp  | PSM 0  | OK     | 32 degrees C / 89 degrees F |
|       | PSM 1  | OK     | 32 degrees C / 89 degrees F |
|       | PSM 2  | OK     | 32 degrees C / 89 degrees F |
|       | PSM 3  | OK     | 32 degrees C / 89 degrees F |
|       | PSM 4  | OK     | 32 degrees C / 89 degrees F |
|       | PSM 5  | OK     | 33 degrees C / 91 degrees F |
|       | PSM 6  | OK     | 32 degrees C / 89 degrees F |
|       | PSM 7  | OK     | 32 degrees C / 89 degrees F |
|       | PSM 8  | OK     | 32 degrees C / 89 degrees F |
|       | PSM 9  | Absent |                             |
|       | PSM 10 | Absent |                             |
|       | PSM 11 | Absent |                             |
|       | PSM 12 | OK     | 33 degrees C / 91 degrees F |
|       | PSM 13 | OK     | 33 degrees C / 91 degrees F |
|       | PSM 14 | OK     | 34 degrees C / 93 degrees F |
|       | PSM 15 | OK     | 34 degrees C / 93 degrees F |
|       | PSM 16 | OK     | 33 degrees C / 91 degrees F |



|                      |    |                              |
|----------------------|----|------------------------------|
| PSM 17               | OK | 33 degrees C / 91 degrees F  |
| PDM 0                | OK |                              |
| PDM 1                | OK |                              |
| PDM 2                | OK |                              |
| PDM 3                | OK |                              |
| CB 0 IntakeA-Zone0   | OK | 34 degrees C / 93 degrees F  |
| CB 0 IntakeB-Zone1   | OK | 26 degrees C / 78 degrees F  |
| CB 0 IntakeC-Zone0   | OK | 38 degrees C / 100 degrees F |
| CB 0 ExhaustA-Zone0  | OK | 34 degrees C / 93 degrees F  |
| CB 0 ExhaustB-Zone1  | OK | 27 degrees C / 80 degrees F  |
| CB 0 TCBC-Zone0      | OK | 32 degrees C / 89 degrees F  |
| CB 1 IntakeA-Zone0   | OK | 24 degrees C / 75 degrees F  |
| CB 1 IntakeB-Zone1   | OK | 22 degrees C / 71 degrees F  |
| CB 1 IntakeC-Zone0   | OK | 34 degrees C / 93 degrees F  |
| CB 1 ExhaustA-Zone0  | OK | 31 degrees C / 87 degrees F  |
| CB 1 ExhaustB-Zone1  | OK | 24 degrees C / 75 degrees F  |
| CB 1 TCBC-Zone0      | OK | 27 degrees C / 80 degrees F  |
| SPMB 0 Intake        | OK | 25 degrees C / 77 degrees F  |
| SPMB 1 Intake        | OK | 23 degrees C / 73 degrees F  |
| Routing Engine 0     | OK | 28 degrees C / 82 degrees F  |
| Routing Engine 0 CPU | OK | 25 degrees C / 77 degrees F  |
| Routing Engine 1     | OK | 25 degrees C / 77 degrees F  |
| Routing Engine 1 CPU | OK | 24 degrees C / 75 degrees F  |
| SFB 0 Intake-Zone0   | OK | 45 degrees C / 113 degrees F |
| SFB 0 Exhaust-Zone1  | OK | 34 degrees C / 93 degrees F  |
| SFB 0 IntakeA-Zone0  | OK | 32 degrees C / 89 degrees F  |
| SFB 0 IntakeB-Zone1  | OK | 28 degrees C / 82 degrees F  |
| SFB 0 Exhaust-Zone0  | OK | 36 degrees C / 96 degrees F  |
| SFB 0 SFB-XF2-Zone1  | OK | 46 degrees C / 114 degrees F |
| SFB 0 SFB-XF1-Zone0  | OK | 48 degrees C / 118 degrees F |
| SFB 0 SFB-XF0-Zone0  | OK | 60 degrees C / 140 degrees F |
| SFB 1 Intake-Zone0   | OK | 44 degrees C / 111 degrees F |
| SFB 1 Exhaust-Zone1  | OK | 34 degrees C / 93 degrees F  |
| SFB 1 IntakeA-Zone0  | OK | 35 degrees C / 95 degrees F  |
| SFB 1 IntakeB-Zone1  | OK | 27 degrees C / 80 degrees F  |
| SFB 1 Exhaust-Zone0  | OK | 37 degrees C / 98 degrees F  |
| SFB 1 SFB-XF2-Zone1  | OK | 47 degrees C / 116 degrees F |
| SFB 1 SFB-XF1-Zone0  | OK | 49 degrees C / 120 degrees F |
| SFB 1 SFB-XF0-Zone0  | OK | 56 degrees C / 132 degrees F |
| SFB 2 Intake-Zone0   | OK | 41 degrees C / 105 degrees F |
| SFB 2 Exhaust-Zone1  | OK | 34 degrees C / 93 degrees F  |
| SFB 2 IntakeA-Zone0  | OK | 35 degrees C / 95 degrees F  |
| SFB 2 IntakeB-Zone1  | OK | 28 degrees C / 82 degrees F  |
| SFB 2 Exhaust-Zone0  | OK | 37 degrees C / 98 degrees F  |
| SFB 2 SFB-XF2-Zone1  | OK | 47 degrees C / 116 degrees F |
| SFB 2 SFB-XF1-Zone0  | OK | 55 degrees C / 131 degrees F |
| SFB 2 SFB-XF0-Zone0  | OK | 55 degrees C / 131 degrees F |
| SFB 3 Intake-Zone0   | OK | 43 degrees C / 109 degrees F |
| SFB 3 Exhaust-Zone1  | OK | 33 degrees C / 91 degrees F  |
| SFB 3 IntakeA-Zone0  | OK | 35 degrees C / 95 degrees F  |
| SFB 3 IntakeB-Zone1  | OK | 27 degrees C / 80 degrees F  |
| SFB 3 Exhaust-Zone0  | OK | 36 degrees C / 96 degrees F  |
| SFB 3 SFB-XF2-Zone1  | OK | 46 degrees C / 114 degrees F |
| SFB 3 SFB-XF1-Zone0  | OK | 46 degrees C / 114 degrees F |
| SFB 3 SFB-XF0-Zone0  | OK | 57 degrees C / 134 degrees F |
| SFB 4 Intake-Zone0   | OK | 36 degrees C / 96 degrees F  |
| SFB 4 Exhaust-Zone1  | OK | 32 degrees C / 89 degrees F  |
| SFB 4 IntakeA-Zone0  | OK | 31 degrees C / 87 degrees F  |
| SFB 4 IntakeB-Zone1  | OK | 26 degrees C / 78 degrees F  |
| SFB 4 Exhaust-Zone0  | OK | 32 degrees C / 89 degrees F  |

|                           |    |                              |
|---------------------------|----|------------------------------|
| SFB 4 SFB-XF2-Zone1       | OK | 44 degrees C / 111 degrees F |
| SFB 4 SFB-XF1-Zone0       | OK | 45 degrees C / 113 degrees F |
| SFB 4 SFB-XF0-Zone0       | OK | 52 degrees C / 125 degrees F |
| SFB 5 Intake-Zone0        | OK | 31 degrees C / 87 degrees F  |
| SFB 5 Exhaust-Zone1       | OK | 30 degrees C / 86 degrees F  |
| SFB 5 IntakeA-Zone0       | OK | 26 degrees C / 78 degrees F  |
| SFB 5 IntakeB-Zone1       | OK | 24 degrees C / 75 degrees F  |
| SFB 5 Exhaust-Zone0       | OK | 29 degrees C / 84 degrees F  |
| SFB 5 SFB-XF2-Zone1       | OK | 43 degrees C / 109 degrees F |
| SFB 5 SFB-XF1-Zone0       | OK | 47 degrees C / 116 degrees F |
| SFB 5 SFB-XF0-Zone0       | OK | 49 degrees C / 120 degrees F |
| SFB 6 Intake-Zone0        | OK | 30 degrees C / 86 degrees F  |
| SFB 6 Exhaust-Zone1       | OK | 29 degrees C / 84 degrees F  |
| SFB 6 IntakeA-Zone0       | OK | 25 degrees C / 77 degrees F  |
| SFB 6 IntakeB-Zone1       | OK | 24 degrees C / 75 degrees F  |
| SFB 6 Exhaust-Zone0       | OK | 29 degrees C / 84 degrees F  |
| SFB 6 SFB-XF2-Zone1       | OK | 43 degrees C / 109 degrees F |
| SFB 6 SFB-XF1-Zone0       | OK | 44 degrees C / 111 degrees F |
| SFB 6 SFB-XF0-Zone0       | OK | 45 degrees C / 113 degrees F |
| SFB 7 Intake-Zone0        | OK | 31 degrees C / 87 degrees F  |
| SFB 7 Exhaust-Zone1       | OK | 30 degrees C / 86 degrees F  |
| SFB 7 IntakeA-Zone0       | OK | 26 degrees C / 78 degrees F  |
| SFB 7 IntakeB-Zone1       | OK | 24 degrees C / 75 degrees F  |
| SFB 7 Exhaust-Zone0       | OK | 28 degrees C / 82 degrees F  |
| SFB 7 SFB-XF2-Zone1       | OK | 50 degrees C / 122 degrees F |
| SFB 7 SFB-XF1-Zone0       | OK | 43 degrees C / 109 degrees F |
| SFB 7 SFB-XF0-Zone0       | OK | 47 degrees C / 116 degrees F |
| FPC 0 Intake              | OK | 31 degrees C / 87 degrees F  |
| FPC 0 Exhaust A           | OK | 49 degrees C / 120 degrees F |
| FPC 0 Exhaust B           | OK | 43 degrees C / 109 degrees F |
| FPC 0 XL TSen             | OK | 42 degrees C / 107 degrees F |
| FPC 0 XL Chip             | OK | 46 degrees C / 114 degrees F |
| FPC 0 XL_XR0 TSen         | OK | 42 degrees C / 107 degrees F |
| FPC 0 XL_XR0 Chip         | OK | 48 degrees C / 118 degrees F |
| FPC 0 XL_XR1 TSen         | OK | 42 degrees C / 107 degrees F |
| FPC 0 XL_XR1 Chip         | OK | 48 degrees C / 118 degrees F |
| FPC 0 XQ TSen             | OK | 42 degrees C / 107 degrees F |
| FPC 0 XQ Chip             | OK | 44 degrees C / 111 degrees F |
| FPC 0 XQ_XR0 TSen         | OK | 42 degrees C / 107 degrees F |
| FPC 0 XQ_XR0 Chip         | OK | 57 degrees C / 134 degrees F |
| FPC 0 XQ_XR1 TSen         | OK | 42 degrees C / 107 degrees F |
| FPC 0 XQ_XR1 Chip         | OK | 55 degrees C / 131 degrees F |
| FPC 0 XM 0 TSen           | OK | 48 degrees C / 118 degrees F |
| FPC 0 XM 0 Chip           | OK | 62 degrees C / 143 degrees F |
| FPC 0 XM 1 TSen           | OK | 48 degrees C / 118 degrees F |
| FPC 0 XM 1 Chip           | OK | 44 degrees C / 111 degrees F |
| FPC 0 PLX PCIe Switch TSe | OK | 48 degrees C / 118 degrees F |
| FPC 0 PLX PCIe Switch Chi | OK | 57 degrees C / 134 degrees F |
| FPC 1 Intake              | OK | 29 degrees C / 84 degrees F  |
| FPC 1 Exhaust A           | OK | 36 degrees C / 96 degrees F  |
| FPC 1 Exhaust B           | OK | 44 degrees C / 111 degrees F |
| FPC 1 LU 0 TSen           | OK | 38 degrees C / 100 degrees F |
| FPC 1 LU 0 Chip           | OK | 45 degrees C / 113 degrees F |
| FPC 1 LU 1 TSen           | OK | 38 degrees C / 100 degrees F |
| FPC 1 LU 1 Chip           | OK | 38 degrees C / 100 degrees F |
| FPC 1 LU 2 TSen           | OK | 38 degrees C / 100 degrees F |
| FPC 1 LU 2 Chip           | OK | 42 degrees C / 107 degrees F |
| FPC 1 LU 3 TSen           | OK | 38 degrees C / 100 degrees F |
| FPC 1 LU 3 Chip           | OK | 47 degrees C / 116 degrees F |
| FPC 1 XM 0 TSen           | OK | 38 degrees C / 100 degrees F |

|                       |    |                              |
|-----------------------|----|------------------------------|
| FPC 1 XM 0 Chip       | OK | 44 degrees C / 111 degrees F |
| FPC 1 XF 0 TSen       | OK | 38 degrees C / 100 degrees F |
| FPC 1 XF 0 Chip       | OK | 54 degrees C / 129 degrees F |
| FPC 1 PLX Switch TSen | OK | 38 degrees C / 100 degrees F |
| FPC 1 PLX Switch Chip | OK | 41 degrees C / 105 degrees F |
| FPC 2 Intake          | OK | 28 degrees C / 82 degrees F  |
| FPC 2 Exhaust A       | OK | 28 degrees C / 82 degrees F  |
| FPC 2 Exhaust B       | OK | 28 degrees C / 82 degrees F  |
| FPC 2 LU 0 TSen       | OK | 40 degrees C / 104 degrees F |
| FPC 2 LU 0 Chip       | OK | 40 degrees C / 104 degrees F |
| FPC 2 LU 1 TSen       | OK | 40 degrees C / 104 degrees F |
| FPC 2 LU 1 Chip       | OK | 41 degrees C / 105 degrees F |
| FPC 2 LU 2 TSen       | OK | 40 degrees C / 104 degrees F |
| FPC 2 LU 2 Chip       | OK | 34 degrees C / 93 degrees F  |
| FPC 2 LU 3 TSen       | OK | 40 degrees C / 104 degrees F |
| FPC 2 LU 3 Chip       | OK | 38 degrees C / 100 degrees F |
| FPC 2 XM 0 TSen       | OK | 40 degrees C / 104 degrees F |
| FPC 2 XM 0 Chip       | OK | 47 degrees C / 116 degrees F |
| FPC 2 XM 1 TSen       | OK | 40 degrees C / 104 degrees F |
| FPC 2 XM 1 Chip       | OK | 42 degrees C / 107 degrees F |
| FPC 2 PLX Switch TSen | OK | 40 degrees C / 104 degrees F |
| FPC 2 PLX Switch Chip | OK | 39 degrees C / 102 degrees F |
| FPC 3 Intake          | OK | 27 degrees C / 80 degrees F  |
| FPC 3 Exhaust A       | OK | 38 degrees C / 100 degrees F |
| FPC 3 Exhaust B       | OK | 31 degrees C / 87 degrees F  |
| FPC 3 QX 0 TSen       | OK | 38 degrees C / 100 degrees F |
| FPC 3 QX 0 Chip       | OK | 42 degrees C / 107 degrees F |
| FPC 3 LU 0 TCAM TSen  | OK | 38 degrees C / 100 degrees F |
| FPC 3 LU 0 TCAM Chip  | OK | 43 degrees C / 109 degrees F |
| FPC 3 LU 0 TSen       | OK | 38 degrees C / 100 degrees F |
| FPC 3 LU 0 Chip       | OK | 42 degrees C / 107 degrees F |
| FPC 3 MQ 0 TSen       | OK | 38 degrees C / 100 degrees F |
| FPC 3 MQ 0 Chip       | OK | 39 degrees C / 102 degrees F |
| FPC 3 QX 1 TSen       | OK | 32 degrees C / 89 degrees F  |
| FPC 3 QX 1 Chip       | OK | 36 degrees C / 96 degrees F  |
| FPC 3 LU 1 TCAM TSen  | OK | 32 degrees C / 89 degrees F  |
| FPC 3 LU 1 TCAM Chip  | OK | 35 degrees C / 95 degrees F  |
| FPC 3 LU 1 TSen       | OK | 32 degrees C / 89 degrees F  |
| FPC 3 LU 1 Chip       | OK | 37 degrees C / 98 degrees F  |
| FPC 3 MQ 1 TSen       | OK | 32 degrees C / 89 degrees F  |
| FPC 3 MQ 1 Chip       | OK | 36 degrees C / 96 degrees F  |
| FPC 4 Intake          | OK | 29 degrees C / 84 degrees F  |
| FPC 4 Exhaust A       | OK | 36 degrees C / 96 degrees F  |
| FPC 4 Exhaust B       | OK | 40 degrees C / 104 degrees F |
| FPC 4 XL TSen         | OK | 39 degrees C / 102 degrees F |
| FPC 4 XL Chip         | OK | 42 degrees C / 107 degrees F |
| FPC 4 XL_XR0 TSen     | OK | 39 degrees C / 102 degrees F |
| FPC 4 XL_XR0 Chip     | OK | 45 degrees C / 113 degrees F |
| FPC 4 XL_XR1 TSen     | OK | 39 degrees C / 102 degrees F |
| FPC 4 XL_XR1 Chip     | OK | 46 degrees C / 114 degrees F |
| FPC 4 XQ TSen         | OK | 39 degrees C / 102 degrees F |
| FPC 4 XQ Chip         | OK | 42 degrees C / 107 degrees F |
| FPC 4 XQ_XR0 TSen     | OK | 39 degrees C / 102 degrees F |
| FPC 4 XQ_XR0 Chip     | OK | 54 degrees C / 129 degrees F |
| FPC 4 XQ_XR1 TSen     | OK | 39 degrees C / 102 degrees F |
| FPC 4 XQ_XR1 Chip     | OK | 53 degrees C / 127 degrees F |
| FPC 4 XM 0 TSen       | OK | 45 degrees C / 113 degrees F |
| FPC 4 XM 0 Chip       | OK | 59 degrees C / 138 degrees F |
| FPC 4 XM 1 TSen       | OK | 45 degrees C / 113 degrees F |
| FPC 4 XM 1 Chip       | OK | 41 degrees C / 105 degrees F |

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FPC 4 PLX PCIe Switch TSe      OK      45 degrees C / 113 degrees F
FPC 4 PLX PCIe Switch Chi      OK      58 degrees C / 136 degrees F
FPC 5 Intake                    OK      29 degrees C / 84 degrees F
FPC 5 Exhaust A                 OK      33 degrees C / 91 degrees F
FPC 5 Exhaust B                 OK      39 degrees C / 102 degrees F
FPC 5 LU 0 TSen                 OK      40 degrees C / 104 degrees F
FPC 5 LU 0 Chip                 OK      40 degrees C / 104 degrees F
FPC 5 LU 1 TSen                 OK      40 degrees C / 104 degrees F
FPC 5 LU 1 Chip                 OK      45 degrees C / 113 degrees F
FPC 5 LU 2 TSen                 OK      40 degrees C / 104 degrees F
FPC 5 LU 2 Chip                 OK      40 degrees C / 104 degrees F
FPC 5 LU 3 TSen                 OK      40 degrees C / 104 degrees F
FPC 5 LU 3 Chip                 OK      46 degrees C / 114 degrees F
FPC 5 MQ 0 TSen                 OK      32 degrees C / 89 degrees F
FPC 5 MQ 0 Chip                 OK      33 degrees C / 91 degrees F
FPC 5 MQ 1 TSen                 OK      32 degrees C / 89 degrees F
FPC 5 MQ 1 Chip                 OK      35 degrees C / 95 degrees F
FPC 5 MQ 2 TSen                 OK      32 degrees C / 89 degrees F
FPC 5 MQ 2 Chip                 OK      32 degrees C / 89 degrees F
FPC 5 MQ 3 TSen                 OK      32 degrees C / 89 degrees F
FPC 5 MQ 3 Chip                 OK      32 degrees C / 89 degrees F
FPC 9 Intake                    OK      25 degrees C / 77 degrees F
FPC 9 Exhaust A                 OK      37 degrees C / 98 degrees F
FPC 9 Exhaust B                 OK      40 degrees C / 104 degrees F
FPC 9 XL 0 TSen                 OK      40 degrees C / 104 degrees F
...

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### 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                    |
| Fans Fan Tray 0 Fan 2 | OK | 3480 RPM                    |
| Fans Fan Tray 0 Fan 3 | OK | 3480 RPM                    |
| Fans Fan Tray 0 Fan 4 | OK | 3360 RPM                    |
| Fans Fan Tray 0 Fan 5 | OK | 3360 RPM                    |
| Fans Fan Tray 0 Fan 6 | OK | 3480 RPM                    |
| Fans Fan Tray 1 Fan 1 | OK | 3360 RPM                    |
| Fans Fan Tray 1 Fan 2 | OK | 3360 RPM                    |
| Fans Fan Tray 1 Fan 3 | OK | 3360 RPM                    |
| Fans Fan Tray 1 Fan 4 | OK | 3480 RPM                    |
| Fans Fan Tray 1 Fan 5 | OK | 3480 RPM                    |
| Fans Fan Tray 1 Fan 6 | OK | 3480 RPM                    |
| Fans Fan Tray 2 Fan 1 | OK | 3360 RPM                    |
| Fans Fan Tray 2 Fan 2 | OK | 3360 RPM                    |
| Fans Fan Tray 2 Fan 3 | OK | 3480 RPM                    |
| Fans Fan Tray 2 Fan 4 | OK | 3480 RPM                    |
| Fans Fan Tray 2 Fan 5 | OK | 3360 RPM                    |
| Fans Fan Tray 2 Fan 6 | OK | 3480 RPM                    |
| Fans Fan Tray 3 Fan 1 | OK | 3360 RPM                    |
| Fans Fan Tray 3 Fan 2 | OK | 3360 RPM                    |
| Fans Fan Tray 3 Fan 3 | OK | 3480 RPM                    |
| Fans Fan Tray 3 Fan 4 | OK | 3480 RPM                    |
| Fans Fan Tray 3 Fan 5 | OK | 3480 RPM                    |
| Fans Fan Tray 3 Fan 6 | OK | 3360 RPM                    |

**show chassis environment (MX2008 Router)**

```
user@host>show chassis environment
```

| Class | Item                 | Status | Measurement                  |
|-------|----------------------|--------|------------------------------|
| Temp  | PSM 0                | Absent |                              |
|       | PSM 1                | OK     | 29 degrees C / 84 degrees F  |
|       | PSM 2                | OK     | 30 degrees C / 86 degrees F  |
|       | PSM 3                | OK     | 29 degrees C / 84 degrees F  |
|       | PSM 4                | OK     | 29 degrees C / 84 degrees F  |
|       | PSM 5                | OK     | 30 degrees C / 86 degrees F  |
|       | PSM 6                | OK     | 29 degrees C / 84 degrees F  |
|       | PSM 7                | OK     | 31 degrees C / 87 degrees F  |
|       | PSM 8                | Absent |                              |
|       | PDM 0                | OK     |                              |
|       | PDM 1                | OK     |                              |
|       | CB 0 Inlet1          | OK     | 37 degrees C / 98 degrees F  |
|       | CB 0 Inlet2          | OK     | 45 degrees C / 113 degrees F |
|       | CB 0 Inlet3          | OK     | 44 degrees C / 111 degrees F |
|       | CB 0 Inlet4          | OK     | 41 degrees C / 105 degrees F |
|       | CB 0 Exhaust1        | OK     | 30 degrees C / 86 degrees F  |
|       | CB 0 Exhaust2        | OK     | 40 degrees C / 104 degrees F |
|       | CB 0 Exhaust3        | OK     | 48 degrees C / 118 degrees F |
|       | CB 0 Exhaust4        | OK     | 46 degrees C / 114 degrees F |
|       | CB 1 Inlet1          | OK     | 30 degrees C / 86 degrees F  |
|       | CB 1 Inlet2          | OK     | 31 degrees C / 87 degrees F  |
|       | CB 1 Inlet3          | OK     | 29 degrees C / 84 degrees F  |
|       | CB 1 Inlet4          | OK     | 32 degrees C / 89 degrees F  |
|       | CB 1 Exhaust1        | OK     | 30 degrees C / 86 degrees F  |
|       | CB 1 Exhaust2        | OK     | 33 degrees C / 91 degrees F  |
|       | CB 1 Exhaust3        | OK     | 34 degrees C / 93 degrees F  |
|       | CB 1 Exhaust4        | OK     | 34 degrees C / 93 degrees F  |
|       | Routing Engine 0     | OK     |                              |
|       | Routing Engine 0 CPU | OK     | 75 degrees C / 167 degrees F |
|       | Routing Engine 1     | OK     |                              |
|       | Routing Engine 1 CPU | OK     | 46 degrees C / 114 degrees F |
|       | SFB 0 Inlet2         | OK     | 44 degrees C / 111 degrees F |
|       | SFB 0 Exhaust1       | OK     | 39 degrees C / 102 degrees F |
|       | SFB 0 Inlet1         | OK     | 41 degrees C / 105 degrees F |
|       | SFB 0 Exhaust2       | OK     | 45 degrees C / 113 degrees F |
|       | SFB 0 SFB2-PF-local  | OK     | 45 degrees C / 113 degrees F |
|       | SFB 0 SFB2-PF-die    | OK     | 51 degrees C / 123 degrees F |
|       | SFB 1 Inlet2         | OK     | 30 degrees C / 86 degrees F  |
|       | SFB 1 Exhaust1       | OK     | 27 degrees C / 80 degrees F  |
|       | SFB 1 Inlet1         | OK     | 28 degrees C / 82 degrees F  |
|       | SFB 1 Exhaust2       | OK     | 31 degrees C / 87 degrees F  |
|       | SFB 1 SFB2-PF-local  | OK     | 30 degrees C / 86 degrees F  |
|       | SFB 1 SFB2-PF-die    | OK     | 37 degrees C / 98 degrees F  |
|       | SFB 2 Inlet2         | OK     | 28 degrees C / 82 degrees F  |
|       | SFB 2 Exhaust1       | OK     | 26 degrees C / 78 degrees F  |
|       | SFB 2 Inlet1         | OK     | 27 degrees C / 80 degrees F  |
|       | SFB 2 Exhaust2       | OK     | 28 degrees C / 82 degrees F  |
|       | SFB 2 SFB2-PF-local  | OK     | 27 degrees C / 80 degrees F  |
|       | SFB 2 SFB2-PF-die    | OK     | 33 degrees C / 91 degrees F  |
|       | SFB 3 Inlet2         | OK     | 28 degrees C / 82 degrees F  |
|       | SFB 3 Exhaust1       | OK     | 26 degrees C / 78 degrees F  |
|       | SFB 3 Inlet1         | OK     | 26 degrees C / 78 degrees F  |
|       | SFB 3 Exhaust2       | OK     | 28 degrees C / 82 degrees F  |
|       | SFB 3 SFB2-PF-local  | OK     | 27 degrees C / 80 degrees F  |
|       | SFB 3 SFB2-PF-die    | OK     | 33 degrees C / 91 degrees F  |
|       | SFB 4 Inlet2         | OK     | 28 degrees C / 82 degrees F  |
|       | SFB 4 Exhaust1       | OK     | 26 degrees C / 78 degrees F  |
|       | SFB 4 Inlet1         | OK     | 26 degrees C / 78 degrees F  |
|       | SFB 4 Exhaust2       | OK     | 28 degrees C / 82 degrees F  |

|                        |    |                              |
|------------------------|----|------------------------------|
| SFB 4 SFB2-PF-local    | OK | 27 degrees C / 80 degrees F  |
| SFB 4 SFB2-PF-die      | OK | 32 degrees C / 89 degrees F  |
| SFB 5 Inlet2           | OK | 29 degrees C / 84 degrees F  |
| SFB 5 Exhaust1         | OK | 27 degrees C / 80 degrees F  |
| SFB 5 Inlet1           | OK | 28 degrees C / 82 degrees F  |
| SFB 5 Exhaust2         | OK | 29 degrees C / 84 degrees F  |
| SFB 5 SFB2-PF-local    | OK | 28 degrees C / 82 degrees F  |
| SFB 5 SFB2-PF-die      | OK | 34 degrees C / 93 degrees F  |
| SFB 6 Inlet2           | OK | 33 degrees C / 91 degrees F  |
| SFB 6 Exhaust1         | OK | 32 degrees C / 89 degrees F  |
| SFB 6 Inlet1           | OK | 32 degrees C / 89 degrees F  |
| SFB 6 Exhaust2         | OK | 34 degrees C / 93 degrees F  |
| SFB 6 SFB2-PF-local    | OK | 33 degrees C / 91 degrees F  |
| SFB 6 SFB2-PF-die      | OK | 40 degrees C / 104 degrees F |
| SFB 7 Inlet2           | OK | 29 degrees C / 84 degrees F  |
| SFB 7 Exhaust1         | OK | 28 degrees C / 82 degrees F  |
| SFB 7 Inlet1           | OK | 29 degrees C / 84 degrees F  |
| SFB 7 Exhaust2         | OK | 29 degrees C / 84 degrees F  |
| SFB 7 SFB2-PF-local    | OK | 28 degrees C / 82 degrees F  |
| SFB 7 SFB2-PF-die      | OK | 33 degrees C / 91 degrees F  |
| FPC 0 Intake           | OK | 29 degrees C / 84 degrees F  |
| FPC 0 Exhaust A        | OK | 42 degrees C / 107 degrees F |
| FPC 0 Exhaust B        | OK | 42 degrees C / 107 degrees F |
| FPC 0 XL 0 TSen        | OK | 38 degrees C / 100 degrees F |
| FPC 0 XL 0 Chip        | OK | 53 degrees C / 127 degrees F |
| FPC 0 XL 0 XR2 0 TSen  | OK | 38 degrees C / 100 degrees F |
| FPC 0 XL 0 XR2 0 Chip  | OK | 59 degrees C / 138 degrees F |
| FPC 0 XL 0 XR2 1 TSen  | OK | 38 degrees C / 100 degrees F |
| FPC 0 XL 0 XR2 1 Chip  | OK | 59 degrees C / 138 degrees F |
| FPC 0 XL 1 TSen        | OK | 30 degrees C / 86 degrees F  |
| FPC 0 XL 1 Chip        | OK | 42 degrees C / 107 degrees F |
| FPC 0 XL 1 XR2 0 TSen  | OK | 30 degrees C / 86 degrees F  |
| FPC 0 XL 1 XR2 0 Chip  | OK | 49 degrees C / 120 degrees F |
| FPC 0 XL 1 XR2 1 TSen  | OK | 30 degrees C / 86 degrees F  |
| FPC 0 XL 1 XR2 1 Chip  | OK | 50 degrees C / 122 degrees F |
| FPC 0 XM 0 TSen        | OK | 42 degrees C / 107 degrees F |
| FPC 0 XM 0 Chip        | OK | 49 degrees C / 120 degrees F |
| FPC 0 XM 1 TSen        | OK | 42 degrees C / 107 degrees F |
| FPC 0 XM 1 Chip        | OK | 42 degrees C / 107 degrees F |
| FPC 0 XM 2 TSen        | OK | 42 degrees C / 107 degrees F |
| FPC 0 XM 2 Chip        | OK | 42 degrees C / 107 degrees F |
| FPC 0 XM 3 TSen        | OK | 42 degrees C / 107 degrees F |
| FPC 0 XM 3 Chip        | OK | 40 degrees C / 104 degrees F |
| FPC 0 PCIe Switch TSen | OK | 42 degrees C / 107 degrees F |
| FPC 0 PCIe Switch Chip | OK | 22 degrees C / 71 degrees F  |
| FPC 1 Intake           | OK | 29 degrees C / 84 degrees F  |
| FPC 1 Exhaust A        | OK | 52 degrees C / 125 degrees F |
| FPC 1 Exhaust B        | OK | 44 degrees C / 111 degrees F |
| FPC 1 EA0 TSen         | OK | 54 degrees C / 129 degrees F |
| FPC 1 EA0 Chip         | OK | 47 degrees C / 116 degrees F |
| FPC 1 EA0_XR0 TSen     | OK | 54 degrees C / 129 degrees F |
| FPC 1 EA0_XR0 Chip     | OK | 56 degrees C / 132 degrees F |
| FPC 1 EA0_XR1 TSen     | OK | 54 degrees C / 129 degrees F |
| FPC 1 EA0_XR1 Chip     | OK | 53 degrees C / 127 degrees F |
| FPC 1 EA1 TSen         | OK | 54 degrees C / 129 degrees F |
| FPC 1 EA1 Chip         | OK | 49 degrees C / 120 degrees F |
| FPC 1 EA1_XR0 TSen     | OK | 54 degrees C / 129 degrees F |
| FPC 1 EA1_XR0 Chip     | OK | 57 degrees C / 134 degrees F |
| FPC 1 EA1_XR1 TSen     | OK | 54 degrees C / 129 degrees F |
| FPC 1 EA1_XR1 Chip     | OK | 58 degrees C / 136 degrees F |

|                          |    |                              |
|--------------------------|----|------------------------------|
| FPC 1 PEX TSen           | OK | 54 degrees C / 129 degrees F |
| FPC 1 PEX Chip           | OK | 39 degrees C / 102 degrees F |
| FPC 1 EA2 TSen           | OK | 43 degrees C / 109 degrees F |
| FPC 1 EA2 Chip           | OK | 39 degrees C / 102 degrees F |
| FPC 1 EA2_XR0 TSen       | OK | 43 degrees C / 109 degrees F |
| FPC 1 EA2_XR0 Chip       | OK | 45 degrees C / 113 degrees F |
| FPC 1 EA2_XR1 TSen       | OK | 43 degrees C / 109 degrees F |
| FPC 1 EA2_XR1 Chip       | OK | 42 degrees C / 107 degrees F |
| FPC 1 EA3 TSen           | OK | 43 degrees C / 109 degrees F |
| FPC 1 EA3 Chip           | OK | 40 degrees C / 104 degrees F |
| FPC 1 EA3_XR0 TSen       | OK | 43 degrees C / 109 degrees F |
| FPC 1 EA3_XR0 Chip       | OK | 50 degrees C / 122 degrees F |
| FPC 1 EA3_XR1 TSen       | OK | 43 degrees C / 109 degrees F |
| FPC 1 EA3_XR1 Chip       | OK | 46 degrees C / 114 degrees F |
| FPC 1 EA0_HMC0 Logic die | OK | 60 degrees C / 140 degrees F |
| FPC 1 EA0_HMC0 DRAM botm | OK | 57 degrees C / 134 degrees F |
| FPC 1 EA0_HMC1 Logic die | OK | 61 degrees C / 141 degrees F |
| FPC 1 EA0_HMC1 DRAM botm | OK | 58 degrees C / 136 degrees F |
| FPC 1 EA0_HMC2 Logic die | OK | 57 degrees C / 134 degrees F |
| FPC 1 EA0_HMC2 DRAM botm | OK | 54 degrees C / 129 degrees F |
| FPC 1 EA1_HMC0 Logic die | OK | 65 degrees C / 149 degrees F |
| FPC 1 EA1_HMC0 DRAM botm | OK | 62 degrees C / 143 degrees F |
| FPC 1 EA1_HMC1 Logic die | OK | 64 degrees C / 147 degrees F |
| FPC 1 EA1_HMC1 DRAM botm | OK | 61 degrees C / 141 degrees F |
| FPC 1 EA1_HMC2 Logic die | OK | 61 degrees C / 141 degrees F |
| FPC 1 EA1_HMC2 DRAM botm | OK | 58 degrees C / 136 degrees F |
| FPC 1 EA2_HMC0 Logic die | OK | 50 degrees C / 122 degrees F |
| FPC 1 EA2_HMC0 DRAM botm | OK | 47 degrees C / 116 degrees F |
| FPC 1 EA2_HMC1 Logic die | OK | 54 degrees C / 129 degrees F |
| FPC 1 EA2_HMC1 DRAM botm | OK | 51 degrees C / 123 degrees F |
| FPC 1 EA2_HMC2 Logic die | OK | 51 degrees C / 123 degrees F |
| FPC 1 EA2_HMC2 DRAM botm | OK | 48 degrees C / 118 degrees F |
| FPC 1 EA3_HMC0 Logic die | OK | 51 degrees C / 123 degrees F |
| FPC 1 EA3_HMC0 DRAM botm | OK | 48 degrees C / 118 degrees F |
| FPC 1 EA3_HMC1 Logic die | OK | 51 degrees C / 123 degrees F |
| FPC 1 EA3_HMC1 DRAM botm | OK | 48 degrees C / 118 degrees F |
| FPC 1 EA3_HMC2 Logic die | OK | 51 degrees C / 123 degrees F |
| FPC 1 EA3_HMC2 DRAM botm | OK | 48 degrees C / 118 degrees F |
| FPC 7 Intake             | OK | 30 degrees C / 86 degrees F  |
| FPC 7 Exhaust A          | OK | 45 degrees C / 113 degrees F |
| FPC 7 Exhaust B          | OK | 38 degrees C / 100 degrees F |
| FPC 7 QX 0 TSen          | OK | 48 degrees C / 118 degrees F |
| FPC 7 QX 0 Chip          | OK | 51 degrees C / 123 degrees F |
| FPC 7 LU 0 TCAM TSen     | OK | 48 degrees C / 118 degrees F |
| FPC 7 LU 0 TCAM Chip     | OK | 51 degrees C / 123 degrees F |
| FPC 7 LU 0 TSen          | OK | 48 degrees C / 118 degrees F |
| FPC 7 LU 0 Chip          | OK | 50 degrees C / 122 degrees F |
| FPC 7 MQ 0 TSen          | OK | 48 degrees C / 118 degrees F |
| FPC 7 MQ 0 Chip          | OK | 54 degrees C / 129 degrees F |
| FPC 7 QX 1 TSen          | OK | 41 degrees C / 105 degrees F |
| FPC 7 QX 1 Chip          | OK | 42 degrees C / 107 degrees F |
| FPC 7 LU 1 TCAM TSen     | OK | 41 degrees C / 105 degrees F |
| FPC 7 LU 1 TCAM Chip     | OK | 43 degrees C / 109 degrees F |
| FPC 7 LU 1 TSen          | OK | 41 degrees C / 105 degrees F |
| FPC 7 LU 1 Chip          | OK | 46 degrees C / 114 degrees F |
| FPC 7 MQ 1 TSen          | OK | 41 degrees C / 105 degrees F |
| FPC 7 MQ 1 Chip          | OK | 47 degrees C / 116 degrees F |
| ADC 7 Intake             | OK | 32 degrees C / 89 degrees F  |
| ADC 7 Exhaust            | OK | 39 degrees C / 102 degrees F |
| ADC 7 ADC-XF1            | OK | 46 degrees C / 114 degrees F |

|      |                  |    |                              |
|------|------------------|----|------------------------------|
|      | ADC 7 ADC-XF0    | OK | 54 degrees C / 129 degrees F |
| Fans | Fan Tray 0 Fan 1 | OK | 6240 RPM                     |
|      | Fan Tray 0 Fan 2 | OK | 6120 RPM                     |
|      | Fan Tray 0 Fan 3 | OK | 6120 RPM                     |
|      | Fan Tray 0 Fan 4 | OK | 5760 RPM                     |
|      | Fan Tray 0 Fan 5 | OK | 5880 RPM                     |
|      | Fan Tray 0 Fan 6 | OK | 6000 RPM                     |
|      | Fan Tray 1 Fan 1 | OK | 5880 RPM                     |
|      | Fan Tray 1 Fan 2 | OK | 5880 RPM                     |
|      | Fan Tray 1 Fan 3 | OK | 6000 RPM                     |
|      | Fan Tray 1 Fan 4 | OK | 6000 RPM                     |
|      | Fan Tray 1 Fan 5 | OK | 6000 RPM                     |
|      | Fan Tray 1 Fan 6 | OK | 6000 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 Fourth 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 (MX10003 Router)

user@host&gt; show chassis environment

| Class | Item                          | Status | Measurement                  |
|-------|-------------------------------|--------|------------------------------|
| Temp  | CB 0 Exhaust Temp Sensor 0x49 | OK     | 36 degrees C / 96 degrees F  |
|       | CB 0 Inlet Temp Sensor 0x49   | OK     | 29 degrees C / 84 degrees F  |
|       | CB 1 Exhaust Temp Sensor 0x49 | OK     | 36 degrees C / 96 degrees F  |
|       | CB 1 Inlet Temp Sensor 0x49   | OK     | 31 degrees C / 87 degrees F  |
|       | FPC 0 Intake Temp Sensor      | OK     | 29 degrees C / 84 degrees F  |
|       | FPC 0 Exhaust-A Temp Sensor   | OK     | 55 degrees C / 131 degrees F |
|       | FPC 0 Exhaust-B Temp Sensor   | OK     | 44 degrees C / 111 degrees F |
|       | FPC 0 EA0 Chip                | OK     | 58 degrees C / 136 degrees F |
|       | FPC 0 EA0-XR0 Chip            | OK     | 61 degrees C / 141 degrees F |
|       | FPC 0 EA0-XR1 Chip            | OK     | 62 degrees C / 143 degrees F |
|       | FPC 0 EA1 Chip                | OK     | 67 degrees C / 152 degrees F |
|       | FPC 0 EA1-XR0 Chip            | OK     | 71 degrees C / 159 degrees F |
|       | FPC 0 EA1-XR1 Chip            | OK     | 72 degrees C / 161 degrees F |
|       | FPC 0 PEX Chip                | OK     | 75 degrees C / 167 degrees F |
|       | FPC 0 EA2 Chip                | OK     | 49 degrees C / 120 degrees F |
|       | FPC 0 EA2-XR0 Chip            | OK     | 55 degrees C / 131 degrees F |
|       | FPC 0 EA2-XR1 Chip            | OK     | 56 degrees C / 132 degrees F |
|       | FPC 0 PF Chip                 | OK     | 68 degrees C / 154 degrees F |
|       | FPC 0 EA0_HMC0 Logic die      | OK     | 72 degrees C / 161 degrees F |
|       | FPC 0 EA0_HMC0 DRAM botm      | OK     | 69 degrees C / 156 degrees F |
|       | FPC 0 EA0_HMC1 Logic die      | OK     | 72 degrees C / 161 degrees F |
|       | FPC 0 EA0_HMC1 DRAM botm      | OK     | 69 degrees C / 156 degrees F |
|       | FPC 0 EA0_HMC2 Logic die      | OK     | 75 degrees C / 167 degrees F |
|       | FPC 0 EA0_HMC2 DRAM botm      | OK     | 72 degrees C / 161 degrees F |
|       | FPC 0 EA1_HMC0 Logic die      | OK     | 81 degrees C / 177 degrees F |
|       | FPC 0 EA1_HMC0 DRAM botm      | OK     | 78 degrees C / 172 degrees F |
|       | FPC 0 EA1_HMC1 Logic die      | OK     | 79 degrees C / 174 degrees F |
|       | FPC 0 EA1_HMC1 DRAM botm      | OK     | 76 degrees C / 168 degrees F |
|       | FPC 0 EA1_HMC2 Logic die      | OK     | 82 degrees C / 179 degrees F |
|       | FPC 0 EA1_HMC2 DRAM botm      | OK     | 79 degrees C / 174 degrees F |
|       | FPC 0 EA2_HMC0 Logic die      | OK     | 61 degrees C / 141 degrees F |
|       | FPC 0 EA2_HMC0 DRAM botm      | OK     | 58 degrees C / 136 degrees F |
|       | FPC 0 EA2_HMC1 Logic die      | OK     | 62 degrees C / 143 degrees F |
|       | FPC 0 EA2_HMC1 DRAM botm      | OK     | 59 degrees C / 138 degrees F |
|       | FPC 0 EA2_HMC2 Logic die      | OK     | 64 degrees C / 147 degrees F |
|       | FPC 0 EA2_HMC2 DRAM botm      | OK     | 61 degrees C / 141 degrees F |
|       | FPC 1 Intake Temp Sensor      | OK     | 28 degrees C / 82 degrees F  |
|       | FPC 1 Exhaust-A Temp Sensor   | OK     | 58 degrees C / 136 degrees F |
|       | FPC 1 Exhaust-B Temp Sensor   | OK     | 46 degrees C / 114 degrees F |
|       | FPC 1 EA0 Chip                | OK     | 64 degrees C / 147 degrees F |
|       | FPC 1 EA0-XR0 Chip            | OK     | 67 degrees C / 152 degrees F |
|       | FPC 1 EA0-XR1 Chip            | OK     | 68 degrees C / 154 degrees F |
|       | FPC 1 EA1 Chip                | OK     | 70 degrees C / 158 degrees F |
|       | FPC 1 EA1-XR0 Chip            | OK     | 74 degrees C / 165 degrees F |
|       | FPC 1 EA1-XR1 Chip            | OK     | 74 degrees C / 165 degrees F |
|       | FPC 1 PEX Chip                | OK     | 88 degrees C / 190 degrees F |
|       | FPC 1 EA2 Chip                | OK     | 50 degrees C / 122 degrees F |
|       | FPC 1 EA2-XR0 Chip            | OK     | 54 degrees C / 129 degrees F |
|       | FPC 1 EA2-XR1 Chip            | OK     | 56 degrees C / 132 degrees F |
|       | FPC 1 PF Chip                 | OK     | 71 degrees C / 159 degrees F |
|       | FPC 1 EA0_HMC0 Logic die      | OK     | 74 degrees C / 165 degrees F |
|       | FPC 1 EA0_HMC0 DRAM botm      | OK     | 71 degrees C / 159 degrees F |
|       | FPC 1 EA0_HMC1 Logic die      | OK     | 78 degrees C / 172 degrees F |
|       | FPC 1 EA0_HMC1 DRAM botm      | OK     | 75 degrees C / 167 degrees F |

|       |                          |        |                              |
|-------|--------------------------|--------|------------------------------|
|       | FPC 1 EA0_HMC2 Logic die | OK     | 78 degrees C / 172 degrees F |
|       | FPC 1 EA0_HMC2 DRAM botm | OK     | 75 degrees C / 167 degrees F |
|       | FPC 1 EA1_HMC0 Logic die | OK     | 84 degrees C / 183 degrees F |
|       | FPC 1 EA1_HMC0 DRAM botm | OK     | 81 degrees C / 177 degrees F |
|       | FPC 1 EA1_HMC1 Logic die | OK     | 81 degrees C / 177 degrees F |
|       | FPC 1 EA1_HMC1 DRAM botm | OK     | 78 degrees C / 172 degrees F |
|       | FPC 1 EA1_HMC2 Logic die | OK     | 85 degrees C / 185 degrees F |
|       | FPC 1 EA1_HMC2 DRAM botm | OK     | 82 degrees C / 179 degrees F |
|       | FPC 1 EA2_HMC0 Logic die | OK     | 63 degrees C / 145 degrees F |
|       | FPC 1 EA2_HMC0 DRAM botm | OK     | 60 degrees C / 140 degrees F |
|       | FPC 1 EA2_HMC1 Logic die | OK     | 60 degrees C / 140 degrees F |
|       | FPC 1 EA2_HMC1 DRAM botm | OK     | 57 degrees C / 134 degrees F |
|       | FPC 1 EA2_HMC2 Logic die | OK     | 66 degrees C / 150 degrees F |
|       | FPC 1 EA2_HMC2 DRAM botm | OK     | 63 degrees C / 145 degrees F |
| Power | PEM 0                    | OK     |                              |
|       | PEM 1                    | OK     |                              |
|       | PEM 2                    | OK     |                              |
|       | PEM 3                    | OK     |                              |
|       | PEM 4                    | Absent |                              |
|       | PEM 5                    | Absent |                              |
| Fans  | Fan Tray 0 Fan 0         | OK     | Spinning at normal speed     |
|       | 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 1 Fan 0         | 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 2 Fan 0         | 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 3 Fan 0         | 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     |

### show chassis environment (MX10008 Router)

```
user@host> show chassis environment
```

| Class | Item                        | Status | Measurement                  |
|-------|-----------------------------|--------|------------------------------|
| Temp  | Routing Engine 0 CPU        | OK     | 41 degrees C / 105 degrees F |
|       | Routing Engine 1 CPU        | OK     | 40 degrees C / 104 degrees F |
|       | CB 0 Intake A Temp Sensor   | OK     | 24 degrees C / 75 degrees F  |
|       | CB 0 Intake B Temp Sensor   | OK     | 24 degrees C / 75 degrees F  |
|       | CB 0 Exhaust A Temp Sensor  | OK     | 28 degrees C / 82 degrees F  |
|       | CB 0 Exhaust B Temp Sensor  | OK     | 30 degrees C / 86 degrees F  |
|       | CB 0 Middle Temp Sensor     | OK     | 28 degrees C / 82 degrees F  |
|       | CB 1 Intake A Temp Sensor   | OK     | 24 degrees C / 75 degrees F  |
|       | CB 1 Intake B Temp Sensor   | OK     | 23 degrees C / 73 degrees F  |
|       | CB 1 Exhaust A Temp Sensor  | OK     | 27 degrees C / 80 degrees F  |
|       | CB 1 Exhaust B Temp Sensor  | OK     | 29 degrees C / 84 degrees F  |
|       | CB 1 Middle Temp Sensor     | OK     | 28 degrees C / 82 degrees F  |
|       | FPC 0 Intake-A Temp Sensor  | OK     | 32 degrees C / 89 degrees F  |
|       | FPC 0 Exhaust-A Temp Sensor | OK     | 44 degrees C / 111 degrees F |
|       | FPC 0 Exhaust-B Temp Sensor | OK     | 49 degrees C / 120 degrees F |
|       | FPC 0 EA0 Temp Sensor       | OK     | 66 degrees C / 150 degrees F |
|       | FPC 0 EA0_XR0 Temp Sensor   | OK     | 69 degrees C / 156 degrees F |
|       | FPC 0 EA0_XR1 Temp Sensor   | OK     | 73 degrees C / 163 degrees F |

|                             |    |                              |
|-----------------------------|----|------------------------------|
| FPC 0 EA1 Temp Sensor       | OK | 60 degrees C / 140 degrees F |
| FPC 0 EA1_XR0 Temp Sensor   | OK | 64 degrees C / 147 degrees F |
| FPC 0 EA1_XR1 Temp Sensor   | OK | 63 degrees C / 145 degrees F |
| FPC 0 EA2 Temp Sensor       | OK | 68 degrees C / 154 degrees F |
| FPC 0 EA2_XR0 Temp Sensor   | OK | 73 degrees C / 163 degrees F |
| FPC 0 EA2_XR1 Temp Sensor   | OK | 72 degrees C / 161 degrees F |
| FPC 0 EA3 Temp Sensor       | OK | 63 degrees C / 145 degrees F |
| FPC 0 EA3_XR0 Temp Sensor   | OK | 66 degrees C / 150 degrees F |
| FPC 0 EA3_XR1 Temp Sensor   | OK | 65 degrees C / 149 degrees F |
| FPC 0 EA4 Temp Sensor       | OK | 68 degrees C / 154 degrees F |
| FPC 0 EA4_XR0 Temp Sensor   | OK | 71 degrees C / 159 degrees F |
| FPC 0 EA4_XR1 Temp Sensor   | OK | 70 degrees C / 158 degrees F |
| FPC 0 EA5 Temp Sensor       | OK | 56 degrees C / 132 degrees F |
| FPC 0 EA5_XR0 Temp Sensor   | OK | 61 degrees C / 141 degrees F |
| FPC 0 EA5_XR1 Temp Sensor   | OK | 63 degrees C / 145 degrees F |
| FPC 0 EA0_HMC0 Logic die    | OK | 75 degrees C / 167 degrees F |
| FPC 0 EA0_HMC0 DRAM botm    | OK | 72 degrees C / 161 degrees F |
| FPC 0 EA0_HMC1 Logic die    | OK | 75 degrees C / 167 degrees F |
| FPC 0 EA0_HMC1 DRAM botm    | OK | 72 degrees C / 161 degrees F |
| FPC 0 EA0_HMC2 Logic die    | OK | 77 degrees C / 170 degrees F |
| FPC 0 EA0_HMC2 DRAM botm    | OK | 74 degrees C / 165 degrees F |
| FPC 0 EA1_HMC0 Logic die    | OK | 72 degrees C / 161 degrees F |
| FPC 0 EA1_HMC0 DRAM botm    | OK | 69 degrees C / 156 degrees F |
| FPC 0 EA1_HMC1 Logic die    | OK | 73 degrees C / 163 degrees F |
| FPC 0 EA1_HMC1 DRAM botm    | OK | 70 degrees C / 158 degrees F |
| FPC 0 EA1_HMC2 Logic die    | OK | 72 degrees C / 161 degrees F |
| FPC 0 EA1_HMC2 DRAM botm    | OK | 69 degrees C / 156 degrees F |
| FPC 0 EA2_HMC0 Logic die    | OK | 80 degrees C / 176 degrees F |
| FPC 0 EA2_HMC0 DRAM botm    | OK | 77 degrees C / 170 degrees F |
| FPC 0 EA2_HMC1 Logic die    | OK | 80 degrees C / 176 degrees F |
| FPC 0 EA2_HMC1 DRAM botm    | OK | 77 degrees C / 170 degrees F |
| FPC 0 EA2_HMC2 Logic die    | OK | 79 degrees C / 174 degrees F |
| FPC 0 EA2_HMC2 DRAM botm    | OK | 76 degrees C / 168 degrees F |
| FPC 0 EA3_HMC0 Logic die    | OK | 77 degrees C / 170 degrees F |
| FPC 0 EA3_HMC0 DRAM botm    | OK | 74 degrees C / 165 degrees F |
| FPC 0 EA3_HMC1 Logic die    | OK | 78 degrees C / 172 degrees F |
| FPC 0 EA3_HMC1 DRAM botm    | OK | 75 degrees C / 167 degrees F |
| FPC 0 EA3_HMC2 Logic die    | OK | 77 degrees C / 170 degrees F |
| FPC 0 EA3_HMC2 DRAM botm    | OK | 74 degrees C / 165 degrees F |
| FPC 0 EA4_HMC0 Logic die    | OK | 80 degrees C / 176 degrees F |
| FPC 0 EA4_HMC0 DRAM botm    | OK | 77 degrees C / 170 degrees F |
| FPC 0 EA4_HMC1 Logic die    | OK | 81 degrees C / 177 degrees F |
| FPC 0 EA4_HMC1 DRAM botm    | OK | 78 degrees C / 172 degrees F |
| FPC 0 EA4_HMC2 Logic die    | OK | 80 degrees C / 176 degrees F |
| FPC 0 EA4_HMC2 DRAM botm    | OK | 77 degrees C / 170 degrees F |
| FPC 0 EA5_HMC0 Logic die    | OK | 68 degrees C / 154 degrees F |
| FPC 0 EA5_HMC0 DRAM botm    | OK | 65 degrees C / 149 degrees F |
| FPC 0 EA5_HMC1 Logic die    | OK | 68 degrees C / 154 degrees F |
| FPC 0 EA5_HMC1 DRAM botm    | OK | 65 degrees C / 149 degrees F |
| FPC 0 EA5_HMC2 Logic die    | OK | 67 degrees C / 152 degrees F |
| FPC 0 EA5_HMC2 DRAM botm    | OK | 64 degrees C / 147 degrees F |
| FPC 2 Intake-A Temp Sensor  | OK | 32 degrees C / 89 degrees F  |
| FPC 2 Exhaust-A Temp Sensor | OK | 52 degrees C / 125 degrees F |
| FPC 2 Exhaust-B Temp Sensor | OK | 50 degrees C / 122 degrees F |
| FPC 2 EA0 Temp Sensor       | OK | 71 degrees C / 159 degrees F |
| FPC 2 EA0_XR0 Temp Sensor   | OK | 75 degrees C / 167 degrees F |
| FPC 2 EA0_XR1 Temp Sensor   | OK | 78 degrees C / 172 degrees F |
| FPC 2 EA1 Temp Sensor       | OK | 64 degrees C / 147 degrees F |
| FPC 2 EA1_XR0 Temp Sensor   | OK | 67 degrees C / 152 degrees F |
| FPC 2 EA1_XR1 Temp Sensor   | OK | 65 degrees C / 149 degrees F |



|                             |    |                              |
|-----------------------------|----|------------------------------|
| FPC 2 EA2 Temp Sensor       | OK | 75 degrees C / 167 degrees F |
| FPC 2 EA2_XR0 Temp Sensor   | OK | 80 degrees C / 176 degrees F |
| FPC 2 EA2_XR1 Temp Sensor   | OK | 80 degrees C / 176 degrees F |
| FPC 2 EA3 Temp Sensor       | OK | 66 degrees C / 150 degrees F |
| FPC 2 EA3_XR0 Temp Sensor   | OK | 69 degrees C / 156 degrees F |
| FPC 2 EA3_XR1 Temp Sensor   | OK | 69 degrees C / 156 degrees F |
| FPC 2 EA4 Temp Sensor       | OK | 75 degrees C / 167 degrees F |
| FPC 2 EA4_XR0 Temp Sensor   | OK | 76 degrees C / 168 degrees F |
| FPC 2 EA4_XR1 Temp Sensor   | OK | 75 degrees C / 167 degrees F |
| FPC 2 EA5 Temp Sensor       | OK | 60 degrees C / 140 degrees F |
| FPC 2 EA5_XR0 Temp Sensor   | OK | 64 degrees C / 147 degrees F |
| FPC 2 EA5_XR1 Temp Sensor   | OK | 64 degrees C / 147 degrees F |
| FPC 2 EA0_HMC0 Logic die    | OK | 84 degrees C / 183 degrees F |
| FPC 2 EA0_HMC0 DRAM botm    | OK | 81 degrees C / 177 degrees F |
| FPC 2 EA0_HMC1 Logic die    | OK | 85 degrees C / 185 degrees F |
| FPC 2 EA0_HMC1 DRAM botm    | OK | 82 degrees C / 179 degrees F |
| FPC 2 EA0_HMC2 Logic die    | OK | 83 degrees C / 181 degrees F |
| FPC 2 EA0_HMC2 DRAM botm    | OK | 80 degrees C / 176 degrees F |
| FPC 2 EA1_HMC0 Logic die    | OK | 76 degrees C / 168 degrees F |
| FPC 2 EA1_HMC0 DRAM botm    | OK | 73 degrees C / 163 degrees F |
| FPC 2 EA1_HMC1 Logic die    | OK | 76 degrees C / 168 degrees F |
| FPC 2 EA1_HMC1 DRAM botm    | OK | 73 degrees C / 163 degrees F |
| FPC 2 EA1_HMC2 Logic die    | OK | 76 degrees C / 168 degrees F |
| FPC 2 EA1_HMC2 DRAM botm    | OK | 73 degrees C / 163 degrees F |
| FPC 2 EA2_HMC0 Logic die    | OK | 86 degrees C / 186 degrees F |
| FPC 2 EA2_HMC0 DRAM botm    | OK | 83 degrees C / 181 degrees F |
| FPC 2 EA2_HMC1 Logic die    | OK | 87 degrees C / 188 degrees F |
| FPC 2 EA2_HMC1 DRAM botm    | OK | 84 degrees C / 183 degrees F |
| FPC 2 EA2_HMC2 Logic die    | OK | 87 degrees C / 188 degrees F |
| FPC 2 EA2_HMC2 DRAM botm    | OK | 84 degrees C / 183 degrees F |
| FPC 2 EA3_HMC0 Logic die    | OK | 80 degrees C / 176 degrees F |
| FPC 2 EA3_HMC0 DRAM botm    | OK | 77 degrees C / 170 degrees F |
| FPC 2 EA3_HMC1 Logic die    | OK | 80 degrees C / 176 degrees F |
| FPC 2 EA3_HMC1 DRAM botm    | OK | 77 degrees C / 170 degrees F |
| FPC 2 EA3_HMC2 Logic die    | OK | 80 degrees C / 176 degrees F |
| FPC 2 EA3_HMC2 DRAM botm    | OK | 77 degrees C / 170 degrees F |
| FPC 2 EA4_HMC0 Logic die    | OK | 88 degrees C / 190 degrees F |
| FPC 2 EA4_HMC0 DRAM botm    | OK | 85 degrees C / 185 degrees F |
| FPC 2 EA4_HMC1 Logic die    | OK | 89 degrees C / 192 degrees F |
| FPC 2 EA4_HMC1 DRAM botm    | OK | 86 degrees C / 186 degrees F |
| FPC 2 EA4_HMC2 Logic die    | OK | 80 degrees C / 176 degrees F |
| FPC 2 EA4_HMC2 DRAM botm    | OK | 77 degrees C / 170 degrees F |
| FPC 2 EA5_HMC0 Logic die    | OK | 72 degrees C / 161 degrees F |
| FPC 2 EA5_HMC0 DRAM botm    | OK | 69 degrees C / 156 degrees F |
| FPC 2 EA5_HMC1 Logic die    | OK | 69 degrees C / 156 degrees F |
| FPC 2 EA5_HMC1 DRAM botm    | OK | 66 degrees C / 150 degrees F |
| FPC 2 EA5_HMC2 Logic die    | OK | 72 degrees C / 161 degrees F |
| FPC 2 EA5_HMC2 DRAM botm    | OK | 69 degrees C / 156 degrees F |
| FPC 3 Intake-A Temp Sensor  | OK | 30 degrees C / 86 degrees F  |
| FPC 3 Exhaust-A Temp Sensor | OK | 48 degrees C / 118 degrees F |
| FPC 3 Exhaust-B Temp Sensor | OK | 44 degrees C / 111 degrees F |
| FPC 3 EA0 Temp Sensor       | OK | 60 degrees C / 140 degrees F |
| FPC 3 EA0_XR0 Temp Sensor   | OK | 65 degrees C / 149 degrees F |
| FPC 3 EA0_XR1 Temp Sensor   | OK | 67 degrees C / 152 degrees F |
| FPC 3 EA1 Temp Sensor       | OK | 54 degrees C / 129 degrees F |
| FPC 3 EA1_XR0 Temp Sensor   | OK | 59 degrees C / 138 degrees F |
| FPC 3 EA1_XR1 Temp Sensor   | OK | 58 degrees C / 136 degrees F |
| FPC 3 EA2 Temp Sensor       | OK | 62 degrees C / 143 degrees F |
| FPC 3 EA2_XR0 Temp Sensor   | OK | 66 degrees C / 150 degrees F |
| FPC 3 EA2_XR1 Temp Sensor   | OK | 66 degrees C / 150 degrees F |

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|                   |    |                              |
|-------------------|----|------------------------------|
| Fan Tray 0 Fan 9  | OK | Spinning at normal speed     |
| Fan Tray 0 Fan 10 | OK | Spinning at normal speed     |
| Fan Tray 1 Fan 0  | 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 1 Fan 7  | OK | Spinning at normal speed     |
| Fan Tray 1 Fan 8  | OK | Spinning at normal speed     |
| Fan Tray 1 Fan 9  | OK | Spinning at normal speed     |
| Fan Tray 1 Fan 10 | OK | Spinning at normal speed     |
| SFB 0 Intake-A    | OK | 32 degrees C / 89 degrees F  |
| SFB 0 Intake-B    | OK | 21 degrees C / 69 degrees F  |
| SFB 0 Exhaust-A   | OK | 27 degrees C / 80 degrees F  |
| SFB 0 Exhaust-B   | OK | 32 degrees C / 89 degrees F  |
| SFB 0 PF0         | OK | 39 degrees C / 102 degrees F |
| SFB 0 PF1         | OK | 29 degrees C / 84 degrees F  |
| SFB 1 Intake-A    | OK | 43 degrees C / 109 degrees F |
| SFB 1 Intake-B    | OK | 20 degrees C / 68 degrees F  |
| SFB 1 Exhaust-A   | OK | 25 degrees C / 77 degrees F  |
| SFB 1 Exhaust-B   | OK | 44 degrees C / 111 degrees F |
| SFB 1 PF0         | OK | 50 degrees C / 122 degrees F |
| SFB 1 PF1         | OK | 29 degrees C / 84 degrees F  |
| SFB 2 Intake-A    | OK | 39 degrees C / 102 degrees F |
| SFB 2 Intake-B    | OK | 20 degrees C / 68 degrees F  |
| SFB 2 Exhaust-A   | OK | 25 degrees C / 77 degrees F  |
| SFB 2 Exhaust-B   | OK | 38 degrees C / 100 degrees F |
| SFB 2 PF0         | OK | 45 degrees C / 113 degrees F |
| SFB 2 PF1         | OK | 30 degrees C / 86 degrees F  |
| SFB 3 Intake-A    | OK | 36 degrees C / 96 degrees F  |
| SFB 3 Intake-B    | OK | 20 degrees C / 68 degrees F  |
| SFB 3 Exhaust-A   | OK | 25 degrees C / 77 degrees F  |
| SFB 3 Exhaust-B   | OK | 35 degrees C / 95 degrees F  |
| SFB 3 PF0         | OK | 42 degrees C / 107 degrees F |
| SFB 3 PF1         | OK | 29 degrees C / 84 degrees F  |
| SFB 4 Intake-A    | OK | 30 degrees C / 86 degrees F  |
| SFB 4 Intake-B    | OK | 20 degrees C / 68 degrees F  |
| SFB 4 Exhaust-A   | OK | 25 degrees C / 77 degrees F  |
| SFB 4 Exhaust-B   | OK | 31 degrees C / 87 degrees F  |
| SFB 4 PF0         | OK | 41 degrees C / 105 degrees F |
| SFB 4 PF1         | OK | 29 degrees C / 84 degrees F  |
| SFB 5 Intake-A    | OK | 30 degrees C / 86 degrees F  |
| SFB 5 Intake-B    | OK | 21 degrees C / 69 degrees F  |
| SFB 5 Exhaust-A   | OK | 25 degrees C / 77 degrees F  |
| SFB 5 Exhaust-B   | OK | 30 degrees C / 86 degrees F  |
| SFB 5 PF0         | OK | 35 degrees C / 95 degrees F  |
| SFB 5 PF1         | OK | 34 degrees C / 93 degrees F  |

**show chassis environment (MX204 Router)**

user@host&gt; show chassis environment

| Class | Item                          | Status | Measurement                  |
|-------|-------------------------------|--------|------------------------------|
| Temp  | CB 0 Top Right Inlet Sensor   | OK     | 35 degrees C / 95 degrees F  |
|       | CB 0 Top Left Inlet Sensor    | OK     | 37 degrees C / 98 degrees F  |
|       | CB 0 Top Right Exhaust Sensor | OK     | 43 degrees C / 109 degrees F |
|       | CB 0 Top Left Exhaust Sensor  | OK     | 50 degrees C / 122 degrees F |

|       |                          |        |                              |
|-------|--------------------------|--------|------------------------------|
|       | CB 0 CPU Core-0 Temp     | OK     | 47 degrees C / 116 degrees F |
|       | CB 0 CPU Core-1 Temp     | OK     | 48 degrees C / 118 degrees F |
|       | CB 0 CPU Core-2 Temp     | OK     | 47 degrees C / 116 degrees F |
|       | CB 0 CPU Core-3 Temp     | OK     | 47 degrees C / 116 degrees F |
|       | CB 0 CPU Core-4 Temp     | OK     | 47 degrees C / 116 degrees F |
|       | CB 0 CPU Core-5 Temp     | OK     | 47 degrees C / 116 degrees F |
|       | CB 0 CPU Core-6 Temp     | OK     | 47 degrees C / 116 degrees F |
|       | CB 0 CPU Core-7 Temp     | OK     | 47 degrees C / 116 degrees F |
|       | FPC 0 EAO_HMC0 Logic die | OK     | 77 degrees C / 170 degrees F |
|       | FPC 0 EAO_HMC0 DRAM botm | OK     | 74 degrees C / 165 degrees F |
|       | FPC 0 EAO_HMC1 Logic die | OK     | 81 degrees C / 177 degrees F |
|       | FPC 0 EAO_HMC1 DRAM botm | OK     | 78 degrees C / 172 degrees F |
|       | FPC 0 EAO Chip           | OK     | 94 degrees C / 201 degrees F |
|       | FPC 0 EAO-XR0 Chip       | OK     | 64 degrees C / 147 degrees F |
|       | FPC 0 EAO-XR1 Chip       | OK     | 65 degrees C / 149 degrees F |
| Power | PEM 0                    | Absent |                              |
|       | PEM 1                    | OK     | 48 degrees C / 118 degrees F |
| Fans  | Fan Tray 0 Fan 0         | OK     | Spinning at normal speed     |
|       | Fan Tray 0 Fan 1         | OK     | Spinning at normal speed     |
|       | Fan Tray 1 Fan 0         | OK     | Spinning at normal speed     |
|       | Fan Tray 1 Fan 1         | OK     | Spinning at normal speed     |
|       | Fan Tray 2 Fan 0         | OK     | Spinning at normal speed     |
|       | Fan Tray 2 Fan 1         | OK     | Spinning at normal speed     |

### 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  |                             |
|       | 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  |                             |
| 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 |
|      | 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       |
|      | Rear Tray Bottom 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
```

| ----- |                  |        |                             |
|-------|------------------|--------|-----------------------------|
| 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 |                              |

1cc0-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  |
| Fans  | FPM GBUS                | OK     | 30 degrees C / 86 degrees F  |
|       | FPM Display             | OK     | 34 degrees C / 93 degrees F  |
|       | 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

```



|      |                         |    |                              |
|------|-------------------------|----|------------------------------|
| Fans | 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  |
|      | 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     |
| Misc | 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     |
|      | CIP                     | OK |                              |
|      | SPMB 0                  | OK |                              |
|      | SPMB 1                  | OK |                              |

### show chassis environment (TX Matrix Plus Router)

```
user@host> show chassis environment
```

| 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
```

| 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     |
| Misc | Rear Tray fan 5           | OK | Spinning at normal speed     |
|      | 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  |
| Fans  | FPC 0 Uplink Conn       | OK     | 29 degrees C / 84 degrees F  |
|       | 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 (EX9200 Switch)

```
user@switch> show chassis environment
```

| Class | Item                 | Status | Measurement                  |
|-------|----------------------|--------|------------------------------|
| Temp  | PEM 0                | Check  |                              |
|       | PEM 1                | OK     | 40 degrees C / 104 degrees F |
|       | PEM 2                | OK     | 40 degrees C / 104 degrees F |
|       | PEM 3                | Absent |                              |
|       | Routing Engine 0     | OK     | 35 degrees C / 95 degrees F  |
|       | Routing Engine 0 CPU | OK     | 33 degrees C / 91 degrees F  |
|       | Routing Engine 1     | OK     | 38 degrees C / 100 degrees F |
|       | Routing Engine 1 CPU | OK     | 33 degrees C / 91 degrees F  |
|       | CB 0 Intake          | OK     | 35 degrees C / 95 degrees F  |
|       | CB 0 Exhaust A       | OK     | 33 degrees C / 91 degrees F  |
|       | CB 0 Exhaust B       | OK     | 40 degrees C / 104 degrees F |

|                      |    |                              |
|----------------------|----|------------------------------|
| CB 0 ACBC            | OK | 39 degrees C / 102 degrees F |
| CB 0 XF A            | OK | 49 degrees C / 120 degrees F |
| CB 0 XF B            | OK | 46 degrees C / 114 degrees F |
| CB 1 Intake          | OK | 37 degrees C / 98 degrees F  |
| CB 1 Exhaust A       | OK | 32 degrees C / 89 degrees F  |
| CB 1 Exhaust B       | OK | 39 degrees C / 102 degrees F |
| CB 1 ACBC            | OK | 41 degrees C / 105 degrees F |
| CB 1 XF A            | OK | 49 degrees C / 120 degrees F |
| CB 1 XF B            | OK | 49 degrees C / 120 degrees F |
| FPC 2 Intake         | OK | 37 degrees C / 98 degrees F  |
| FPC 2 Exhaust A      | OK | 40 degrees C / 104 degrees F |
| FPC 2 Exhaust B      | OK | 34 degrees C / 93 degrees F  |
| FPC 2 LU 0 TCAM TSen | OK | 44 degrees C / 111 degrees F |
| FPC 2 LU 0 TCAM Chip | OK | 48 degrees C / 118 degrees F |
| FPC 2 LU 0 TSen      | OK | 44 degrees C / 111 degrees F |
| FPC 2 LU 0 Chip      | OK | 60 degrees C / 140 degrees F |
| FPC 2 MQ 0 TSen      | OK | 44 degrees C / 111 degrees F |
| FPC 2 MQ 0 Chip      | OK | 51 degrees C / 123 degrees F |
| FPC 3 Intake         | OK | 39 degrees C / 102 degrees F |
| FPC 3 Exhaust A      | OK | 51 degrees C / 123 degrees F |

[...Output truncated...]

|                   |    |                                |
|-------------------|----|--------------------------------|
| Fans Top Rear Fan | OK | Spinning at intermediate-speed |
| Bottom Rear Fan   | OK | Spinning at intermediate-speed |
| Top Middle Fan    | OK | Spinning at intermediate-speed |
| Bottom Middle Fan | OK | Spinning at intermediate-speed |
| Top Front Fan     | OK | Spinning at intermediate-speed |
| Bottom Front Fan  | OK | Spinning at intermediate-speed |

### show chassis environment (EX9251 Switch)

```
user@switch> show chassis environment
```

| Class | Item                          | Status | Measurement                  |
|-------|-------------------------------|--------|------------------------------|
| Temp  | CB 0 Top Right Inlet Sensor   | OK     | 29 degrees C / 84 degrees F  |
|       | CB 0 Top Left Inlet Sensor    | OK     | 29 degrees C / 84 degrees F  |
|       | CB 0 Top Right Exhaust Sensor | OK     | 40 degrees C / 104 degrees F |
|       | CB 0 Top Left Exhaust Sensor  | OK     | 59 degrees C / 138 degrees F |
|       | CB 0 CPU Core-0 Temp          | OK     | 45 degrees C / 113 degrees F |
|       | CB 0 CPU Core-1 Temp          | OK     | 44 degrees C / 111 degrees F |
|       | CB 0 CPU Core-2 Temp          | OK     | 44 degrees C / 111 degrees F |
|       | CB 0 CPU Core-3 Temp          | OK     | 44 degrees C / 111 degrees F |
|       | CB 0 CPU Core-4 Temp          | OK     | 45 degrees C / 113 degrees F |
|       | CB 0 CPU Core-5 Temp          | OK     | 44 degrees C / 111 degrees F |
|       | CB 0 CPU Core-6 Temp          | OK     | 44 degrees C / 111 degrees F |
|       | CB 0 CPU Core-7 Temp          | OK     | 43 degrees C / 109 degrees F |
| Power | PEM 0                         | Check  |                              |
|       | PEM 1                         | OK     | 36 degrees C / 96 degrees F  |
| Fans  | Fan Tray 0 Fan 0              | OK     | Spinning at normal speed     |
|       | Fan Tray 0 Fan 1              | OK     | Spinning at normal speed     |
|       | Fan Tray 1 Fan 0              | OK     | Spinning at normal speed     |
|       | Fan Tray 1 Fan 1              | OK     | Spinning at normal speed     |
|       | Fan Tray 2 Fan 0              | Absent |                              |
|       | Fan Tray 2 Fan 1              | Absent |                              |

### show chassis environment (EX9253 Switch)

```
user@switch> show chassis environment
```



| Class | Item                        | Status | Measurement                  |
|-------|-----------------------------|--------|------------------------------|
| Temp  | CB 0 Exhaust Temp Sensor    | OK     | 37 degrees C / 98 degrees F  |
|       | CB 0 Inlet Temp Sensor      | OK     | 31 degrees C / 87 degrees F  |
|       | CB 0 CPU DIE Temp Sensor    | OK     | 42 degrees C / 107 degrees F |
|       | CB 1 Exhaust Temp Sensor    | OK     | 31 degrees C / 87 degrees F  |
|       | CB 1 Inlet Temp Sensor      | OK     | 28 degrees C / 82 degrees F  |
|       | CB 1 CPU DIE Temp Sensor    | OK     | 42 degrees C / 107 degrees F |
|       | FPC 0 Intake Temp Sensor    | OK     | 31 degrees C / 87 degrees F  |
|       | FPC 0 Exhaust-A Temp Sensor | OK     | 58 degrees C / 136 degrees F |
|       | FPC 0 Exhaust-B Temp Sensor | OK     | 47 degrees C / 116 degrees F |
|       | FPC 1 Intake Temp Sensor    | OK     | 29 degrees C / 84 degrees F  |
|       | FPC 1 Exhaust-A Temp Sensor | OK     | 59 degrees C / 138 degrees F |
|       | FPC 1 Exhaust-B Temp Sensor | OK     | 48 degrees C / 118 degrees F |
| Power | PEM 0                       | OK     | 54 degrees C / 129 degrees F |
|       | PEM 1                       | Check  |                              |
|       | PEM 2                       | Absent |                              |
|       | PEM 3                       | Absent |                              |
|       | PEM 4                       | Check  |                              |
|       | PEM 5                       | OK     | 61 degrees C / 141 degrees F |
| Fans  | Fan Tray 0 Fan 0            | OK     | Spinning at normal speed     |
|       | 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 1 Fan 0            | 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 2 Fan 0            | 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 3 Fan 0            | 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     |

### show chassis environment (QFX Series and OCX Series)

```
user@switch> show chassis environment
```

| Class | Item                          | Status | Measurement                  |
|-------|-------------------------------|--------|------------------------------|
| Temp  | CB 0 Top Right Inlet Sensor   | OK     | 29 degrees C / 84 degrees F  |
|       | CB 0 Top Left Inlet Sensor    | OK     | 29 degrees C / 84 degrees F  |
|       | CB 0 Top Right Exhaust Sensor | OK     | 40 degrees C / 104 degrees F |
|       | CB 0 Top Left Exhaust Sensor  | OK     | 59 degrees C / 138 degrees F |
|       | CB 0 CPU Core-0 Temp          | OK     | 45 degrees C / 113 degrees F |
|       | CB 0 CPU Core-1 Temp          | OK     | 44 degrees C / 111 degrees F |
|       | CB 0 CPU Core-2 Temp          | OK     | 44 degrees C / 111 degrees F |
|       | CB 0 CPU Core-3 Temp          | OK     | 44 degrees C / 111 degrees F |
|       | CB 0 CPU Core-4 Temp          | OK     | 45 degrees C / 113 degrees F |
|       | CB 0 CPU Core-5 Temp          | OK     | 44 degrees C / 111 degrees F |
|       | CB 0 CPU Core-6 Temp          | OK     | 44 degrees C / 111 degrees F |
|       | CB 0 CPU Core-7 Temp          | OK     | 43 degrees C / 109 degrees F |
| Power | PEM 0                         | Check  |                              |
|       | PEM 1                         | OK     | 36 degrees C / 96 degrees F  |
| Fans  | Fan Tray 0 Fan 0              | OK     | Spinning at normal speed     |
|       | Fan Tray 0 Fan 1              | OK     | Spinning at normal speed     |
|       | Fan Tray 1 Fan 0              | OK     | Spinning at normal speed     |
|       | Fan Tray 1 Fan 1              | OK     | Spinning at normal speed     |

|                  |        |
|------------------|--------|
| Fan Tray 2 Fan 0 | Absent |
| Fan Tray 2 Fan 1 | Absent |

### show chassis environment interconnect-device (QFabric System)

```
user@switch> show chassis environment interconnect-device IC-A0004
```

| Class | Item                      | Status | Measurement                  |
|-------|---------------------------|--------|------------------------------|
|       | 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@host> 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                     |
|      | 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                     |

|      |               |    |                              |
|------|---------------|----|------------------------------|
| Misc | SPMB 0 Intake | OK | 50 degrees C / 122 degrees F |
|      | SPMB 1 Intake | OK | 40 degrees C / 104 degrees F |

### show chassis environment (PTX5000 Packet Transport Router with FPC2-PTX-P1A)

```
user@host> show chassis environment
```

| Class | Item        | Status | Measurement                  |
|-------|-------------|--------|------------------------------|
| Temp  | PDU 0       | OK     |                              |
|       | PDU 0 PSM 0 | OK     | 41 degrees C / 105 degrees F |
|       | PDU 0 PSM 1 | Absent |                              |
|       | PDU 0 PSM 2 | OK     | 43 degrees C / 109 degrees F |
|       | PDU 0 PSM 3 | Absent |                              |
|       | PDU 0 PSM 4 | OK     | 44 degrees C / 111 degrees F |
|       | PDU 0 PSM 5 | Absent |                              |
|       | PDU 0 PSM 6 | OK     | 45 degrees C / 113 degrees F |
|       | PDU 0 PSM 7 | Absent |                              |
|       | PDU 1       | OK     |                              |
|       | PDU 1 PSM 0 | Absent |                              |
|       | PDU 1 PSM 1 | OK     | 45 degrees C / 113 degrees F |
|       | PDU 1 PSM 2 | Absent |                              |
|       | PDU 1 PSM 3 | OK     | 43 degrees C / 109 degrees F |
|       | PDU 1 PSM 4 | Absent |                              |
|       | PDU 1 PSM 5 | OK     | 46 degrees C / 114 degrees F |
|       | PDU 1 PSM 6 | Absent |                              |
|       | PDU 1 PSM 7 | OK     | 46 degrees C / 114 degrees F |
|       | CCG 0       | OK     | 27 degrees C / 80 degrees F  |
|       | CCG 1       | OK     | 29 degrees C / 84 degrees F  |
|       | ...         |        |                              |

### show chassis environment (PTX1000 Packet Transport Router)

```
user@host> show chassis environment
```

| Class | Item                      | Status | Measurement                  |
|-------|---------------------------|--------|------------------------------|
| Power | FPC 0 Power Supply 0      | Absent |                              |
|       | FPC 0 Power Supply 1      | Absent |                              |
|       | FPC 0 Power Supply 2      | OK     |                              |
|       | FPC 0 Power Supply 3      | OK     |                              |
| Temp  | FPC 0 Intake Temp Sensor  | OK     | 25 degrees C / 77 degrees F  |
|       | FPC 0 Exhaust Temp Sensor | OK     | 35 degrees C / 95 degrees F  |
|       | FPC 0 Mezz Temp Sensor 0  | OK     | 25 degrees C / 77 degrees F  |
|       | FPC 0 Mezz Temp Sensor 1  | OK     | 34 degrees C / 93 degrees F  |
|       | FPC 0 PE2 Temp Sensor     | OK     | 34 degrees C / 93 degrees F  |
|       | FPC 0 PE1 Temp Sensor     | OK     | 32 degrees C / 89 degrees F  |
|       | FPC 0 PF0 Temp Sensor     | OK     | 40 degrees C / 104 degrees F |
|       | FPC 0 PE0 Temp Sensor     | OK     | 33 degrees C / 91 degrees F  |
|       | FPC 0 PE5 Temp Sensor     | OK     | 34 degrees C / 93 degrees F  |
|       | FPC 0 PE4 Temp Sensor     | OK     | 34 degrees C / 93 degrees F  |
|       | FPC 0 PF1 Temp Sensor     | OK     | 41 degrees C / 105 degrees F |
|       | FPC 0 PE3 Temp Sensor     | OK     | 36 degrees C / 96 degrees F  |
|       | FPC 0 CPU Die Temp Sensor | OK     | 40 degrees C / 104 degrees F |
|       | FPC 0 OCX0 Temp Sensor    | OK     | 37 degrees C / 98 degrees F  |
| Fans  | FPC 0 Fan Tray 0          | OK     | Spinning at normal speed     |
|       | FPC 0 Fan Tray 1          | OK     | Spinning at normal speed     |
|       | FPC 0 Fan Tray 2          | OK     | Spinning at normal speed     |

## show chassis environment (PTX10008 Router)

user@host&gt; show chassis environment

| Class | Item                        | Status | Measurement                  |
|-------|-----------------------------|--------|------------------------------|
| Temp  | Routing Engine 0 CPU        | OK     | 40 degrees C / 104 degrees F |
|       | Routing Engine 1 CPU        | OK     | 40 degrees C / 104 degrees F |
|       | CB 0 Intake Temp Sensor     | OK     | 29 degrees C / 84 degrees F  |
|       | CB 0 Exhaust Temp Sensor    | OK     | 33 degrees C / 91 degrees F  |
|       | CB 1 Intake Temp Sensor     | OK     | 28 degrees C / 82 degrees F  |
|       | CB 1 Exhaust Temp Sensor    | OK     | 32 degrees C / 89 degrees F  |
|       | FPC 0 Intake-A Temp Sensor  | OK     | 38 degrees C / 100 degrees F |
|       | FPC 0 Intake-B Temp Sensor  | OK     | 34 degrees C / 93 degrees F  |
|       | FPC 0 Exhaust-A Temp Sensor | OK     | 36 degrees C / 96 degrees F  |
|       | FPC 0 Exhaust-B Temp Sensor | OK     | 37 degrees C / 98 degrees F  |
|       | FPC 0 Exhaust-C Temp Sensor | OK     | 40 degrees C / 104 degrees F |
|       | FPC 0 PE0 Temp Sensor       | OK     | 40 degrees C / 104 degrees F |
|       | FPC 0 PE1 Temp Sensor       | OK     | 42 degrees C / 107 degrees F |
|       | FPC 0 PE2 Temp Sensor       | OK     | 44 degrees C / 111 degrees F |
|       | FPC 0 LCPU Temp Sensor      | OK     | 41 degrees C / 105 degrees F |
|       | FPC 1 Intake-A Temp Sensor  | OK     | 37 degrees C / 98 degrees F  |
|       | FPC 1 Intake-B Temp Sensor  | OK     | 33 degrees C / 91 degrees F  |
|       | FPC 1 Exhaust-A Temp Sensor | OK     | 37 degrees C / 98 degrees F  |
|       | FPC 1 Exhaust-B Temp Sensor | OK     | 38 degrees C / 100 degrees F |
|       | FPC 1 Exhaust-C Temp Sensor | OK     | 40 degrees C / 104 degrees F |
|       | FPC 1 PE0 Temp Sensor       | OK     | 41 degrees C / 105 degrees F |
|       | FPC 1 PE1 Temp Sensor       | OK     | 41 degrees C / 105 degrees F |
|       | FPC 1 PE2 Temp Sensor       | OK     | 45 degrees C / 113 degrees F |
|       | FPC 1 LCPU Temp Sensor      | OK     | 40 degrees C / 104 degrees F |
|       | FPC 2 Intake-A Temp Sensor  | OK     | 44 degrees C / 111 degrees F |
|       | FPC 2 Intake-B Temp Sensor  | OK     | 30 degrees C / 86 degrees F  |
|       | FPC 2 Exhaust-A Temp Sensor | OK     | 52 degrees C / 125 degrees F |
|       | FPC 2 Exhaust-B Temp Sensor | OK     | 54 degrees C / 129 degrees F |
|       | FPC 2 Exhaust-C Temp Sensor | OK     | 52 degrees C / 125 degrees F |
|       | FPC 2 PE0 Temp Sensor       | OK     | 49 degrees C / 120 degrees F |
|       | FPC 2 PE1 Temp Sensor       | OK     | 59 degrees C / 138 degrees F |
|       | FPC 2 PE2 Temp Sensor       | OK     | 49 degrees C / 120 degrees F |
|       | FPC 2 PE3 Temp Sensor       | OK     | 60 degrees C / 140 degrees F |
|       | FPC 2 PE4 Temp Sensor       | OK     | 49 degrees C / 120 degrees F |
|       | FPC 2 PE5 Temp Sensor       | OK     | 63 degrees C / 145 degrees F |
|       | FPC 2 LCPU Temp Sensor      | OK     | 47 degrees C / 116 degrees F |
|       | FPC 3 Intake-A Temp Sensor  | OK     | 42 degrees C / 107 degrees F |
|       | FPC 3 Intake-B Temp Sensor  | OK     | 30 degrees C / 86 degrees F  |
|       | FPC 3 Exhaust-A Temp Sensor | OK     | 46 degrees C / 114 degrees F |
|       | FPC 3 Exhaust-B Temp Sensor | OK     | 48 degrees C / 118 degrees F |
|       | FPC 3 Exhaust-C Temp Sensor | OK     | 47 degrees C / 116 degrees F |
|       | FPC 3 PE0 Temp Sensor       | OK     | 47 degrees C / 116 degrees F |
|       | FPC 3 PE1 Temp Sensor       | OK     | 53 degrees C / 127 degrees F |
|       | FPC 3 PE2 Temp Sensor       | OK     | 46 degrees C / 114 degrees F |
|       | FPC 3 PE3 Temp Sensor       | OK     | 53 degrees C / 127 degrees F |
|       | FPC 3 PE4 Temp Sensor       | OK     | 48 degrees C / 118 degrees F |
|       | FPC 3 PE5 Temp Sensor       | OK     | 57 degrees C / 134 degrees F |
|       | FPC 3 LCPU Temp Sensor      | OK     | 47 degrees C / 116 degrees F |
|       | FPC 5 Intake-A Temp Sensor  | Failed |                              |
|       | FPC 5 Intake-B Temp Sensor  | Failed |                              |
|       | FPC 5 Exhaust-A Temp Sensor | OK     | 40 degrees C / 104 degrees F |
|       | FPC 5 Exhaust-B Temp Sensor | OK     | 40 degrees C / 104 degrees F |
|       | FPC 5 Exhaust-C Temp Sensor | OK     | 41 degrees C / 105 degrees F |
|       | FPC 5 PE0 Temp Sensor       | OK     | 46 degrees C / 114 degrees F |
|       | FPC 5 PE1 Temp Sensor       | OK     | 48 degrees C / 118 degrees F |
|       | FPC 5 PE2 Temp Sensor       | OK     | 51 degrees C / 123 degrees F |



|       |                             |        |                              |
|-------|-----------------------------|--------|------------------------------|
|       | FPC 5 LCPU Temp Sensor      | Failed |                              |
|       | FPC 6 Intake-A Temp Sensor  | OK     | 40 degrees C / 104 degrees F |
|       | FPC 6 Intake-B Temp Sensor  | OK     | 36 degrees C / 96 degrees F  |
|       | FPC 6 Exhaust-A Temp Sensor | OK     | 39 degrees C / 102 degrees F |
|       | FPC 6 Exhaust-B Temp Sensor | OK     | 39 degrees C / 102 degrees F |
|       | FPC 6 Exhaust-C Temp Sensor | OK     | 39 degrees C / 102 degrees F |
|       | FPC 6 PE0 Temp Sensor       | OK     | 44 degrees C / 111 degrees F |
|       | FPC 6 PE1 Temp Sensor       | OK     | 45 degrees C / 113 degrees F |
|       | FPC 6 PE2 Temp Sensor       | OK     | 50 degrees C / 122 degrees F |
|       | FPC 6 LCPU Temp Sensor      | OK     | 40 degrees C / 104 degrees F |
|       | SIB 0 Intake-A Temp Sensor  | OK     | 37 degrees C / 98 degrees F  |
|       | SIB 0 Intake-B Temp Sensor  | OK     | 30 degrees C / 86 degrees F  |
|       | SIB 0 Exhaust-A Temp Sensor | OK     | 33 degrees C / 91 degrees F  |
|       | SIB 0 Exhaust-B Temp Sensor | OK     | 38 degrees C / 100 degrees F |
|       | SIB 0 PF0 Temp Sensor       | OK     | 46 degrees C / 114 degrees F |
|       | SIB 0 PF1 Temp Sensor       | OK     | 39 degrees C / 102 degrees F |
|       | SIB 1 Intake-A Temp Sensor  | OK     | 43 degrees C / 109 degrees F |
|       | SIB 1 Intake-B Temp Sensor  | OK     | 34 degrees C / 93 degrees F  |
|       | SIB 1 Exhaust-A Temp Sensor | OK     | 36 degrees C / 96 degrees F  |
|       | SIB 1 Exhaust-B Temp Sensor | OK     | 44 degrees C / 111 degrees F |
|       | SIB 1 PF0 Temp Sensor       | OK     | 54 degrees C / 129 degrees F |
|       | SIB 1 PF1 Temp Sensor       | OK     | 41 degrees C / 105 degrees F |
|       | SIB 2 Intake-A Temp Sensor  | OK     | 46 degrees C / 114 degrees F |
|       | SIB 2 Intake-B Temp Sensor  | OK     | 35 degrees C / 95 degrees F  |
|       | SIB 2 Exhaust-A Temp Sensor | OK     | 37 degrees C / 98 degrees F  |
|       | SIB 2 Exhaust-B Temp Sensor | OK     | 47 degrees C / 116 degrees F |
|       | SIB 2 PF0 Temp Sensor       | OK     | 55 degrees C / 131 degrees F |
|       | SIB 2 PF1 Temp Sensor       | OK     | 42 degrees C / 107 degrees F |
|       | SIB 3 Intake-A Temp Sensor  | OK     | 45 degrees C / 113 degrees F |
|       | SIB 3 Intake-B Temp Sensor  | OK     | 35 degrees C / 95 degrees F  |
|       | SIB 3 Exhaust-A Temp Sensor | OK     | 36 degrees C / 96 degrees F  |
|       | SIB 3 Exhaust-B Temp Sensor | OK     | 45 degrees C / 113 degrees F |
|       | SIB 3 PF0 Temp Sensor       | OK     | 54 degrees C / 129 degrees F |
|       | SIB 3 PF1 Temp Sensor       | OK     | 42 degrees C / 107 degrees F |
|       | SIB 4 Intake-A Temp Sensor  | OK     | 46 degrees C / 114 degrees F |
|       | SIB 4 Intake-B Temp Sensor  | OK     | 34 degrees C / 93 degrees F  |
|       | SIB 4 Exhaust-A Temp Sensor | OK     | 36 degrees C / 96 degrees F  |
|       | SIB 4 Exhaust-B Temp Sensor | OK     | 46 degrees C / 114 degrees F |
|       | SIB 4 PF0 Temp Sensor       | OK     | 54 degrees C / 129 degrees F |
|       | SIB 4 PF1 Temp Sensor       | OK     | 41 degrees C / 105 degrees F |
|       | SIB 5 Intake-A Temp Sensor  | OK     | 38 degrees C / 100 degrees F |
|       | SIB 5 Intake-B Temp Sensor  | OK     | 31 degrees C / 87 degrees F  |
|       | SIB 5 Exhaust-A Temp Sensor | OK     | 34 degrees C / 93 degrees F  |
|       | SIB 5 Exhaust-B Temp Sensor | OK     | 39 degrees C / 102 degrees F |
|       | SIB 5 PF0 Temp Sensor       | OK     | 44 degrees C / 111 degrees F |
|       | SIB 5 PF1 Temp Sensor       | OK     | 42 degrees C / 107 degrees F |
| Power | Power Supply 0              | OK     |                              |
|       | Power Supply 1              | OK     |                              |
|       | Power Supply 2              | OK     |                              |
|       | Power Supply 3              | OK     |                              |
|       | Power Supply 4              | Check  |                              |
|       | Power Supply 5              | OK     |                              |
| Fans  | Fan Tray 0 Fan 0            | OK     | Spinning at normal speed     |
|       | 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            | Failed |                              |
|       | Fan Tray 0 Fan 5            | Failed |                              |
|       | 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 0 Fan 9  | OK | Spinning at normal speed |
| Fan Tray 0 Fan 10 | OK | Spinning at normal speed |
| Fan Tray 1 Fan 0  | 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 1 Fan 7  | OK | Spinning at normal speed |
| Fan Tray 1 Fan 8  | OK | Spinning at normal speed |
| Fan Tray 1 Fan 9  | OK | Spinning at normal speed |
| Fan Tray 1 Fan 10 | OK | Spinning at normal speed |

### show chassis environment (PTX10016 Router)

```
user@host> show chassis environment
```

| Class | Item                        | Status | Measurement                  |
|-------|-----------------------------|--------|------------------------------|
|       | Routing Engine 0 CPU        | OK     | 34 degrees C / 93 degrees F  |
|       | Routing Engine 1 CPU        | OK     | 34 degrees C / 93 degrees F  |
| Temp  | CB 0 Intake Temp Sensor     | OK     | 20 degrees C / 68 degrees F  |
|       | CB 0 Exhaust Temp Sensor    | OK     | 24 degrees C / 75 degrees F  |
|       | CB 1 Intake Temp Sensor     | OK     | 20 degrees C / 68 degrees F  |
|       | CB 1 Exhaust Temp Sensor    | OK     | 23 degrees C / 73 degrees F  |
|       | FPC 1 Intake-A Temp Sensor  | OK     | 37 degrees C / 98 degrees F  |
|       | FPC 1 Intake-B Temp Sensor  | OK     | 32 degrees C / 89 degrees F  |
|       | FPC 1 Exhaust-A Temp Sensor | OK     | 37 degrees C / 98 degrees F  |
|       | FPC 1 Exhaust-B Temp Sensor | OK     | 36 degrees C / 96 degrees F  |
|       | FPC 1 Exhaust-C Temp Sensor | OK     | 36 degrees C / 96 degrees F  |
|       | FPC 1 PE0 Temp Sensor       | OK     | 45 degrees C / 113 degrees F |
|       | FPC 1 PE1 Temp Sensor       | OK     | 46 degrees C / 114 degrees F |
|       | FPC 1 PE2 Temp Sensor       | OK     | 54 degrees C / 129 degrees F |
|       | FPC 1 LCPU Temp Sensor      | OK     | 35 degrees C / 95 degrees F  |
|       | FPC 3 Intake-A Temp Sensor  | OK     | 35 degrees C / 95 degrees F  |
|       | FPC 3 Intake-B Temp Sensor  | OK     | 31 degrees C / 87 degrees F  |
|       | FPC 3 Exhaust-A Temp Sensor | OK     | 36 degrees C / 96 degrees F  |
|       | FPC 3 Exhaust-B Temp Sensor | OK     | 35 degrees C / 95 degrees F  |
|       | FPC 3 Exhaust-C Temp Sensor | OK     | 33 degrees C / 91 degrees F  |
|       | FPC 3 PE0 Temp Sensor       | OK     | 43 degrees C / 109 degrees F |
|       | FPC 3 PE1 Temp Sensor       | OK     | 45 degrees C / 113 degrees F |
|       | FPC 3 PE2 Temp Sensor       | OK     | 49 degrees C / 120 degrees F |
|       | FPC 3 LCPU Temp Sensor      | OK     | 35 degrees C / 95 degrees F  |
|       | FPC 6 Intake-A Temp Sensor  | OK     | 34 degrees C / 93 degrees F  |
|       | FPC 6 Intake-B Temp Sensor  | OK     | 31 degrees C / 87 degrees F  |
|       | FPC 6 Exhaust-A Temp Sensor | OK     | 35 degrees C / 95 degrees F  |
|       | FPC 6 Exhaust-B Temp Sensor | OK     | 35 degrees C / 95 degrees F  |
|       | FPC 6 Exhaust-C Temp Sensor | OK     | 35 degrees C / 95 degrees F  |
|       | FPC 6 PE0 Temp Sensor       | OK     | 43 degrees C / 109 degrees F |
|       | FPC 6 PE1 Temp Sensor       | OK     | 43 degrees C / 109 degrees F |
|       | FPC 6 PE2 Temp Sensor       | OK     | 47 degrees C / 116 degrees F |
|       | FPC 6 LCPU Temp Sensor      | OK     | 35 degrees C / 95 degrees F  |
|       | FPC 8 Intake-A Temp Sensor  | OK     | 34 degrees C / 93 degrees F  |
|       | FPC 8 Intake-B Temp Sensor  | OK     | 31 degrees C / 87 degrees F  |
|       | FPC 8 Exhaust-A Temp Sensor | OK     | 37 degrees C / 98 degrees F  |
|       | FPC 8 Exhaust-B Temp Sensor | OK     | 37 degrees C / 98 degrees F  |
|       | FPC 8 Exhaust-C Temp Sensor | OK     | 38 degrees C / 100 degrees F |
|       | FPC 8 PE0 Temp Sensor       | OK     | 42 degrees C / 107 degrees F |
|       | FPC 8 PE1 Temp Sensor       | OK     | 44 degrees C / 111 degrees F |

|       |                             |        |                              |
|-------|-----------------------------|--------|------------------------------|
|       | FPC 8 PE2 Temp Sensor       | OK     | 47 degrees C / 116 degrees F |
|       | FPC 8 LCPU Temp Sensor      | OK     | 33 degrees C / 91 degrees F  |
|       | FPC 9 Intake-A Temp Sensor  | OK     | 44 degrees C / 111 degrees F |
|       | FPC 9 Intake-B Temp Sensor  | OK     | 28 degrees C / 82 degrees F  |
|       | FPC 9 Exhaust-A Temp Sensor | OK     | 51 degrees C / 123 degrees F |
|       | FPC 9 Exhaust-B Temp Sensor | OK     | 52 degrees C / 125 degrees F |
|       | FPC 9 Exhaust-C Temp Sensor | OK     | 48 degrees C / 118 degrees F |
|       | FPC 9 PE0 Temp Sensor       | OK     | 52 degrees C / 125 degrees F |
|       | FPC 9 PE1 Temp Sensor       | OK     | 66 degrees C / 150 degrees F |
|       | FPC 9 PE2 Temp Sensor       | OK     | 50 degrees C / 122 degrees F |
|       | FPC 9 PE3 Temp Sensor       | OK     | 65 degrees C / 149 degrees F |
|       | FPC 9 PE4 Temp Sensor       | OK     | 51 degrees C / 123 degrees F |
|       | FPC 9 PE5 Temp Sensor       | OK     | 68 degrees C / 154 degrees F |
|       | FPC 9 LCPU Temp Sensor      | OK     | 46 degrees C / 114 degrees F |
| Power | Power Supply 0              | OK     | 22 degrees C / 71 degrees F  |
|       | Power Supply 1              | OK     | 23 degrees C / 73 degrees F  |
|       | Power Supply 2              | OK     | 23 degrees C / 73 degrees F  |
|       | Power Supply 3              | OK     | 21 degrees C / 69 degrees F  |
|       | Power Supply 4              | OK     | 22 degrees C / 71 degrees F  |
|       | Power Supply 5              | OK     | 25 degrees C / 77 degrees F  |
|       | Power Supply 6              | OK     | 21 degrees C / 69 degrees F  |
|       | Power Supply 7              | Absent |                              |
|       | Power Supply 8              | Absent |                              |
|       | Power Supply 9              | Absent |                              |
| Fans  | Fan Tray 0 Fan 0            | OK     | Spinning at normal speed     |
|       | 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 0 Fan 9            | OK     | Spinning at normal speed     |
|       | Fan Tray 0 Fan 10           | OK     | Spinning at normal speed     |
|       | Fan Tray 0 Fan 11           | OK     | Spinning at normal speed     |
|       | Fan Tray 0 Fan 12           | OK     | Spinning at normal speed     |
|       | Fan Tray 0 Fan 13           | OK     | Spinning at normal speed     |
|       | Fan Tray 0 Fan 14           | OK     | Spinning at normal speed     |
|       | Fan Tray 0 Fan 15           | OK     | Spinning at normal speed     |
|       | Fan Tray 0 Fan 16           | OK     | Spinning at normal speed     |
|       | Fan Tray 0 Fan 17           | OK     | Spinning at normal speed     |
|       | Fan Tray 0 Fan 18           | OK     | Spinning at normal speed     |
|       | Fan Tray 0 Fan 19           | OK     | Spinning at normal speed     |
|       | Fan Tray 0 Fan 20           | OK     | Spinning at normal speed     |
|       | Fan Tray 1 Fan 0            | 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 1 Fan 7            | OK     | Spinning at normal speed     |
|       | Fan Tray 1 Fan 8            | OK     | Spinning at normal speed     |
|       | Fan Tray 1 Fan 9            | OK     | Spinning at normal speed     |
|       | Fan Tray 1 Fan 10           | OK     | Spinning at normal speed     |
|       | Fan Tray 1 Fan 11           | OK     | Spinning at normal speed     |
|       | Fan Tray 1 Fan 12           | OK     | Spinning at normal speed     |
|       | Fan Tray 1 Fan 13           | OK     | Spinning at normal speed     |
|       | Fan Tray 1 Fan 14           | OK     | Spinning at normal speed     |

|                             |    |                              |
|-----------------------------|----|------------------------------|
| Fan Tray 1 Fan 15           | OK | Spinning at normal speed     |
| Fan Tray 1 Fan 16           | OK | Spinning at normal speed     |
| Fan Tray 1 Fan 17           | OK | Spinning at normal speed     |
| Fan Tray 1 Fan 18           | OK | Spinning at normal speed     |
| Fan Tray 1 Fan 19           | OK | Spinning at normal speed     |
| Fan Tray 1 Fan 20           | OK | Spinning at normal speed     |
| SIB 0 Intake-A Temp Sensor  | OK | 20 degrees C / 68 degrees F  |
| SIB 0 Intake-B Temp Sensor  | OK | 20 degrees C / 68 degrees F  |
| SIB 0 Intake-C Temp Sensor  | OK | 16 degrees C / 60 degrees F  |
| SIB 0 Exhaust-A Temp Sensor | OK | 28 degrees C / 82 degrees F  |
| SIB 0 Exhaust-B Temp Sensor | OK | 28 degrees C / 82 degrees F  |
| SIB 0 Exhaust-C Temp Sensor | OK | 23 degrees C / 73 degrees F  |
| SIB 0 PF0 Temp Sensor       | OK | 30 degrees C / 86 degrees F  |
| SIB 0 PF1 Temp Sensor       | OK | 30 degrees C / 86 degrees F  |
| SIB 0 PF2 Temp Sensor       | OK | 31 degrees C / 87 degrees F  |
| SIB 0 PF3 Temp Sensor       | OK | 32 degrees C / 89 degrees F  |
| SIB 0 PF4 Temp Sensor       | OK | 27 degrees C / 80 degrees F  |
| SIB 0 PF5 Temp Sensor       | OK | 26 degrees C / 78 degrees F  |
| SIB 1 Intake-A Temp Sensor  | OK | 22 degrees C / 71 degrees F  |
| SIB 1 Intake-B Temp Sensor  | OK | 22 degrees C / 71 degrees F  |
| SIB 1 Intake-C Temp Sensor  | OK | 16 degrees C / 60 degrees F  |
| SIB 1 Exhaust-A Temp Sensor | OK | 29 degrees C / 84 degrees F  |
| SIB 1 Exhaust-B Temp Sensor | OK | 31 degrees C / 87 degrees F  |
| SIB 1 Exhaust-C Temp Sensor | OK | 23 degrees C / 73 degrees F  |
| SIB 1 PF0 Temp Sensor       | OK | 32 degrees C / 89 degrees F  |
| SIB 1 PF1 Temp Sensor       | OK | 31 degrees C / 87 degrees F  |
| SIB 1 PF2 Temp Sensor       | OK | 33 degrees C / 91 degrees F  |
| SIB 1 PF3 Temp Sensor       | OK | 38 degrees C / 100 degrees F |
| SIB 1 PF4 Temp Sensor       | OK | 28 degrees C / 82 degrees F  |
| SIB 1 PF5 Temp Sensor       | OK | 26 degrees C / 78 degrees F  |
| SIB 2 Intake-A Temp Sensor  | OK | 24 degrees C / 75 degrees F  |
| SIB 2 Intake-B Temp Sensor  | OK | 21 degrees C / 69 degrees F  |
| SIB 2 Intake-C Temp Sensor  | OK | 16 degrees C / 60 degrees F  |
| SIB 2 Exhaust-A Temp Sensor | OK | 28 degrees C / 82 degrees F  |
| SIB 2 Exhaust-B Temp Sensor | OK | 32 degrees C / 89 degrees F  |
| SIB 2 Exhaust-C Temp Sensor | OK | 23 degrees C / 73 degrees F  |
| SIB 2 PF0 Temp Sensor       | OK | 31 degrees C / 87 degrees F  |
| SIB 2 PF1 Temp Sensor       | OK | 30 degrees C / 86 degrees F  |
| SIB 2 PF2 Temp Sensor       | OK | 33 degrees C / 91 degrees F  |
| SIB 2 PF3 Temp Sensor       | OK | 41 degrees C / 105 degrees F |
| SIB 2 PF4 Temp Sensor       | OK | 27 degrees C / 80 degrees F  |
| SIB 2 PF5 Temp Sensor       | OK | 26 degrees C / 78 degrees F  |
| SIB 3 Intake-A Temp Sensor  | OK | 22 degrees C / 71 degrees F  |
| SIB 3 Intake-B Temp Sensor  | OK | 23 degrees C / 73 degrees F  |
| SIB 3 Intake-C Temp Sensor  | OK | 16 degrees C / 60 degrees F  |
| SIB 3 Exhaust-A Temp Sensor | OK | 29 degrees C / 84 degrees F  |
| SIB 3 Exhaust-B Temp Sensor | OK | 31 degrees C / 87 degrees F  |
| SIB 3 Exhaust-C Temp Sensor | OK | 24 degrees C / 75 degrees F  |
| SIB 3 PF0 Temp Sensor       | OK | 32 degrees C / 89 degrees F  |
| SIB 3 PF1 Temp Sensor       | OK | 30 degrees C / 86 degrees F  |
| SIB 3 PF2 Temp Sensor       | OK | 31 degrees C / 87 degrees F  |
| SIB 3 PF3 Temp Sensor       | OK | 39 degrees C / 102 degrees F |
| SIB 3 PF4 Temp Sensor       | OK | 27 degrees C / 80 degrees F  |
| SIB 3 PF5 Temp Sensor       | OK | 26 degrees C / 78 degrees F  |
| SIB 4 Intake-A Temp Sensor  | OK | 22 degrees C / 71 degrees F  |
| SIB 4 Intake-B Temp Sensor  | OK | 25 degrees C / 77 degrees F  |
| SIB 4 Intake-C Temp Sensor  | OK | 16 degrees C / 60 degrees F  |
| SIB 4 Exhaust-A Temp Sensor | OK | 29 degrees C / 84 degrees F  |
| SIB 4 Exhaust-B Temp Sensor | OK | 32 degrees C / 89 degrees F  |
| SIB 4 Exhaust-C Temp Sensor | OK | 23 degrees C / 73 degrees F  |

|                             |    |                              |
|-----------------------------|----|------------------------------|
| SIB 4 PF0 Temp Sensor       | OK | 32 degrees C / 89 degrees F  |
| SIB 4 PF1 Temp Sensor       | OK | 31 degrees C / 87 degrees F  |
| SIB 4 PF2 Temp Sensor       | OK | 32 degrees C / 89 degrees F  |
| SIB 4 PF3 Temp Sensor       | OK | 40 degrees C / 104 degrees F |
| SIB 4 PF4 Temp Sensor       | OK | 26 degrees C / 78 degrees F  |
| SIB 4 PF5 Temp Sensor       | OK | 25 degrees C / 77 degrees F  |
| SIB 5 Intake-A Temp Sensor  | OK | 21 degrees C / 69 degrees F  |
| SIB 5 Intake-B Temp Sensor  | OK | 20 degrees C / 68 degrees F  |
| SIB 5 Intake-C Temp Sensor  | OK | 16 degrees C / 60 degrees F  |
| SIB 5 Exhaust-A Temp Sensor | OK | 27 degrees C / 80 degrees F  |
| SIB 5 Exhaust-B Temp Sensor | OK | 27 degrees C / 80 degrees F  |
| SIB 5 Exhaust-C Temp Sensor | OK | 23 degrees C / 73 degrees F  |
| SIB 5 PF0 Temp Sensor       | OK | 30 degrees C / 86 degrees F  |
| SIB 5 PF1 Temp Sensor       | OK | 29 degrees C / 84 degrees F  |
| SIB 5 PF2 Temp Sensor       | OK | 30 degrees C / 86 degrees F  |
| SIB 5 PF3 Temp Sensor       | OK | 32 degrees C / 89 degrees F  |
| SIB 5 PF4 Temp Sensor       | OK | 28 degrees C / 82 degrees F  |
| SIB 5 PF5 Temp Sensor       | OK | 27 degrees C / 80 degrees F  |

### show chassis environment (ACX2000 Universal Metro 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 Metro 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 environment (ACX5048 Router)

```
user@host> show chassis environment
```

| Class | Item                      | Status | Measurement                  |
|-------|---------------------------|--------|------------------------------|
| Power | FPC 0 Power Supply 0      | Absent |                              |
|       | FPC 0 Power Supply 1      | OK     |                              |
| Temp  | FPC 0 Sensor TopMiddle E  | OK     | 23 degrees C / 73 degrees F  |
|       | FPC 0 Sensor TopRight C   | OK     | 18 degrees C / 64 degrees F  |
|       | FPC 0 Sensor TopLeft C    | OK     | 21 degrees C / 69 degrees F  |
|       | FPC 0 Sensor TopRight E   | OK     | 20 degrees C / 68 degrees F  |
|       | FPC 0 Sensor CPURight C   | OK     | 23 degrees C / 73 degrees F  |
|       | FPC 0 Sensor CPULeft E    | OK     | 22 degrees C / 71 degrees F  |
|       | FPC 0 Sensor CPU Die Temp | OK     | 39 degrees C / 102 degrees F |
| Fans  | FPC 0 Fan Tray 0          | OK     | Spinning at normal speed     |
|       | FPC 0 Fan Tray 1          | OK     | Spinning at normal speed     |
|       | FPC 0 Fan Tray 2          | OK     | Spinning at normal speed     |
|       | FPC 0 Fan Tray 3          | OK     | Spinning at normal speed     |
|       | FPC 0 Fan Tray 4          | OK     | Spinning at normal speed     |

### show chassis environment (ACX5096 Router)

```
user@host> show chassis environment
```

| Class | Item                     | Status | Measurement                 |
|-------|--------------------------|--------|-----------------------------|
| Power | FPC 0 Power Supply 0     | OK     |                             |
|       | FPC 0 Power Supply 1     | OK     |                             |
| Temp  | FPC 0 Sensor TopMiddle E | OK     | 32 degrees C / 89 degrees F |
|       | FPC 0 Sensor TopRight I  | OK     | 29 degrees C / 84 degrees F |
|       | FPC 0 Sensor TopLeft I   | OK     | 23 degrees C / 73 degrees F |
|       | FPC 0 Sensor TopRight E  | OK     | 28 degrees C / 82 degrees F |
|       | FPC 0 Sensor CPURight I  | OK     | 30 degrees C / 86 degrees F |
|       | FPC 0 Sensor CPULeft I   | OK     | 29 degrees C / 84 degrees F |

|      |                       |    |                              |
|------|-----------------------|----|------------------------------|
|      | FPC 0 Sensor Die Temp | OK | 46 degrees C / 114 degrees F |
|      | FPC 0 Mezz Temp       | OK | 23 degrees C / 73 degrees F  |
| Fans | FPC 0 Fan Tray 0      | OK | Spinning at normal speed     |
|      | FPC 0 Fan Tray 1      | OK | Spinning at normal speed     |
|      | FPC 0 Fan Tray 2      | OK | Spinning at normal speed     |

### show chassis environment (ACX500 Router)

```
user@host> show chassis environment
```

| Class | Item           | Status | Measurement                  |
|-------|----------------|--------|------------------------------|
|       | Power Mod      | OK     | 47 degrees C / 116 degrees F |
|       | BCM54610       | OK     | 46 degrees C / 114 degrees F |
|       | DPLL31404      | OK     | 45 degrees C / 113 degrees F |
|       | CPLD           | OK     | 42 degrees C / 107 degrees F |
|       | 1588-FPGA      | OK     | 43 degrees C / 109 degrees F |
|       | NPU            | OK     | 62 degrees C / 143 degrees F |
|       | MAC sensor 1   | OK     | 40 degrees C / 104 degrees F |
|       | MAC sensor 2   | OK     | 38 degrees C / 100 degrees F |
|       | SFP PHY        | OK     | 38 degrees C / 100 degrees F |
|       | Combo/RJ45 PHY | OK     | 37 degrees C / 98 degrees F  |
|       | SFP sensor 1   | OK     | 35 degrees C / 95 degrees F  |
|       | SFP sensor 2   | OK     | 33 degrees C / 91 degrees F  |
|       | SFP sensor 3   | OK     | 32 degrees C / 89 degrees F  |
|       | Routing Engine | OK     | 54 degrees C / 129 degrees F |
|       | Heater off     |        |                              |

## show chassis environment fpc

---

**List of Syntax**    [Syntax on page 268](#)  
[Syntax \(TX Matrix and TX Matrix Plus Routers\) on page 268](#)  
[Syntax \(MX Series Routers\) on page 268](#)  
[Syntax \(MX2010, MX10003, MX204, MX2008, and MX10008 Universal Routing Platforms\) on page 268](#)  
[Syntax \(MX2020 Universal Routing Platforms\) on page 268](#)  
[Syntax \(QFX Series\) on page 268](#)  
[Syntax \(OCX Series\) on page 268](#)  
[Syntax \(PTX3000 Series\) on page 269](#)  
[Syntax \(PTX10008 Series\) on page 269](#)  
[Syntax \(Junos OS Evolved\) on page 269](#)

|               |  |
|---------------|--|
| <b>Syntax</b> | <code>show chassis environment fpc<br/>&lt;slot&gt;</code> |
|---------------|--|

|  |   |
|--|---|
| <b>Syntax (TX Matrix and TX Matrix Plus Routers)</b> | <code>show chassis environment fpc<br/>&lt;lcc number&gt;<br/>&lt;slot&gt;</code> |
|--|---|

|                                   |   |
|-----------------------------------|---|
| <b>Syntax (MX Series Routers)</b> | <code>show chassis environment fpc<br/>&lt;slot&gt;<br/>&lt;all-members&gt;<br/>&lt;local&gt;<br/>&lt;member member-id&gt;</code> |
|-----------------------------------|---|

|   |  |
|---|--|
| <b>Syntax (MX2010, MX10003, MX204, MX2008, and MX10008 Universal Routing Platforms)</b> | <code>show chassis environment fpc<br/>&lt;slot&gt;</code> |
|---|--|

|  |  |
|--|--|
| <b>Syntax (MX2020 Universal Routing Platforms)</b> | <code>show chassis environment fpc<br/>&lt;slot&gt;<br/>&lt;satellite [fpc-slot slot-id  device-alias alias-name]</code> |
|--|--|

|                            |   |
|----------------------------|---|
| <b>Syntax (QFX Series)</b> | <code>show chassis environment fpc<br/>&lt;fpc-slot&gt;<br/>interconnect-device name</code> |
|----------------------------|---|

|                            |  |
|----------------------------|--|
| <b>Syntax (OCX Series)</b> | <code>show chassis environment fpc<br/>&lt;fpc-slot&gt;</code> |
|----------------------------|--|



|                                  |  |
|----------------------------------|--|
| <b>Syntax (PTX3000 Series)</b>   | <code>show chassis environment fpc<br/>&lt;fpc-slot&gt;</code>   |
| <b>Syntax (PTX10008 Series)</b>  | <code>show chassis environment fpc<br/>&lt;fpc-slot&gt;</code>   |
| <b>Syntax (Junos OS Evolved)</b> | <code>show chassis environment fpc<br/>&lt;fpc-slot&gt;</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 12.1X48 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 12.3 for MX 2010 and MX2020 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p> <p><b>satellite</b> option introduced in Junos OS Release 14.2R3.</p> <p>Command introduced in Junos OS Release 17.2 for MX2008 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 17.2 for PTX10008 Routers.</p> <p>Command introduced in Junos OS Release 17.3 for MX10003 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 17.4 for MX204 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 18.1R1 for EX9251 switches.</p> <p>Command introduced in Junos OS Release 18.2 for EX9253 Switches.</p> <p>Command introduced in Junos OS Release 18.2R1 for MX10008 Universal Routing Platforms.</p> |
| <b>Description</b>               | (M40e, M120, M160, M320, MX Series, T Series routers, EX Series, QFX Series, and PTX Series routers only) Display environmental information about Flexible PIC Concentrators (FPCs).   |
| <b>Options</b>                   | <p><b>none</b>—Display environmental information about all FPCs. On a TX Matrix router, display environmental information about all FPCs on the TX Matrix router and its attached T640 routers. On a TX Matrix Plus router, display environmental information about all FPCs on the TX Matrix Plus router and its attached routers.</p> <p><b>all-members</b>—(MX Series routers only) (Optional) Display environmental information for the FPCs in all the members of the Virtual Chassis configuration.</p> <p><b>interconnect-device <i>name</i></b>—(QFabric systems only) (Optional) Display chassis environmental information for the Interconnect device.</p> <p><b>lcc <i>number</i></b>—(TX Matrix router and TX Matrix Plus router only) (Optional) Line-card chassis number.</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 environmental information for the FPCs in the local Virtual Chassis member.

**member *member-id***—(MX Series routers only) (Optional) Display environmental information for the FPCs in the specified member of the Virtual Chassis configuration. Replace *member-id* with a value of 0 or 1.

**satellite [*fpc-slot slot-id* | *device-alias alias-name*]**—(Junos Fusion only)(Optional) Display environmental information for the FPCs in the specified satellite device in a Junos Fusion, or for all satellite devices in the Junos Fusion if no satellite devices are specified.

***slot* or *fpc-slot***—(Optional) Display environmental information about an individual FPC:

- (TX Matrix and TX Matrix Plus routers only) On a TX Matrix router, if you specify the number of the T640 router by using only the **lcc *number*** option (the recommended method), replace ***slot*** with a value from 0 through 7. Similarly, on a TX Matrix Plus router, if you specify the number of the router by using only the **lcc *number*** option (the recommended method), replace ***slot*** with a value from 0 through 7. Otherwise, replace ***slot*** with a value from 0 through 31. For example, the following commands have the same result:

```
user@host> show chassis environment fpc 1 lcc 1
user@host> show chassis environment fpc 9
```

- M120 router—Replace ***slot*** with a value from 0 through 5.
- MX240 router—Replace ***slot*** with a value from 0 through 2.
- MX480 router—Replace ***slot*** with a value from 0 through 5.
- MX960 router—Replace ***slot*** with a value from 0 through 11.
- MX2010 router—Replace ***slot*** with a value from 0 through 9.
- MX2020 router—Replace ***slot*** with a value from 0 through 19.
- MX2008 router—Replace ***slot*** with a value from 0 through 9.
- Other routers—Replace ***slot*** with a value from 0 through 7.

- EX Series switches:
  - EX3200 switches and EX4200 standalone switches—Replace **slot** with 0.
  - EX4200 switches in a Virtual Chassis configuration—Replace **slot** with a value from 0 through 9 (switch's member ID).
  - EX6210 switches—Replace **slot** with a value from 0 through 3 (line card only), 4 or 5 (line card or Switch Fabric and Rotuing Engine (SRE) module), or 6 through 9 (line card only).
  - EX8208 switches—Replace **slot** with a value from 0 through 7 (line card).
  - EX8216 switches—Replace **slot** with a value from 0 through 15 (line card).
- QFX3500 switches —Replace **fpc-slot** with 0 through 15.
- PTX5000 Packet Transport Router—Replace **fpc-slot** with 0 through 7.
- PTX3000 Packet Transport Router—Replace **fpc-slot** with 0 through 15.

**Required Privilege Level** view

**Related Documentation**

- *request chassis fpc*
- *show chassis fpc*
- *show chassis fpc-feb-connectivity*
- *Resynchronizing FPC Sequence Numbers with Active FPCs when an FPC Comes Online*
- *MX960 Flexible PIC Concentrator Description*

**List of Sample Output**

[show chassis environment fpc \(M120 Router\) on page 273](#)  
[show chassis environment fpc \(M160 Router\) on page 274](#)  
[show chassis environment fpc \(M320 Router\) on page 275](#)  
[show chassis environment fpc \(MX2020 Router\) on page 275](#)  
[show chassis environment fpc \(MX2010 Router\) on page 278](#)  
[show chassis environment fpc \(MX2008 Router\) on page 281](#)  
[show chassis environment fpc \(MX240 Router\) on page 284](#)  
[show chassis environment fpc \(MX480 Router\) on page 286](#)  
[show chassis environment fpc \(MX960 Router MPC10E-15C-MRATE\) on page 286](#)  
[show chassis environment fpc \(MX960 Router\) on page 289](#)  
[show chassis environment fpc \(MX480 Router with 100-Gigabit Ethernet CFP\) on page 290](#)  
[show chassis environment fpc \(MX240, MX480, MX960 with Application Services Modular Line Card on page 292](#)  
[show chassis environment fpc \(MX10003 Router\) on page 292](#)  
[show chassis environment fpc \(MX204 Router\) on page 296](#)  
[show chassis environment fpc \(MX10008 Router\) on page 296](#)  
[show chassis environment fpc \(T320, T640, and T1600 Routers\) on page 303](#)

[show chassis environment fpc \(T4000 Router\) on page 304](#)  
[show chassis environment fpc lcc \(TX Matrix Router\) on page 309](#)  
[show chassis environment fpc lcc \(TX Matrix Plus Router\) on page 309](#)  
[show chassis environment fpc \(QFX Series and OCX Series\) on page 310](#)  
[show chassis environment fpc interconnect-device \(QFabric Systems\) on page 310](#)  
[show chassis environment fpc 5 \(PTX3000 Packet Transport Router\) on page 311](#)  
[show chassis environment fpc 0 \(PTX5000 Packet Transport Router\) on page 311](#)  
[show chassis environment fpc 07 \(PTX5000 Packet Transport Router with FPC2-PTX-P1A\) on page 312](#)  
[show chassis environment fpc \(PTX10008 router\) on page 313](#)  
[show chassis environment fpc \(PTX10016 router\) on page 317](#)  
[show chassis environment FPC 1 \(MX Routers with Media Services Blade \[MSB\]\) on page 320](#)  
[show chassis environment FPC \(Junos OS Evolved\) on page 320](#)

**Output Fields** [Table 10 on page 272](#) lists the output fields for the **show chassis environment fpc** command. Output fields are listed in the approximate order in which they appear.

*Table 10: show chassis environment fpc Output Fields*

| Field Name                 | Field Description   |
|----------------------------|---|
| <b>State</b>               | Status of the FPC: <ul style="list-style-type: none"> <li>• <b>Unknown</b>—FPC is not detected by the router.</li> <li>• <b>Empty</b>—No FPC is present.</li> <li>• <b>Present</b>—FPC is detected by the chassis daemon but is either not supported by the current version of the Junos OS, or the FPC is coming up but not yet online.</li> <li>• <b>Ready</b>—FPC is in intermediate or transition state.</li> <li>• <b>Announce online</b>—Intermediate state during which the FPC is coming up but not yet online, and the chassis manager acknowledges the chassisd FPC online initiative.</li> <li>• <b>Online</b>—FPC is online and running.</li> <li>• <b>Offline</b>—FPC is powered down.</li> <li>• <b>Diagnostics</b>—FPC is set to operate in diagnostics mode.</li> </ul> |
| <b>Temperature</b>         | (M40e and M160 routers and QFX Series only) Temperature of the air flowing past the FPC.  |
| <b>PMB Temperature</b>     | (PTX Series only) Temperature of the air flowing past the PMB (bottom of the FPC).<br><br>The PTX5000 Packet Transport Router with FPC2-PTX-P1A include multiple temperatures for PMB ( <b>TEMPO</b> and <b>TEMP1</b> ).  |
| <b>PMB CPU Temperature</b> | (PTX5000 Packet Transport Router with FPC2-PTX-P1A only) Temperature of the air flowing past the PMB CPU.   |
| <b>Temperature Intake</b>  | (M320 routers, MX2010 routers, MX2020 routers, MX2008 routers, and PTX Series only) Temperature of the air flowing into the chassis.  |
| <b>Temperature Top</b>     | (T Series routers only) Temperature of the air flowing past the top of the FPC.   |

Table 10: show chassis environment fpc Output Fields (continued)

| Field Name                   | Field Description   |
|------------------------------|---|
| Temperature Exhaust          | (M120 and M320 routers, MX2010 routers, MX2020 routers, MX2008 routers, and PTX Series only) Temperature of the air flowing out of the chassis.<br><br>The PTX Series Packet Transport Routers, and the MX2010, MX2020, and MX2008 routers include exhaust temperatures for multiple zones ( <b>Exhaust A</b> and <b>Exhaust B</b> ). |
| Temperature Bottom           | (T Series routers only) Temperature of the air flowing past the bottom of the FPC.  |
| TL <i>n</i> Temperature      | (PTX Series only) Temperature of the air flowing past the specified TL area of the packet forwarding engine (PFE) on the FPC.   |
| TQ <i>n</i> Temperature      | (PTX Series only) Temperature of the air flowing past the specified TQ area of the packet forwarding engine (PFE) on the FPC.   |
| Temperature MMBO             | (T640 router only) Temperature of the air flowing past the type 3 FPC.  |
| Temperature MMB1             | (M320 and T Series routers only) Temperature of the air flowing past the type 1, type 2, and type 3 FPC.  |
| Power                        | Information about the voltage supplied to the FPC. The left column displays the required power, in volts. The right column displays the measured power, in millivolts.  |
| CMB Revision or BUS revision | Revision level of the chassis management bus device (M Series router) or bus (T Series routers).  |

## Sample Output

### show chassis environment fpc (M120 Router)

```

user@host> show chassis environment fpc

FPC 2 status:
  State                Online
  Temperature Exhaust A 32 degrees C / 89 degrees F
  Temperature Exhaust B 31 degrees C / 87 degrees F
  Power A-Board
    1.2 V                1202 mV
    1.5 V                1508 mV
    1.8 V                1798 mV
    2.5 V                2507 mV
    3.3 V                3351 mV
    5.0 V                4995 mV
    3.3 V bias           3296 mV
    1.2 V Rocket IO      1205 mV
    1.5 V Rocket IO      1501 mV
  I2C Slave Revision    12
FPC 3 status:
  State                Online
  Temperature Exhaust A 31 degrees C / 87 degrees F
  Temperature Exhaust B 33 degrees C / 91 degrees F
  Power A-Board
    1.2 V                1211 mV

```

```

1.5 V          1501 mV
1.8 V          1798 mV
2.5 V          2471 mV
3.3 V          3293 mV
5.0 V          4930 mV
3.3 V bias     3296 mV
1.2 V Rocket IO 1205 mV
1.5 V Rocket IO 1501 mV
Power B-Board
1.2 V          1214 mV
1.5 V          1501 mV
2.5 V          2471 mV
3.3 V          3300 mV
5.0 V          4943 mV
3.3 V bias     3296 mV
1.2 V Rocket IO 1205 mV
1.5 V Rocket IO 1501 mV
I2C Slave Revision 12
FPC 4 status:
State          Online
Temperature Exhaust A 32 degrees C / 89 degrees F
Temperature Exhaust B 30 degrees C / 86 degrees F
Power A-Board
1.2 V          1195 mV
1.5 V          1504 mV
1.8 V          1801 mV
2.5 V          2504 mV
3.3 V          3293 mV
5.0 V          4917 mV
3.3 V bias     3296 mV
1.2 V Rocket IO 1202 mV
1.5 V Rocket IO 1492 mV
I2C Slave Revision 12

```

#### show chassis environment fpc (M160 Router)

```

user@host> show chassis environment fpc

FPC 0 status:
State          Online
Temperature          42 degrees C / 107 degrees F
Power:
1.5 V          1500 mV
2.5 V          2509 mV
3.3 V          3308 mV
5.0 V          4991 mV
5.0 V bias     4952 mV
8.0 V bias     8307 mV
CMB Revision     12
FPC 1 status:
State          Online
Temperature          45 degrees C / 113 degrees F
Power:
1.5 V          1498 mV
2.5 V          2501 mV
3.3 V          3319 mV
5.0 V          5020 mV
5.0 V bias     5025 mV
8.0 V bias     8307 mV
CMB Revision     12

```

**show chassis environment fpc (M320 Router)**

```

user@host> show chassis environment fpc

FPC 0 status:
  State                Online
  Temperature Intake    27 degrees C / 80 degrees F
  Temperature Exhaust   38 degrees C / 100 degrees F
  Temperature MMB1      31 degrees C / 87 degrees F
  Power:
    1.5 V               1487 mV
    1.5 V *             1494 mV
    1.8 V               1821 mV
    2.5 V               2533 mV
    3.3 V               3323 mV
    5.0 V               5028 mV
    3.3 V bias          3296 mV
    5.0 V bias          4984 mV
  CMB Revision          16
FPC 1 status:
  State                Online
  Temperature Intake    27 degrees C / 80 degrees F
  Temperature Exhaust   37 degrees C / 98 degrees F
  Temperature MMB1      32 degrees C / 89 degrees F
  Power:
    1.5 V               1504 mV
    1.5 V *             1499 mV
    1.8 V               1820 mV
    2.5 V               2529 mV
    3.3 V               3328 mV
    5.0 V               5013 mV
    3.3 V bias          3294 mV
    5.0 V bias          4984 mV
  CMB Revision          16
FPC 2 status:
  State                Online
  Temperature Intake    28 degrees C / 82 degrees F
  Temperature Exhaust   38 degrees C / 100 degrees F
  Temperature MMB1      32 degrees C / 89 degrees F
  Power:
    1.5 V               1498 mV
    1.5 V *             1487 mV
    1.8 V               1816 mV
    2.5 V               2531 mV
    3.3 V               3324 mV
    5.0 V               5025 mV
    3.3 V bias          3277 mV
    5.0 V bias          5013 mV
  CMB Revision          17
FPC 3 status:
...

```

**show chassis environment fpc (MX2020 Router)**

```

user@host> show chassis environment fpc

FPC 0 status:
  State                Online
  Temperature Intake    41 degrees C / 105 degrees F
  Temperature Exhaust A 48 degrees C / 118 degrees F

```

```

Temperature Exhaust B      60 degrees C / 140 degrees F
Temperature LU 0 TSen      56 degrees C / 132 degrees F
Temperature LU 0 Chip      59 degrees C / 138 degrees F
Temperature LU 1 TSen      56 degrees C / 132 degrees F
Temperature LU 1 Chip      61 degrees C / 141 degrees F
Temperature LU 2 TSen      56 degrees C / 132 degrees F
Temperature LU 2 Chip      52 degrees C / 125 degrees F
Temperature LU 3 TSen      56 degrees C / 132 degrees F
Temperature LU 3 Chip      52 degrees C / 125 degrees F
Temperature MQ 0 TSen      49 degrees C / 120 degrees F
Temperature MQ 0 Chip      49 degrees C / 120 degrees F
Temperature MQ 1 TSen      49 degrees C / 120 degrees F
Temperature MQ 1 Chip      52 degrees C / 125 degrees F
Temperature MQ 2 TSen      49 degrees C / 120 degrees F
Temperature MQ 2 Chip      45 degrees C / 113 degrees F
Temperature MQ 3 TSen      49 degrees C / 120 degrees F
Temperature MQ 3 Chip      46 degrees C / 114 degrees F
Power
  AS-BIAS3V3-z12105      3299 mV
  AS-VDD1V8-z12006      1807 mV
  AS-VDD2V5-z12006      2512 mV
  AS-AVDD1V0-z12004      997 mV
  AS-PCIE_1V0-z12004      996 mV
  AS-VDD3V3-z12004      3294 mV
  AS-VDD_1V5A-z12004      1501 mV
  AS-VDD_1V5B-z12004      1498 mV
  AS-LU0_1V0-z12004      998 mV
  AS-LU1_1V0-z12004      1002 mV
  AS-MQ0_1V0-z12004      999 mV
  AS-MQ1_1V0-z12004      994 mV
  AS-LU2_1V0-z12004      1000 mV
  AS-LU3_1V0-z12004      998 mV
  AS-MQ2_1V0-z12004      1002 mV
  AS-MQ3_1V0-z12004      999 mV
  AS-PMB_1V1-z12006      1096 mV
I2C Slave Revision      68
FPC 1 status:
State      Online
Temperature Intake      39 degrees C / 102 degrees F
Temperature Exhaust A    48 degrees C / 118 degrees F
Temperature Exhaust B    55 degrees C / 131 degrees F
Temperature LU 0 TSen    52 degrees C / 125 degrees F
Temperature LU 0 Chip    54 degrees C / 129 degrees F
Temperature LU 1 TSen    52 degrees C / 125 degrees F
Temperature LU 1 Chip    56 degrees C / 132 degrees F
Temperature LU 2 TSen    52 degrees C / 125 degrees F
Temperature LU 2 Chip    49 degrees C / 120 degrees F
Temperature LU 3 TSen    52 degrees C / 125 degrees F
Temperature LU 3 Chip    50 degrees C / 122 degrees F
Temperature MQ 0 TSen    48 degrees C / 118 degrees F
Temperature MQ 0 Chip    48 degrees C / 118 degrees F
Temperature MQ 1 TSen    48 degrees C / 118 degrees F
Temperature MQ 1 Chip    51 degrees C / 123 degrees F
Temperature MQ 2 TSen    48 degrees C / 118 degrees F
Temperature MQ 2 Chip    45 degrees C / 113 degrees F
Temperature MQ 3 TSen    48 degrees C / 118 degrees F
Temperature MQ 3 Chip    45 degrees C / 113 degrees F
Power
  AS-BIAS3V3-z12105      3291 mV
  AS-VDD1V8-z12006      1786 mV

```



```

AS-VDD2V5-z12006      2496 mV
AS-AVDD1V0-z12004     1000 mV
AS-PCIE_1V0-z12004     1000 mV
AS-VDD3V3-z12004      3294 mV
AS-VDD_1V5A-z12004    1500 mV
AS-VDD_1V5B-z12004    1498 mV
AS-LU0_1V0-z12004     1003 mV
AS-LU1_1V0-z12004     1000 mV
AS-MQ0_1V0-z12004     1000 mV
AS-MQ1_1V0-z12004      995 mV
AS-LU2_1V0-z12004     1002 mV
AS-LU3_1V0-z12004      997 mV
AS-MQ2_1V0-z12004     1000 mV
AS-MQ3_1V0-z12004      998 mV
AS-PMB_1V1-z12006     1096 mV
I2C Slave Revision    68
FPC 2 status:
State                 Online
Temperature Intake     39 degrees C / 102 degrees F
Temperature Exhaust A  48 degrees C / 118 degrees F
Temperature Exhaust B  58 degrees C / 136 degrees F
Temperature LU 0 TSen  55 degrees C / 131 degrees F
Temperature LU 0 Chip  57 degrees C / 134 degrees F
Temperature LU 1 TSen  55 degrees C / 131 degrees F
Temperature LU 1 Chip  63 degrees C / 145 degrees F
Temperature LU 2 TSen  55 degrees C / 131 degrees F
Temperature LU 2 Chip  51 degrees C / 123 degrees F
Temperature LU 3 TSen  55 degrees C / 131 degrees F
Temperature LU 3 Chip  52 degrees C / 125 degrees F
Temperature MQ 0 TSen  48 degrees C / 118 degrees F
Temperature MQ 0 Chip  50 degrees C / 122 degrees F
Temperature MQ 1 TSen  48 degrees C / 118 degrees F
Temperature MQ 1 Chip  52 degrees C / 125 degrees F
Temperature MQ 2 TSen  48 degrees C / 118 degrees F
Temperature MQ 2 Chip  47 degrees C / 116 degrees F
Temperature MQ 3 TSen  48 degrees C / 118 degrees F
Temperature MQ 3 Chip  47 degrees C / 116 degrees F
Power
AS-BIAS3V3-z12105     3299 mV
AS-VDD1V8-z12006     1805 mV
AS-VDD2V5-z12006     2510 mV
AS-AVDD1V0-z12004      999 mV
AS-PCIE_1V0-z12004      998 mV
AS-VDD3V3-z12004      3296 mV
AS-VDD_1V5A-z12004    1492 mV
AS-VDD_1V5B-z12004    1497 mV
AS-LU0_1V0-z12004      997 mV
AS-LU1_1V0-z12004     1000 mV
AS-MQ0_1V0-z12004      998 mV
AS-MQ1_1V0-z12004     1001 mV
AS-LU2_1V0-z12004      996 mV
AS-LU3_1V0-z12004      995 mV
AS-MQ2_1V0-z12004      998 mV
AS-MQ3_1V0-z12004      997 mV
AS-PMB_1V1-z12006     1100 mV
I2C Slave Revision    68
FPC 3 status:
State                 Online
Temperature Intake     41 degrees C / 105 degrees F
Temperature Exhaust A  48 degrees C / 118 degrees F

```

```

Temperature Exhaust B      58 degrees C / 136 degrees F
Temperature LU 0 TSen      56 degrees C / 132 degrees F
Temperature LU 0 Chip      59 degrees C / 138 degrees F
Temperature LU 1 TSen      56 degrees C / 132 degrees F
Temperature LU 1 Chip      61 degrees C / 141 degrees F
Temperature LU 2 TSen      56 degrees C / 132 degrees F
Temperature LU 2 Chip      51 degrees C / 123 degrees F
Temperature LU 3 TSen      56 degrees C / 132 degrees F
Temperature LU 3 Chip      53 degrees C / 127 degrees F
Temperature MQ 0 TSen      50 degrees C / 122 degrees F
Temperature MQ 0 Chip      51 degrees C / 123 degrees F
Temperature MQ 1 TSen      50 degrees C / 122 degrees F
Temperature MQ 1 Chip      55 degrees C / 131 degrees F
Temperature MQ 2 TSen      50 degrees C / 122 degrees F
Temperature MQ 2 Chip      47 degrees C / 116 degrees F
Temperature MQ 3 TSen      50 degrees C / 122 degrees F
Temperature MQ 3 Chip      50 degrees C / 122 degrees F
Power
  AS-BIAS3V3-z12105        3305 mV
  AS-VDD1V8-z12006         1810 mV
  AS-VDD2V5-z12006         2508 mV
  AS-AVDD1V0-z12004         999 mV
  AS-PCIE_1V0-z12004        1001 mV
  AS-VDD3V3-z12004         3294 mV
  AS-VDD_1V5A-z12004        1500 mV
  AS-VDD_1V5B-z12004        1498 mV
  AS-LU0_1V0-z12004         998 mV
  AS-LU1_1V0-z12004         998 mV
  AS-MQ0_1V0-z12004         999 mV
  AS-MQ1_1V0-z12004         998 mV
  AS-LU2_1V0-z12004        1000 mV
  AS-LU3_1V0-z12004        1001 mV
  AS-MQ2_1V0-z12004         996 mV
  AS-MQ3_1V0-z12004         998 mV
  AS-PMB_1V1-z12006        1098 mV
I2C Slave Revision        68
FPC 4 status:
...
```

### show chassis environment fpc (MX2010 Router)

```
user@host> show chassis environment fpc
```

```

FPC 0 status:
State      Online
Temperature Intake      36 degrees C / 96 degrees F
Temperature Exhaust A   42 degrees C / 107 degrees F
Temperature Exhaust B   51 degrees C / 123 degrees F
Temperature LU 0 TSen    49 degrees C / 120 degrees F
Temperature LU 0 Chip    50 degrees C / 122 degrees F
Temperature LU 1 TSen    49 degrees C / 120 degrees F
Temperature LU 1 Chip    54 degrees C / 129 degrees F
Temperature LU 2 TSen    49 degrees C / 120 degrees F
Temperature LU 2 Chip    45 degrees C / 113 degrees F
Temperature LU 3 TSen    49 degrees C / 120 degrees F
Temperature LU 3 Chip    46 degrees C / 114 degrees F
Temperature MQ 0 TSen    40 degrees C / 104 degrees F
Temperature MQ 0 Chip    41 degrees C / 105 degrees F
Temperature MQ 1 TSen    40 degrees C / 104 degrees F
Temperature MQ 1 Chip    44 degrees C / 111 degrees F
```

```

Temperature MQ 2 TSen      40 degrees C / 104 degrees F
Temperature MQ 2 Chip      38 degrees C / 100 degrees F
Temperature MQ 3 TSen      40 degrees C / 104 degrees F
Temperature MQ 3 Chip      41 degrees C / 105 degrees F
Power
  AS-BIAS3V3-z12105        3300 mV
  AS-VDD1V8-z12006         1805 mV
  AS-VDD2V5-z12006         2505 mV
  AS-AVDD1V0-z12004         998 mV
  AS-PCIE_1V0-z12004         999 mV
  AS-VDD3V3-z12004         3303 mV
  AS-VDD_1V5A-z12004        1497 mV
  AS-VDD_1V5B-z12004        1497 mV
  AS-LU0_1V0-z12004         998 mV
  AS-LU1_1V0-z12004        1003 mV
  AS-MQ0_1V0-z12004         998 mV
  AS-MQ1_1V0-z12004         998 mV
  AS-LU2_1V0-z12004         997 mV
  AS-LU3_1V0-z12004        1001 mV
  AS-MQ2_1V0-z12004         996 mV
  AS-MQ3_1V0-z12004         994 mV
  AS-PMB_1V1-z12006        1097 mV
I2C Slave Revision        68
FPC 1 status:
State                      Online
Temperature Intake          34 degrees C / 93 degrees F
Temperature Exhaust A       46 degrees C / 114 degrees F
Temperature Exhaust B       54 degrees C / 129 degrees F
Temperature LU 0 TSen        45 degrees C / 113 degrees F
Temperature LU 0 Chip        55 degrees C / 131 degrees F
Temperature LU 1 TSen        45 degrees C / 113 degrees F
Temperature LU 1 Chip        44 degrees C / 111 degrees F
Temperature LU 2 TSen        45 degrees C / 113 degrees F
Temperature LU 2 Chip        50 degrees C / 122 degrees F
Temperature LU 3 TSen        45 degrees C / 113 degrees F
Temperature LU 3 Chip        58 degrees C / 136 degrees F
Temperature XM 0 TSen        45 degrees C / 113 degrees F
Temperature XM 0 Chip        51 degrees C / 123 degrees F
Temperature XF 0 TSen        45 degrees C / 113 degrees F
Temperature XF 0 Chip        63 degrees C / 145 degrees F
Temperature PLX Switch TSen  45 degrees C / 113 degrees F
Temperature PLX Switch Chip  47 degrees C / 116 degrees F
Power
  MPC-BIAS3V3-z12105        3300 mV
  MPC-VDD3V3-z12100         3294 mV
  MPC-VDD2V5-z12100         2505 mV
  MPC-VDD1V8-z12004         1796 mV
  MPC-AVDD1V0-z12004         991 mV
  MPC-VDD1V2-z12100         1196 mV
  MPC-VDD1V5A-z12004        1491 mV
  MPC-VDD1V5B-z12004        1492 mV
  MPC-XF_0V9-z12004         996 mV
  MPC-PCIE_1V0-z12100        1003 mV
  MPC-LU0_1V0-z12004         996 mV
  MPC-LU1_1V0-z12004         996 mV
  MPC-LU2_1V0-z12004         998 mV
  MPC-LU3_1V0-z12004         994 mV
  MPC-12VA-BMR453           12031 mV
  MPC-12VB-BMR453           12003 mV
  MPC-PMB_1V1-z12006        1104 mV

```

```

MPC-PMB_1V2-z12106      1194 mV
MPC-XM_OV9-vt273m       911 mV
I2C Slave Revision      110
FPC 8 status:
State                    Online
Temperature Intake        32 degrees C / 89 degrees F
Temperature Exhaust A    44 degrees C / 111 degrees F
Temperature Exhaust B    37 degrees C / 98 degrees F
Temperature LU 0 TCAM TSen 41 degrees C / 105 degrees F
Temperature LU 0 TCAM Chip 49 degrees C / 120 degrees F
Temperature LU 0 TSen     41 degrees C / 105 degrees F
Temperature LU 0 Chip     52 degrees C / 125 degrees F
Temperature MQ 0 TSen     41 degrees C / 105 degrees F
Temperature MQ 0 Chip     47 degrees C / 116 degrees F
Temperature LU 1 TCAM TSen 39 degrees C / 102 degrees F
Temperature LU 1 TCAM Chip 42 degrees C / 107 degrees F
Temperature LU 1 TSen     39 degrees C / 102 degrees F
Temperature LU 1 Chip     46 degrees C / 114 degrees F
Temperature MQ 1 TSen     39 degrees C / 102 degrees F
Temperature MQ 1 Chip     45 degrees C / 113 degrees F
Power
MPC-BIAS3V3-z12105      3296 mV
MPC-VDD3V3-z12006      3298 mV
MPC-VDD2V5-z12006      2505 mV
MPC-TCAM_1V0-z12004     997 mV
MPC-AVDD1V0-z12006     1007 mV
MPC-VDD1V8-z12006      1803 mV
MPC-PCIE_1V0-z12006     1004 mV
MPC-LU0_1V0-z12004     1000 mV
MPC-MQ0_1V0-z12004     999 mV
MPC-VDD_1V5-z12004     1498 mV
MPC-PMB_1V1-z12006     1102 mV
MPC-9VA-BMR453         9009 mV
MPC-9VB-BMR453         8960 mV
MPC-PMB_1V2-z12105     1202 mV
MPC-LU1_1V0-z12004     1005 mV
MPC-MQ1_1V0-z12004     1000 mV
I2C Slave Revision      70
FPC 9 status:
State                    Online
Temperature Intake        34 degrees C / 93 degrees F
Temperature Exhaust A    41 degrees C / 105 degrees F
Temperature Exhaust B    54 degrees C / 129 degrees F
Temperature LU 0 TSen     51 degrees C / 123 degrees F
Temperature LU 0 Chip     52 degrees C / 125 degrees F
Temperature LU 1 TSen     51 degrees C / 123 degrees F
Temperature LU 1 Chip     55 degrees C / 131 degrees F
Temperature LU 2 TSen     51 degrees C / 123 degrees F
Temperature LU 2 Chip     47 degrees C / 116 degrees F
Temperature LU 3 TSen     51 degrees C / 123 degrees F
Temperature LU 3 Chip     47 degrees C / 116 degrees F
Temperature MQ 0 TSen     40 degrees C / 104 degrees F
Temperature MQ 0 Chip     42 degrees C / 107 degrees F
Temperature MQ 1 TSen     40 degrees C / 104 degrees F
Temperature MQ 1 Chip     44 degrees C / 111 degrees F
Temperature MQ 2 TSen     40 degrees C / 104 degrees F
Temperature MQ 2 Chip     38 degrees C / 100 degrees F
Temperature MQ 3 TSen     40 degrees C / 104 degrees F
Temperature MQ 3 Chip     40 degrees C / 104 degrees F
Power

```

```

AS-BIAS3V3-z12105      3302 mV
AS-VDD1V8-z12006      1808 mV
AS-VDD2V5-z12006      2513 mV
AS-AVDD1V0-z12004      997 mV
AS-PCIE_1V0-z12004      999 mV
AS-VDD3V3-z12004      3294 mV
AS-VDD_1V5A-z12004     1503 mV
AS-VDD_1V5B-z12004     1502 mV
AS-LU0_1V0-z12004      996 mV
AS-LU1_1V0-z12004      999 mV
AS-MQ0_1V0-z12004      997 mV
AS-MQ1_1V0-z12004      999 mV
AS-LU2_1V0-z12004      997 mV
AS-LU3_1V0-z12004      998 mV
AS-MQ2_1V0-z12004     1000 mV
AS-MQ3_1V0-z12004     1000 mV
AS-PMB_1V1-z12006     1102 mV
I2C Slave Revision      68

```

### show chassis environment fpc (MX2008 Router)

```
user@host> show chassis environment fpc
```

```

FPC 0 status:
State                               Online
Temperature Intake                  29 degrees C / 84 degrees F
Temperature Exhaust A               43 degrees C / 109 degrees F
Temperature Exhaust B               42 degrees C / 107 degrees F
Temperature XL 0 TSen                38 degrees C / 100 degrees F
Temperature XL 0 Chip                53 degrees C / 127 degrees F
Temperature XL 0 XR2 0 TSen          38 degrees C / 100 degrees F
Temperature XL 0 XR2 0 Chip          60 degrees C / 140 degrees F
Temperature XL 0 XR2 1 TSen          38 degrees C / 100 degrees F
Temperature XL 0 XR2 1 Chip          60 degrees C / 140 degrees F
Temperature XL 1 TSen                30 degrees C / 86 degrees F
Temperature XL 1 Chip                43 degrees C / 109 degrees F
Temperature XL 1 XR2 0 TSen          30 degrees C / 86 degrees F
Temperature XL 1 XR2 0 Chip          50 degrees C / 122 degrees F
Temperature XL 1 XR2 1 TSen          30 degrees C / 86 degrees F
Temperature XL 1 XR2 1 Chip          50 degrees C / 122 degrees F
Temperature XM 0 TSen                42 degrees C / 107 degrees F
Temperature XM 0 Chip                49 degrees C / 120 degrees F
Temperature XM 1 TSen                42 degrees C / 107 degrees F
Temperature XM 1 Chip                42 degrees C / 107 degrees F
Temperature XM 2 TSen                42 degrees C / 107 degrees F
Temperature XM 2 Chip                42 degrees C / 107 degrees F
Temperature XM 3 TSen                42 degrees C / 107 degrees F
Temperature XM 3 Chip                40 degrees C / 104 degrees F
Temperature PCIE Switch TSen         42 degrees C / 107 degrees F
Temperature PCIE Switch Chip         22 degrees C / 71 degrees F
Power
MPC-VDD_3V3-vt273m                 3304 mV
MPC-VDD_2V5-vt273m                 2503 mV
MPC-VDD_1V5-vt273m                 1499 mV
MPC-PCIE_0V9-vt273m                 900 mV
MPC-VDD_1V8-vt273m                 1799 mV
MPC-VDD_1V2-vt273m                 1203 mV
MPC-XM01_AVDD_1V0-vt273             1001 mV
MPC-XM23_AVDD_1V0-vt273             1001 mV
MPC-XM0_0V9-vt273m                 900 mV

```

```

MPC-XM1_0V9-vt273m      901 mV
MPC-XM2_0V9-vt273m      903 mV
MPC-XM3_0V9-vt273m      899 mV
MPC-XL0_XR0_0V9-vt273m  899 mV
MPC-XL0_XR1_0V9-vt273m  903 mV
MPC-XL0_0V9-vt273m      899 mV
MPC-XL0_AVDD_1V0-vt273m 1000 mV
MPC-XL0_VDD_1V5-vt273m  1498 mV
MPC-XL0_XR_1V2-vt273m   1200 mV
MPC-XL1_XR0_0V9-vt273m  899 mV
MPC-XL1_XR1_0V9-vt273m  899 mV
MPC-XL1_0V9-vt273m      900 mV
MPC-XL1_AVDD_1V0-vt273m 1000 mV
MPC-XL1_VDD_1V5-vt273m  1501 mV
MPC-XL1_XR_1V2-vt273m   1199 mV
MPC-PMB-1V05-ltc2978    1049 mV
MPC-PMB-1V5-ltc2978     1500 mV
MPC-PMB-2V5-ltc2978     2500 mV
MPC-PMB-3V3-ltc2978     3298 mV
I2C Slave Revision      20
FPC 1 status:
State                   Online
Temperature Intake      29 degrees C / 84 degrees F
Temperature Exhaust A   52 degrees C / 125 degrees F
Temperature Exhaust B   44 degrees C / 111 degrees F
Temperature EA0 TSen     55 degrees C / 131 degrees F
Temperature EA0 Chip     48 degrees C / 118 degrees F
Temperature EA0_XR0 TSen 55 degrees C / 131 degrees F
Temperature EA0_XR0 Chip 57 degrees C / 134 degrees F
Temperature EA0_XR1 TSen 55 degrees C / 131 degrees F
Temperature EA0_XR1 Chip 54 degrees C / 129 degrees F
Temperature EA1 TSen     55 degrees C / 131 degrees F
Temperature EA1 Chip     50 degrees C / 122 degrees F
Temperature EA1_XR0 TSen 55 degrees C / 131 degrees F
Temperature EA1_XR0 Chip 59 degrees C / 138 degrees F
Temperature EA1_XR1 TSen 55 degrees C / 131 degrees F
Temperature EA1_XR1 Chip 59 degrees C / 138 degrees F
Temperature PEX TSen     55 degrees C / 131 degrees F
Temperature PEX Chip     39 degrees C / 102 degrees F
Temperature EA2 TSen     43 degrees C / 109 degrees F
Temperature EA2 Chip     39 degrees C / 102 degrees F
Temperature EA2_XR0 TSen 43 degrees C / 109 degrees F
Temperature EA2_XR0 Chip 45 degrees C / 113 degrees F
Temperature EA2_XR1 TSen 43 degrees C / 109 degrees F
Temperature EA2_XR1 Chip 43 degrees C / 109 degrees F
Temperature EA3 TSen     43 degrees C / 109 degrees F
Temperature EA3 Chip     41 degrees C / 105 degrees F
Temperature EA3_XR0 TSen 43 degrees C / 109 degrees F
Temperature EA3_XR0 Chip 50 degrees C / 122 degrees F
Temperature EA3_XR1 TSen 43 degrees C / 109 degrees F
Temperature EA3_XR1 Chip 46 degrees C / 114 degrees F
Temperature EA0_HMC0 Logic die 61 degrees C / 141 degrees F
Temperature EA0_HMC0 DRAM botm 58 degrees C / 136 degrees F
Temperature EA0_HMC1 Logic die 62 degrees C / 143 degrees F
Temperature EA0_HMC1 DRAM botm 59 degrees C / 138 degrees F
Temperature EA0_HMC2 Logic die 59 degrees C / 138 degrees F
Temperature EA0_HMC2 DRAM botm 56 degrees C / 132 degrees F
Temperature EA1_HMC0 Logic die 67 degrees C / 152 degrees F
Temperature EA1_HMC0 DRAM botm 64 degrees C / 147 degrees F
Temperature EA1_HMC1 Logic die 65 degrees C / 149 degrees F

```

```

Temperature EA1_HMC1 DRAM botm 62 degrees C / 143 degrees F
Temperature EA1_HMC2 Logic die 63 degrees C / 145 degrees F
Temperature EA1_HMC2 DRAM botm 60 degrees C / 140 degrees F
Temperature EA2_HMC0 Logic die 51 degrees C / 123 degrees F
Temperature EA2_HMC0 DRAM botm 48 degrees C / 118 degrees F
Temperature EA2_HMC1 Logic die 55 degrees C / 131 degrees F
Temperature EA2_HMC1 DRAM botm 52 degrees C / 125 degrees F
Temperature EA2_HMC2 Logic die 52 degrees C / 125 degrees F
Temperature EA2_HMC2 DRAM botm 49 degrees C / 120 degrees F
Temperature EA3_HMC0 Logic die 51 degrees C / 123 degrees F
Temperature EA3_HMC0 DRAM botm 48 degrees C / 118 degrees F
Temperature EA3_HMC1 Logic die 52 degrees C / 125 degrees F
Temperature EA3_HMC1 DRAM botm 49 degrees C / 120 degrees F
Temperature EA3_HMC2 Logic die 52 degrees C / 125 degrees F
Temperature EA3_HMC2 DRAM botm 49 degrees C / 120 degrees F

```

#### Power

```

MPC-EA0_OV9-vt1527mb          950 mV
MPC-EA1_OV9-vt1527mb          950 mV
MPC-EA2_OV9-vt1527mb          925 mV
MPC-EA3_OV9-vt1527mb          924 mV
MAX20751-1V0                   1020 mV
MAX20731-OV9                   891 mV
MAX20751-EA0-AVDD1V0          1000 mV
MAX20731-EA0-1V2              1189 mV
MAX20731-EA0-HMC-1V2          1182 mV
MAX20731-EA0-OV906            899 mV
MAX20731-EA0-HMC-OV9          891 mV
MAX20751-EA1-AVDD1V0          1000 mV
MAX20731-EA1-1V2              1189 mV
MAX20731-EA1-HMC-1V2          1182 mV
MAX20731-EA1-OV906            899 mV
MAX20731-EA1-HMC-OV9          889 mV
MAX20751-EA2-AVDD1V0          1000 mV
MAX20731-EA2-1V2              1186 mV
MAX20731-EA2-HMC-1V2          1193 mV
MAX20731-EA2-OV906            899 mV
MAX20731-EA2-HMC-OV9          889 mV
MAX20751-EA3-AVDD1V0          1000 mV
MAX20731-EA3-1V2              1186 mV
MAX20731-EA3-HMC-1V2          1193 mV
MAX20731-EA3-OV906            897 mV
MAX20731-EA3-HMC-OV9          894 mV
MAX20731-3V3                  3268 mV
UCD9090_0-CH_1-EA0_PLL_       1010 mV
UCD9090_0-CH_2-EA0_1V04       1038 mV
UCD9090_0-CH_3-EA0_2V5        2499 mV
UCD9090_0-CH_4-EA0_1V5        1494 mV
UCD9090_0-CH_5-EA1_PLL_       1012 mV
UCD9090_0-CH_6-EA1_1V04       1038 mV
UCD9090_0-CH_7-EA1_2V5        2497 mV
UCD9090_0-CH_8-EA1_1V5        1498 mV
UCD9090_0-CH_9-VDD_1V8        1804 mV
UCD9090_0-CH_10-VDD_2V5       2499 mV
UCD9090_1-CH_1-EA2_PLL_       1017 mV
UCD9090_1-CH_2-EA2_1V04       1041 mV
UCD9090_1-CH_3-EA2_2V5        2499 mV
UCD9090_1-CH_4-EA2_1V5        1503 mV
UCD9090_1-CH_5-EA3_PLL_       1015 mV
UCD9090_1-CH_6-EA3_1V04       1048 mV
UCD9090_1-CH_7-EA3_2V5        2499 mV

```

```

UCD9090_1-CH_8-EA3_1V5      1500 mV
UCD9090_1-CH_9-VDD_1V5      1497 mV
UCD9090_1-CH_10-VDD_1V2     1216 mV
PMB PVCC 0.7V - 1.05V        802 mV
PMB PVNN 0V - 1.02V          976 mV
PMB 1.0V                      1002 mV
PMB 1.1V                      1076 mV
PMB 1.35V                     1347 mV
PMB VDDQ 1.5V                 1504 mV
PMB 1.8V                      1804 mV
PMB VDD 3.3V                  3292 mV
PMB BIAS 5.0V                 5008 mV
PMB USB 5.0V                  5000 mV
PMB 12V                       10866 mV
I2C Slave Revision           112
FPC 7 status:
State                         Online
Temperature Intake            31 degrees C / 87 degrees F
Temperature Exhaust A        46 degrees C / 114 degrees F
Temperature Exhaust B        38 degrees C / 100 degrees F
Temperature QX 0 TSen         49 degrees C / 120 degrees F
Temperature QX 0 Chip         52 degrees C / 125 degrees F
Temperature LU 0 TCAM TSen    49 degrees C / 120 degrees F
Temperature LU 0 TCAM Chip    52 degrees C / 125 degrees F
Temperature LU 0 TSen         49 degrees C / 120 degrees F
Temperature LU 0 Chip         51 degrees C / 123 degrees F
Temperature MQ 0 TSen         49 degrees C / 120 degrees F
Temperature MQ 0 Chip         55 degrees C / 131 degrees F
Temperature QX 1 TSen         41 degrees C / 105 degrees F
Temperature QX 1 Chip         42 degrees C / 107 degrees F
Temperature LU 1 TCAM TSen    41 degrees C / 105 degrees F
Temperature LU 1 TCAM Chip    43 degrees C / 109 degrees F
Temperature LU 1 TSen         41 degrees C / 105 degrees F
Temperature LU 1 Chip         46 degrees C / 114 degrees F
Temperature MQ 1 TSen         41 degrees C / 105 degrees F
Temperature MQ 1 Chip         47 degrees C / 116 degrees F
Power
MPC-BIAS3V3-z12105           3302 mV
MPC-VDD3V3-z12006            3307 mV
MPC-VDD2V5-z12006            2505 mV
MPC-TCAM_1V0-z12004           1000 mV
MPC-AVDD1V0-z12006            1006 mV
MPC-VDD1V8-z12006             1800 mV
MPC-PCIE_1V0-z12006           1000 mV
MPC-LU0_1V0-z12004            997 mV
MPC-MQ0_1V0-z12004            999 mV
MPC-VDD_1V5-z12004            1495 mV
MPC-PMB_1V1-z12006            1096 mV
MPC-9VA-BMR453                9051 mV
MPC-9VB-BMR453                8990 mV
MPC-PMB_1V2-z12106            1200 mV
MPC-LU1_1V0-z12004            997 mV
MPC-MQ1_1V0-z12004            998 mV
MPC-QXM0_1V0-z12006           1000 mV
MPC-QXM1_1V0-z12006           999 mV
I2C Slave Revision           70

```

#### show chassis environment fpc (MX240 Router)

```
user@host> show chassis environment fpc
```



## FPC 1 status:

|                          |                              |
|--------------------------|------------------------------|
| State                    | Online                       |
| Temperature Intake       | 34 degrees C / 93 degrees F  |
| Temperature Exhaust A    | 39 degrees C / 102 degrees F |
| Temperature Exhaust B    | 53 degrees C / 127 degrees F |
| Temperature I3 0 TSensor | 51 degrees C / 123 degrees F |
| Temperature I3 0 Chip    | 54 degrees C / 129 degrees F |
| Temperature I3 1 TSensor | 50 degrees C / 122 degrees F |
| Temperature I3 1 Chip    | 53 degrees C / 127 degrees F |
| Temperature I3 2 TSensor | 48 degrees C / 118 degrees F |
| Temperature I3 2 Chip    | 51 degrees C / 123 degrees F |
| Temperature I3 3 TSensor | 45 degrees C / 113 degrees F |
| Temperature I3 3 Chip    | 48 degrees C / 118 degrees F |
| Temperature IA 0 TSensor | 45 degrees C / 113 degrees F |
| Temperature IA 0 Chip    | 45 degrees C / 113 degrees F |
| Temperature IA 1 TSensor | 45 degrees C / 113 degrees F |
| Temperature IA 1 Chip    | 49 degrees C / 120 degrees F |
| Power                    |                              |
| 1.5 V                    | 1492 mV                      |
| 2.5 V                    | 2507 mV                      |
| 3.3 V                    | 3306 mV                      |
| 1.8 V PFE 0              | 1801 mV                      |
| 1.8 V PFE 1              | 1804 mV                      |
| 1.8 V PFE 2              | 1798 mV                      |
| 1.8 V PFE 3              | 1798 mV                      |
| 1.2 V PFE 0              | 1169 mV                      |
| 1.2 V PFE 1              | 1189 mV                      |
| 1.2 V PFE 2              | 1182 mV                      |
| 1.2 V PFE 3              | 1176 mV                      |
| I2C Slave Revision       | 42                           |

## FPC 2 status:

|                          |                              |
|--------------------------|------------------------------|
| State                    | Online                       |
| Temperature Intake       | 33 degrees C / 91 degrees F  |
| Temperature Exhaust A    | 41 degrees C / 105 degrees F |
| Temperature Exhaust B    | 53 degrees C / 127 degrees F |
| Temperature I3 0 TSensor | 53 degrees C / 127 degrees F |
| Temperature I3 0 Chip    | 58 degrees C / 136 degrees F |
| Temperature I3 1 TSensor | 52 degrees C / 125 degrees F |
| Temperature I3 1 Chip    | 56 degrees C / 132 degrees F |
| Temperature I3 2 TSensor | 50 degrees C / 122 degrees F |
| Temperature I3 2 Chip    | 52 degrees C / 125 degrees F |
| Temperature I3 3 TSensor | 46 degrees C / 114 degrees F |
| Temperature I3 3 Chip    | 49 degrees C / 120 degrees F |
| Temperature IA 0 TSensor | 51 degrees C / 123 degrees F |
| Temperature IA 0 Chip    | 49 degrees C / 120 degrees F |
| Temperature IA 1 TSensor | 48 degrees C / 118 degrees F |
| Temperature IA 1 Chip    | 53 degrees C / 127 degrees F |
| Power                    |                              |
| 1.5 V                    | 1492 mV                      |
| 2.5 V                    | 2445 mV                      |
| 3.3 V                    | 3293 mV                      |
| 1.8 V PFE 0              | 1827 mV                      |
| 1.8 V PFE 1              | 1775 mV                      |
| 1.8 V PFE 2              | 1788 mV                      |
| 1.8 V PFE 3              | 1798 mV                      |
| 1.2 V PFE 0              | 1250 mV                      |
| 1.2 V PFE 1              | 1234 mV                      |
| 1.2 V PFE 2              | 1231 mV                      |
| 1.2 V PFE 3              | 1192 mV                      |
| I2C Slave Revision       | 42                           |

**show chassis environment fpc (MX480 Router)**

```
user@host> show chassis environment fpc
```

```
FPC 1 status:
State                               Online
Temperature Intake                  36 degrees C / 96 degrees F
Temperature Exhaust A               41 degrees C / 105 degrees F
Temperature Exhaust B               55 degrees C / 131 degrees F
Temperature I3 0 TSensor            55 degrees C / 131 degrees F
Temperature I3 0 Chip               57 degrees C / 134 degrees F
Temperature I3 1 TSensor            53 degrees C / 127 degrees F
Temperature I3 1 Chip               53 degrees C / 127 degrees F
Temperature I3 2 TSensor            52 degrees C / 125 degrees F
Temperature I3 2 Chip               49 degrees C / 120 degrees F
Temperature I3 3 TSensor            47 degrees C / 116 degrees F
Temperature I3 3 Chip               47 degrees C / 116 degrees F
Temperature IA 0 TSensor            54 degrees C / 129 degrees F
Temperature IA 0 Chip               58 degrees C / 136 degrees F
Temperature IA 1 TSensor            48 degrees C / 118 degrees F
Temperature IA 1 Chip               53 degrees C / 127 degrees F
Power
  1.5 V                             1479 mV
  2.5 V                             2542 mV
  3.3 V                             3319 mV
  1.8 V PFE 0                       1811 mV
  1.8 V PFE 1                       1804 mV
  1.8 V PFE 2                       1804 mV
  1.8 V PFE 3                       1814 mV
  1.2 V PFE 0                       1192 mV
  1.2 V PFE 1                       1202 mV
  1.2 V PFE 2                       1205 mV
  1.2 V PFE 3                       1189 mV
I2C Slave Revision                  40
```

**show chassis environment fpc (MX960 Router MPC10E-15C-MRATE)**

```
user@router> show chassis environment fpc 8
```

```
FPC 8 status:
State                               Online
Temperature Intake                  37 degrees C / 98 degrees F
Temperature Exhaust A               50 degrees C / 122 degrees F
Temperature Exhaust B               56 degrees C / 132 degrees F
Temperature ZT0 Chip                83 degrees C / 181 degrees F
Temperature ZT1 Chip                80 degrees C / 176 degrees F
Temperature ZT2 Chip                81 degrees C / 177 degrees F
Temperature PCIE_SW Chip            64 degrees C / 147 degrees F
Temperature ZT0 TestMacro            73 degrees C / 163 degrees F
Temperature ZT0 hbmio_grp3          74 degrees C / 165 degrees F
```

|                            |                              |
|----------------------------|------------------------------|
| Temperature ZT0 hbmio_grp0 | 76 degrees C / 168 degrees F |
| Temperature ZT0 gumem1     | 78 degrees C / 172 degrees F |
| Temperature ZT0 llm        | 80 degrees C / 176 degrees F |
| Temperature ZT0 wanio_sd   | 78 degrees C / 172 degrees F |
| Temperature ZT0 fabio_sd   | 84 degrees C / 183 degrees F |
| Temperature ZT0 flexmem    | 84 degrees C / 183 degrees F |
| Temperature ZT1 TestMacro  | 70 degrees C / 158 degrees F |
| Temperature ZT1 hbmio_grp3 | 71 degrees C / 159 degrees F |
| Temperature ZT1 hbmio_grp0 | 74 degrees C / 165 degrees F |
| Temperature ZT1 gumem1     | 75 degrees C / 167 degrees F |
| Temperature ZT1 llm        | 78 degrees C / 172 degrees F |
| Temperature ZT1 wanio_sd   | 76 degrees C / 168 degrees F |
| Temperature ZT1 fabio_sd   | 78 degrees C / 172 degrees F |
| Temperature ZT1 flexmem    | 82 degrees C / 179 degrees F |
| Temperature ZT2 TestMacro  | 71 degrees C / 159 degrees F |
| Temperature ZT2 hbmio_grp3 | 72 degrees C / 161 degrees F |
| Temperature ZT2 hbmio_grp0 | 75 degrees C / 167 degrees F |
| Temperature ZT2 gumem1     | 76 degrees C / 168 degrees F |
| Temperature ZT2 llm        | 78 degrees C / 172 degrees F |
| Temperature ZT2 wanio_sd   | 78 degrees C / 172 degrees F |
| Temperature ZT2 fabio_sd   | 80 degrees C / 176 degrees F |
| Temperature ZT2 flexmem    | 76 degrees C / 168 degrees F |
| Temperature ZT0 HBMO       | 74 degrees C / 165 degrees F |
| Temperature ZT0 HBM1       | 74 degrees C / 165 degrees F |
| Temperature ZT1 HBMO       | 74 degrees C / 165 degrees F |
| Temperature ZT1 HBM1       | 75 degrees C / 167 degrees F |
| Temperature ZT2 HBMO       | 73 degrees C / 163 degrees F |
| Temperature ZT2 HBM1       | 73 degrees C / 163 degrees F |
| Temperature FAB RT1.0      | 73 degrees C / 163 degrees F |
| Temperature FAB RT2.0      | 75 degrees C / 167 degrees F |

|                                      |                              |
|--------------------------------------|------------------------------|
| Temperature FAB RT3.0                | 73 degrees C / 163 degrees F |
| Temperature FAB RT4.0                | 70 degrees C / 158 degrees F |
| Temperature FAB RT5.0                | 67 degrees C / 152 degrees F |
| Temperature FAB RT6.0                | 67 degrees C / 152 degrees F |
| Temperature FAB RT7.0                | 65 degrees C / 149 degrees F |
| Temperature FAB RT8.0                | 66 degrees C / 150 degrees F |
| Temperature WAN RT9.0                | 64 degrees C / 147 degrees F |
| Temperature WAN RT9.1                | 62 degrees C / 143 degrees F |
| Temperature WAN RT10.0               | 65 degrees C / 149 degrees F |
| Temperature WAN RT10.1               | 63 degrees C / 145 degrees F |
| Temperature WAN RT11.0               | 51 degrees C / 123 degrees F |
| Temperature WAN RT11.1               | 49 degrees C / 120 degrees F |
| Temperature PIM4820 T1               | 72 degrees C / 161 degrees F |
| Temperature BMR456-12V-BRICK-A T1    | 83 degrees C / 181 degrees F |
| Temperature BMR456-12V-BRICK-B T1    | 91 degrees C / 195 degrees F |
| Temperature MAX20730-ZT0-AVDDH T1    | 72 degrees C / 161 degrees F |
| Temperature MAX20730-ZT0-HBM-VDDQ T1 | 64 degrees C / 147 degrees F |
| Temperature MAX20730-ZT0-HBM-VDDC T1 | 65 degrees C / 149 degrees F |
| Temperature MAX20730-ZT1-AVDDH T1    | 65 degrees C / 149 degrees F |
| Temperature MAX20730-ZT1-HBM-VDDQ T1 | 60 degrees C / 140 degrees F |
| Temperature MAX20730-ZT1-HBM-VDDC T1 | 57 degrees C / 134 degrees F |
| Temperature MAX20730-ZT2-AVDDH T1    | 65 degrees C / 149 degrees F |
| Temperature MAX20730-ZT2-HBM-VDDQ T1 | 58 degrees C / 136 degrees F |
| Temperature MAX20730-ZT2-HBM-VDDC T1 | 55 degrees C / 131 degrees F |
| Temperature CPU0_PMB                 | 61 degrees C / 141 degrees F |
| Temperature CPU7_PMB                 | 61 degrees C / 141 degrees F |
| Temperature DDR4 A                   | 38 degrees C / 100 degrees F |
| Temperature DDR4 B                   | 37 degrees C / 98 degrees F  |
| Power                                |                              |
| PIM4820                              | 56967 mV                     |
| BMR456-12V-BRICK-A                   | 12016 mV                     |
| BMR456-12V-BRICK-B                   | 12039 mV                     |

|                       |         |
|-----------------------|---------|
| MAX20743-RT01-DVDD    | 724 mV  |
| MAX20743-RT234-DVDD   | 724 mV  |
| MAX20743-RT567-DVDD   | 724 mV  |
| MAX20754-ZT0-VDD      | 750 mV  |
| MAX20754-ZT0-VDDM     | 799 mV  |
| MAX20743-ZT0-AVDD     | 904 mV  |
| MAX20730-ZT0-AVDDH    | 1103 mV |
| MAX20730-ZT0-HBM-VDDQ | 1198 mV |
| MAX20730-ZT0-HBM-VDDC | 1202 mV |
| MAX20730-VDD-1V25     | 1246 mV |
| MAX20754-ZT1-VDD      | 724 mV  |
| MAX20754-ZT1-VDDM     | 800 mV  |
| MAX20743-ZT1-AVDD     | 904 mV  |
| MAX20730-ZT1-AVDDH    | 1103 mV |
| MAX20730-ZT1-HBM-VDDQ | 1202 mV |
| MAX20730-ZT1-HBM-VDDC | 1198 mV |
| MAX20730-PCIE-0V9     | 901 mV  |
| MAX20754-ZT2-VDD      | 724 mV  |
| MAX20754-ZT2-VDDM     | 799 mV  |
| MAX20743-ZT2-AVDD     | 904 mV  |
| MAX20730-ZT2-AVDDH    | 1103 mV |
| MAX20730-ZT2-HBM-VDDQ | 1198 mV |
| MAX20730-ZT2-HBM-VDDC | 1198 mV |
| MAX20730-VDD3V3       | 3308 mV |
| MAX20754-WAN-VDD3V3   | 3301 mV |
| MAX20754-WAN-DVDD0V8  | 799 mV  |
| MAX20743-WAN-VDD1V0A  | 1003 mV |
| MAX20743-WAN-AVDD0V8  | 800 mV  |
| MAX20743-WAN-VDD1V0C  | 1003 mV |
| TPS53631-1V2-VDDQ-PMB | 1225 mV |
| TPS53641-VCCIN-PMB    | 1770 mV |
| TPS53641-VCCSBUS-PMB  | 1040 mV |
| MAX20730-BIAS3P30-PMB | 3308 mV |
| MAX20730-BIAS5P0-PMB  | 5063 mV |
| MAX20730-VPP-V2P5-PMB | 2503 mV |
| MAX20730-VDD1V2       | 1195 mV |
| MAX20730-VDD1V5       | 1496 mV |
| MAX20730-VDD1V8       | 1799 mV |
| MAX20730-VDD2V5       | 2511 mV |
| MAX20754-RT-AVDD-0V8  | 800 mV  |
| MAX20743-XGE-VDD-AVS  | 1012 mV |
| PMB VCC1P05_PCH_SW    | 1048 mV |
| PMB VCC1P3            | 1294 mV |
| PMB VCC1P5            | 1485 mV |
| PMB VCC1P7            | 1705 mV |
| PMB DDR4_VPP          | 2519 mV |
| PMB VCC3P3            | 3336 mV |
| PMB VCC3P3_PCH        | 3332 mV |
| I2C Slave Revision    | 124     |

### show chassis environment fpc (MX960 Router)

```
user@host> show chassis environment fpc
```

```
FPC 5 status:
```

|                          |                              |
|--------------------------|------------------------------|
| State                    | Online                       |
| Temperature Intake       | 27 degrees C / 80 degrees F  |
| Temperature Exhaust A    | 34 degrees C / 93 degrees F  |
| Temperature Exhaust B    | 40 degrees C / 104 degrees F |
| Temperature I3 0 TSensor | 39 degrees C / 102 degrees F |

```

Temperature I3 0 Chip      41 degrees C / 105 degrees F
Temperature I3 1 TSensor   38 degrees C / 100 degrees F
Temperature I3 1 Chip      37 degrees C / 98 degrees F
Temperature I3 2 TSensor   37 degrees C / 98 degrees F
Temperature I3 2 Chip      34 degrees C / 93 degrees F
Temperature I3 3 TSensor   32 degrees C / 89 degrees F
Temperature I3 3 Chip      33 degrees C / 91 degrees F
Temperature IA 0 TSensor   39 degrees C / 102 degrees F
Temperature IA 0 Chip      44 degrees C / 111 degrees F
Temperature IA 1 TSensor   36 degrees C / 96 degrees F
Temperature IA 1 Chip      44 degrees C / 111 degrees F
Power
  1.5 V                    1479 mV
  2.5 V                    2523 mV
  3.3 V                    3254 mV
  1.8 V PFE 0              1798 mV
  1.8 V PFE 1              1798 mV
  1.8 V PFE 2              1807 mV
  1.8 V PFE 3              1791 mV
  1.2 V PFE 0              1173 mV
  1.2 V PFE 1              1179 mV
  1.2 V PFE 2              1179 mV
  1.2 V PFE 3              1185 mV
I2C Slave Revision        6
FPC 6 status:
State                      Online
Temperature Intake          25 degrees C / 77 degrees F
Temperature Exhaust A       38 degrees C / 100 degrees F
Temperature Exhaust B       38 degrees C / 100 degrees F
Temperature I3 0 TSensor    40 degrees C / 104 degrees F
Temperature I3 0 Chip       40 degrees C / 104 degrees F
Temperature I3 1 TSensor    40 degrees C / 104 degrees F
Temperature I3 1 Chip       38 degrees C / 100 degrees F
Temperature I3 2 TSensor    37 degrees C / 98 degrees F
Temperature I3 2 Chip       32 degrees C / 89 degrees F
Temperature I3 3 TSensor    34 degrees C / 93 degrees F
Temperature I3 3 Chip       33 degrees C / 91 degrees F
Temperature IA 0 TSensor    45 degrees C / 113 degrees F
Temperature IA 0 Chip       47 degrees C / 116 degrees F
Temperature IA 1 TSensor    37 degrees C / 98 degrees F
Temperature IA 1 Chip       42 degrees C / 107 degrees F
Power
  1.5 V                    1485 mV
  2.5 V                    2510 mV
  3.3 V                    3332 mV
  1.8 V PFE 0              1801 mV
  1.8 V PFE 1              1814 mV
  1.8 V PFE 2              1804 mV
  1.8 V PFE 3              1820 mV
  1.2 V PFE 0              1192 mV
  1.2 V PFE 1              1189 mV
  1.2 V PFE 2              1202 mV
  1.2 V PFE 3              1156 mV
I2C Slave Revision        40

```

### show chassis environment fpc (MX480 Router with 100-Gigabit Ethernet CFP)

```
user@host> show chassis environment fpc
```

## FPC 0 status:

|                            |                              |
|----------------------------|------------------------------|
| State                      | Online                       |
| Temperature Intake         | 32 degrees C / 89 degrees F  |
| Temperature Exhaust A      | 39 degrees C / 102 degrees F |
| Temperature Exhaust B      | 37 degrees C / 98 degrees F  |
| Temperature QX 0 TSen      | 44 degrees C / 111 degrees F |
| Temperature QX 0 Chip      | 48 degrees C / 118 degrees F |
| Temperature LU 0 TCAM TSen | 44 degrees C / 111 degrees F |
| Temperature LU 0 TCAM Chip | 47 degrees C / 116 degrees F |
| Temperature LU 0 TSen      | 44 degrees C / 111 degrees F |
| Temperature LU 0 Chip      | 48 degrees C / 118 degrees F |
| Temperature MQ 0 TSen      | 44 degrees C / 111 degrees F |
| Temperature MQ 0 Chip      | 47 degrees C / 116 degrees F |
| Power                      |                              |
| MPC-BIAS3V3-z12105         | 3297 mV                      |
| MPC-VDD3V3-z12105          | 3306 mV                      |
| MPC-VDD2V5-z12105          | 2498 mV                      |
| MPC-TCAM_1V0-z12004        | 999 mV                       |
| MPC-AVDD1V0-z12006         | 999 mV                       |
| MPC-VDD1V8-z12006          | 1796 mV                      |
| MPC-PCIE_1V0-z12006        | 1002 mV                      |
| MPC-LU0_1V0-z12004         | 997 mV                       |
| MPC-MQ0_1V0-z12004         | 995 mV                       |
| MPC-VDD_1V5-z12004         | 1496 mV                      |
| MPC-PMB_1V1-z12006         | 1094 mV                      |
| MPC-9VA-BMR453             | 9054 mV                      |
| MPC-9VB-BMR453             | 9037 mV                      |
| MPC-PMB_1V2-z12106         | 1191 mV                      |
| MPC-QXM0_1V0-z12006        | 1000 mV                      |
| I2C Slave Revision         | 66                           |

## FPC 1 status:

|                       |                              |
|-----------------------|------------------------------|
| State                 | Online                       |
| Temperature Intake    | 35 degrees C / 95 degrees F  |
| Temperature Exhaust A | 50 degrees C / 122 degrees F |
| Temperature Exhaust B | 56 degrees C / 132 degrees F |
| Temperature LU 0 TSen | 46 degrees C / 114 degrees F |
| Temperature LU 0 Chip | 59 degrees C / 138 degrees F |
| Temperature LU 1 TSen | 46 degrees C / 114 degrees F |
| Temperature LU 1 Chip | 45 degrees C / 113 degrees F |
| Temperature LU 2 TSen | 46 degrees C / 114 degrees F |
| Temperature LU 2 Chip | 60 degrees C / 140 degrees F |
| Temperature LU 3 TSen | 46 degrees C / 114 degrees F |
| Temperature LU 3 Chip | 71 degrees C / 159 degrees F |
| Temperature XM 0 TSen | 46 degrees C / 114 degrees F |
| Temperature XM 0 Chip | -18 degrees C / 0 degrees F  |
| Temperature XF 0 TSen | 46 degrees C / 114 degrees F |
| Temperature XF 0 Chip | 76 degrees C / 168 degrees F |
| Power                 |                              |
| MPC-BIAS3V3-z12105    | 3292 mV                      |
| MPC-VDD3V3-z16100     | 3303 mV                      |
| MPC-VDD2V5-z16100     | 2501 mV                      |
| MPC-VDD1V8-z12004     | 1801 mV                      |
| MPC-AVDD1V0-z12006    | 996 mV                       |
| MPC-VDD1V2-z16100     | 1199 mV                      |
| MPC-VDD1V5A-z12004    | 1493 mV                      |
| MPC-VDD1V5B-z12004    | 1498 mV                      |
| MPC-XF_0V9-z12006     | 996 mV                       |
| MPC-PCIE_1V0-z16100   | 1000 mV                      |
| MPC-LU0_1V0-z12004    | 994 mV                       |
| MPC-LU1_1V0-z12004    | 994 mV                       |

```

MPC-LU2_1V0-z12004      992 mV
MPC-LU3_1V0-z12004      993 mV
MPC-12VA-BMR453         12003 mV
MPC-12VB-BMR453         12043 mV
MPC-PMB_1V1-z12006      1091 mV
MPC-PMB_1V2-z12106      1196 mV
MPC-XM_0V9-vt273m       899 mV
I2C Slave Revision      106

```

### show chassis environment fpc (MX240, MX480, MX960 with Application Services Modular Line Card)

```
user@host>show chassis environment fpc 1
```

```

FPC 1 status:
State                               Online
Temperature Intake                  36 degrees C / 96 degrees F
Temperature Exhaust A               39 degrees C / 102 degrees F
Temperature LU TSen                 52 degrees C / 125 degrees F
Temperature LU Chip                 54 degrees C / 129 degrees F
Temperature XM TSen                 52 degrees C / 125 degrees F
Temperature XM Chip                 60 degrees C / 140 degrees F
Temperature PCIE TSen               52 degrees C / 125 degrees F
Temperature PCIE Chip               69 degrees C / 156 degrees F
Power
MPC-BIAS3V3-z12106                 3302 mV
MPC-VDD3V3-z16100                  3325 mV
MPC-AVDD1V0-z16100                 1007 mV
MPC-PCIE_1V0-z16100                904 mV
MPC-LU0_1V0-z12004                 996 mV
MPC-VDD_1V5-z12004                 1498 mV
MPC-12VA-BMR453                    11733 mV
MPC-12VB-BMR453                    11728 mV
MPC-XM_0V9-vt273m                  900 mV
I2C Slave Revision                  81

```

### show chassis environment fpc (MX10003 Router)

```
user@host> show chassis environment fpc
```

```

FPC 0 status:
State                               Online
FPC 0 Intake Temp Sensor           29 degrees C / 84 degrees F
FPC 0 Exhaust-A Temp Sensor        56 degrees C / 132 degrees F
FPC 0 Exhaust-B Temp Sensor        44 degrees C / 111 degrees F
FPC 0 EA0 Chip                     58 degrees C / 136 degrees F
FPC 0 EA0-XR0 Chip                  61 degrees C / 141 degrees F
FPC 0 EA0-XR1 Chip                  62 degrees C / 143 degrees F
FPC 0 EA1 Chip                      67 degrees C / 152 degrees F
FPC 0 EA1-XR0 Chip                  72 degrees C / 161 degrees F
FPC 0 EA1-XR1 Chip                  72 degrees C / 161 degrees F
FPC 0 PEX Chip                      77 degrees C / 170 degrees F
FPC 0 EA2 Chip                      48 degrees C / 118 degrees F
FPC 0 EA2-XR0 Chip                  54 degrees C / 129 degrees F
FPC 0 EA2-XR1 Chip                  56 degrees C / 132 degrees F
FPC 0 PF Chip                       68 degrees C / 154 degrees F
FPC 0 EA0_HMC0 Logic die            72 degrees C / 161 degrees F
FPC 0 EA0_HMC0 DRAM botm           69 degrees C / 156 degrees F
FPC 0 EA0_HMC1 Logic die            71 degrees C / 159 degrees F

```



```

FPC 0 EA0_HMC1 DRAM botm 68 degrees C / 154 degrees F
FPC 0 EA0_HMC2 Logic die 75 degrees C / 167 degrees F
FPC 0 EA0_HMC2 DRAM botm 72 degrees C / 161 degrees F
FPC 0 EA1_HMC0 Logic die 81 degrees C / 177 degrees F
FPC 0 EA1_HMC0 DRAM botm 78 degrees C / 172 degrees F
FPC 0 EA1_HMC1 Logic die 80 degrees C / 176 degrees F
FPC 0 EA1_HMC1 DRAM botm 77 degrees C / 170 degrees F
FPC 0 EA1_HMC2 Logic die 82 degrees C / 179 degrees F
FPC 0 EA1_HMC2 DRAM botm 79 degrees C / 174 degrees F
FPC 0 EA2_HMC0 Logic die 60 degrees C / 140 degrees F
FPC 0 EA2_HMC0 DRAM botm 57 degrees C / 134 degrees F
FPC 0 EA2_HMC1 Logic die 61 degrees C / 141 degrees F
FPC 0 EA2_HMC1 DRAM botm 58 degrees C / 136 degrees F
FPC 0 EA2_HMC2 Logic die 63 degrees C / 145 degrees F
FPC 0 EA2_HMC2 DRAM botm 60 degrees C / 140 degrees F
Power
LTC3887-PF-VDD0V9-RAIL 898 mV
LTC3887-PF-VDD0V9-DEV0- 898 mV
LTC3887-PF-VDD0V9-DEV0- 900 mV
LTC3887-PF-VDD0V9-DEV1- 899 mV
LTC3887-PF-VDD0V9-DEV1- 901 mV
LTC3887-PF-AVDD1V0-RAIL 998 mV
LTC3887-PF-AVDD1V0-CH0 998 mV
LTC3887-PF-AVDD1V0-CH1 999 mV
LTC3887-ETHSW-VDD1V0 1000 mV
LTC3887-VDD2V5 2499 mV
LTC3887-PCIE-VDD0V9 899 mV
LTC3887-V1P0 999 mV
LTC3887-PHY-VDD1V0-A 999 mV
LTC3887-3V3 3300 mV
LTC3887-VDD1V8 1799 mV
UCD9090_0-CH_1-EA0_PLL_ 1005 mV
UCD9090_0-CH_2-EA0_1V4 1049 mV
UCD9090_0-CH_3-EA0_2V5 2499 mV
UCD9090_0-CH_4-EA0_1V5 1499 mV
UCD9090_0-CH_5-EA1_PLL_ 999 mV
UCD9090_0-CH_6-EA1_1V4 1037 mV
UCD9090_0-CH_7-EA1_2V5 2499 mV
UCD9090_0-CH_8-EA1_1V5 1510 mV
UCD9090_0-CH_9-PVCC 797 mV
UCD9090_0-CH_10-PVNN 991 mV
UCD9090_1-CH_1-EA2_PLL_ 1008 mV
UCD9090_1-CH_2-EA2_1V4 1009 mV
UCD9090_1-CH_3-EA2_2V5 2499 mV
UCD9090_1-CH_4-EA2_1V5 1513 mV
UCD9090_1-CH_5-1V0_PFP 1009 mV
UCD9090_1-CH_6-V1P1 1075 mV
UCD9090_1-CH_7-V1P5 1531 mV
UCD9090_1-CH_8-V1P35 1359 mV
UCD9090_1-CH_9-VDD1V5 1511 mV
UCD9090_1-CH_10-VDD1V2 1210 mV
LTC3887-EA0-VDD0V9-RAIL 949 mV
LTC3887-EA0-VDD0V9-DEV0 949 mV
LTC3887-EA0-VDD0V9-DEV0 951 mV
LTC3887-EA0-VDD0V9-DEV1 949 mV
LTC3887-EA0-VDD0V9-DEV1 951 mV
LTC3887-EA0-VDD0V9R2-RA 947 mV
LTC3887-EA0-VDD0V9R2-CH 947 mV
LTC3887-EA0-VDD0V9R2-CH 949 mV
LTC3887-EA0-VDD1V0-RAIL 999 mV

```

```

LTC3887-EA0-VDD1V0-CH0      999 mV
LTC3887-EA0-VDD1V0-CH1      1001 mV
LTC3887-EA0-XR-VDD0V9        900 mV
LTC3887-EA0-XR-VDD1V2        1199 mV
LTC3887-EA0-HM1-VDD0V9        899 mV
LTC3887-EA0-HM-VDD1V2        1200 mV
LTC3887-EA0-HM-VDDM1V2        1199 mV
LTC3887-EA1-VDD0V9-RAIL       949 mV
LTC3887-EA1-VDD0V9-DEV0       952 mV
LTC3887-EA1-VDD0V9-DEV0       952 mV
LTC3887-EA1-VDD0V9-DEV1       951 mV
LTC3887-EA1-VDD0V9-DEV1       951 mV
LTC3887-EA1-VDD0V9R2-RA       948 mV
LTC3887-EA1-VDD0V9R2-CH       948 mV
LTC3887-EA1-VDD0V9R2-CH       950 mV
LTC3887-EA1-VDD1V0-RAIL       1000 mV
LTC3887-EA1-VDD1V0-CH0        1000 mV
LTC3887-EA1-VDD1V0-CH1        1001 mV
I2C Slave Revision            13
FPC 1 status:
State                           Online
FPC 1 Intake Temp Sensor        27 degrees C / 80 degrees F
FPC 1 Exhaust-A Temp Sensor     60 degrees C / 140 degrees F
FPC 1 Exhaust-B Temp Sensor     46 degrees C / 114 degrees F
FPC 1 EA0 Chip                   63 degrees C / 145 degrees F
FPC 1 EA0-XR0 Chip               67 degrees C / 152 degrees F
FPC 1 EA0-XR1 Chip               68 degrees C / 154 degrees F
FPC 1 EA1 Chip                   70 degrees C / 158 degrees F
FPC 1 EA1-XR0 Chip               75 degrees C / 167 degrees F
FPC 1 EA1-XR1 Chip               75 degrees C / 167 degrees F
FPC 1 PEX Chip                   89 degrees C / 192 degrees F
FPC 1 EA2 Chip                   49 degrees C / 120 degrees F
FPC 1 EA2-XR0 Chip               53 degrees C / 127 degrees F
FPC 1 EA2-XR1 Chip               56 degrees C / 132 degrees F
FPC 1 PF Chip                    71 degrees C / 159 degrees F
FPC 1 EA0_HMC0 Logic die         74 degrees C / 165 degrees F
FPC 1 EA0_HMC0 DRAM botm        71 degrees C / 159 degrees F
FPC 1 EA0_HMC1 Logic die         78 degrees C / 172 degrees F
FPC 1 EA0_HMC1 DRAM botm        75 degrees C / 167 degrees F
FPC 1 EA0_HMC2 Logic die         78 degrees C / 172 degrees F
FPC 1 EA0_HMC2 DRAM botm        75 degrees C / 167 degrees F
FPC 1 EA1_HMC0 Logic die         84 degrees C / 183 degrees F
FPC 1 EA1_HMC0 DRAM botm        81 degrees C / 177 degrees F
FPC 1 EA1_HMC1 Logic die         82 degrees C / 179 degrees F
FPC 1 EA1_HMC1 DRAM botm        79 degrees C / 174 degrees F
FPC 1 EA1_HMC2 Logic die         85 degrees C / 185 degrees F
FPC 1 EA1_HMC2 DRAM botm        82 degrees C / 179 degrees F
FPC 1 EA2_HMC0 Logic die         62 degrees C / 143 degrees F
FPC 1 EA2_HMC0 DRAM botm        59 degrees C / 138 degrees F
FPC 1 EA2_HMC1 Logic die         60 degrees C / 140 degrees F
FPC 1 EA2_HMC1 DRAM botm        57 degrees C / 134 degrees F
FPC 1 EA2_HMC2 Logic die         65 degrees C / 149 degrees F
FPC 1 EA2_HMC2 DRAM botm        62 degrees C / 143 degrees F
Power
LTC3887-PF-VDD0V9-RAIL         899 mV
LTC3887-PF-VDD0V9-DEV0         899 mV
LTC3887-PF-VDD0V9-DEV0         901 mV
LTC3887-PF-VDD0V9-DEV1         899 mV
LTC3887-PF-VDD0V9-DEV1         901 mV
LTC3887-PF-AVDD1V0-RAIL        998 mV

```

|                          |         |
|--------------------------|---------|
| LTC3887-PF-AVDD1V0-CH0   | 998 mV  |
| LTC3887-PF-AVDD1V0-CH1   | 999 mV  |
| LTC3887-ETHSW-VDD1V0     | 999 mV  |
| LTC3887-VDD2V5           | 2499 mV |
| LTC3887-PCIE-VDD0V9      | 900 mV  |
| LTC3887-V1P0             | 1000 mV |
| LTC3887-PHY-VDD1V0-A     | 1000 mV |
| LTC3887-3V3              | 3300 mV |
| LTC3887-VDD1V8           | 1799 mV |
| UCD9090_0-CH_1-EA0_PLL_  | 1004 mV |
| UCD9090_0-CH_2-EA0_1V4   | 1004 mV |
| UCD9090_0-CH_3-EA0_2V5   | 2499 mV |
| UCD9090_0-CH_4-EA0_1V5   | 1511 mV |
| UCD9090_0-CH_5-EA1_PLL_  | 999 mV  |
| UCD9090_0-CH_6-EA1_1V4   | 1008 mV |
| UCD9090_0-CH_7-EA1_2V5   | 2499 mV |
| UCD9090_0-CH_8-EA1_1V5   | 1510 mV |
| UCD9090_0-CH_9-PVCC      | 839 mV  |
| UCD9090_0-CH_10-PVNN     | 1016 mV |
| UCD9090_1-CH_1-EA2_PLL_  | 1011 mV |
| UCD9090_1-CH_2-EA2_1V4   | 1046 mV |
| UCD9090_1-CH_3-EA2_2V5   | 2499 mV |
| UCD9090_1-CH_4-EA2_1V5   | 1501 mV |
| UCD9090_1-CH_5-1V0_PFP_L | 1000 mV |
| UCD9090_1-CH_6-V1P1      | 1037 mV |
| UCD9090_1-CH_7-V1P5      | 1530 mV |
| UCD9090_1-CH_8-V1P35     | 1360 mV |
| UCD9090_1-CH_9-VDD1V5    | 1513 mV |
| UCD9090_1-CH_10-VDD1V2   | 1217 mV |
| LTC3887-EA0-VDD0V9-RAIL  | 949 mV  |
| LTC3887-EA0-VDD0V9-DEV0  | 949 mV  |
| LTC3887-EA0-VDD0V9-DEV0  | 951 mV  |
| LTC3887-EA0-VDD0V9-DEV1  | 949 mV  |
| LTC3887-EA0-VDD0V9-DEV1  | 952 mV  |
| LTC3887-EA0-VDD0V9R2-RA  | 947 mV  |
| LTC3887-EA0-VDD0V9R2-CH  | 947 mV  |
| LTC3887-EA0-VDD0V9R2-CH  | 949 mV  |
| LTC3887-EA0-VDD1V0-RAIL  | 1000 mV |
| LTC3887-EA0-VDD1V0-CH0   | 1000 mV |
| LTC3887-EA0-VDD1V0-CH1   | 1001 mV |
| LTC3887-EA0-XR-VDD0V9    | 899 mV  |
| LTC3887-EA0-XR-VDD1V2    | 1200 mV |
| LTC3887-EA0-HM1-VDD0V9   | 899 mV  |
| LTC3887-EA0-HM-VDD1V2    | 1199 mV |
| LTC3887-EA0-HM-VDDM1V2   | 1199 mV |
| LTC3887-EA1-VDD0V9-RAIL  | 948 mV  |
| LTC3887-EA1-VDD0V9-DEV0  | 950 mV  |
| LTC3887-EA1-VDD0V9-DEV0  | 950 mV  |
| LTC3887-EA1-VDD0V9-DEV1  | 951 mV  |
| LTC3887-EA1-VDD0V9-DEV1  | 951 mV  |
| LTC3887-EA1-VDD0V9R2-RA  | 947 mV  |
| LTC3887-EA1-VDD0V9R2-CH  | 947 mV  |
| LTC3887-EA1-VDD0V9R2-CH  | 949 mV  |
| LTC3887-EA1-VDD1V0-RAIL  | 1000 mV |
| LTC3887-EA1-VDD1V0-CH0   | 1000 mV |
| LTC3887-EA1-VDD1V0-CH1   | 1002 mV |
| I2C Slave Revision       | 99      |

**show chassis environment fpc (MX204 Router)**

```
user@host> show chassis environment fpc
```

```
FPC 0 status:
State                               Online
FPC 0 EA0_HMC0 Logic die           77 degrees C / 170 degrees F
FPC 0 EA0_HMC0 DRAM botm           74 degrees C / 165 degrees F
FPC 0 EA0_HMC1 Logic die           80 degrees C / 176 degrees F
FPC 0 EA0_HMC1 DRAM botm           77 degrees C / 170 degrees F
FPC 0 EA0 Chip                      93 degrees C / 199 degrees F
FPC 0 EA0-XR0 Chip                  63 degrees C / 145 degrees F
FPC 0 EA0-XR1 Chip                  64 degrees C / 147 degrees F
Power
I2C Slave Revision                 0
```

**show chassis environment fpc (MX10008 Router)**

```
user@host> show chassis environment fpc
```

```
FPC 0 status:
State                               Online
FPC 0 Intake-A Temp Sensor          32 degrees C / 89 degrees F
FPC 0 Exhaust-A Temp Sensor         44 degrees C / 111 degrees F
FPC 0 Exhaust-B Temp Sensor         50 degrees C / 122 degrees F
FPC 0 EA0 Temp Sensor               67 degrees C / 152 degrees F
FPC 0 EA0_XR0 Temp Sensor           69 degrees C / 156 degrees F
FPC 0 EA0_XR1 Temp Sensor           73 degrees C / 163 degrees F
FPC 0 EA1 Temp Sensor               61 degrees C / 141 degrees F
FPC 0 EA1_XR0 Temp Sensor           65 degrees C / 149 degrees F
FPC 0 EA1_XR1 Temp Sensor           63 degrees C / 145 degrees F
FPC 0 EA2 Temp Sensor               69 degrees C / 156 degrees F
FPC 0 EA2_XR0 Temp Sensor           73 degrees C / 163 degrees F
FPC 0 EA2_XR1 Temp Sensor           72 degrees C / 161 degrees F
FPC 0 EA3 Temp Sensor               64 degrees C / 147 degrees F
FPC 0 EA3_XR0 Temp Sensor           66 degrees C / 150 degrees F
FPC 0 EA3_XR1 Temp Sensor           66 degrees C / 150 degrees F
FPC 0 EA4 Temp Sensor               70 degrees C / 158 degrees F
FPC 0 EA4_XR0 Temp Sensor           72 degrees C / 161 degrees F
FPC 0 EA4_XR1 Temp Sensor           72 degrees C / 161 degrees F
FPC 0 EA5 Temp Sensor               58 degrees C / 136 degrees F
FPC 0 EA5_XR0 Temp Sensor           61 degrees C / 141 degrees F
FPC 0 EA5_XR1 Temp Sensor           64 degrees C / 147 degrees F
FPC 0 EA0_HMC0 Logic die            75 degrees C / 167 degrees F
FPC 0 EA0_HMC0 DRAM botm            72 degrees C / 161 degrees F
FPC 0 EA0_HMC1 Logic die            76 degrees C / 168 degrees F
FPC 0 EA0_HMC1 DRAM botm            73 degrees C / 163 degrees F
FPC 0 EA0_HMC2 Logic die            77 degrees C / 170 degrees F
FPC 0 EA0_HMC2 DRAM botm            74 degrees C / 165 degrees F
FPC 0 EA1_HMC0 Logic die            72 degrees C / 161 degrees F
FPC 0 EA1_HMC0 DRAM botm            69 degrees C / 156 degrees F
FPC 0 EA1_HMC1 Logic die            73 degrees C / 163 degrees F
FPC 0 EA1_HMC1 DRAM botm            70 degrees C / 158 degrees F
FPC 0 EA1_HMC2 Logic die            72 degrees C / 161 degrees F
FPC 0 EA1_HMC2 DRAM botm            69 degrees C / 156 degrees F
FPC 0 EA2_HMC0 Logic die            80 degrees C / 176 degrees F
FPC 0 EA2_HMC0 DRAM botm            77 degrees C / 170 degrees F
FPC 0 EA2_HMC1 Logic die            81 degrees C / 177 degrees F
```

```

FPC 0 EA2_HMC1 DRAM botm      78 degrees C / 172 degrees F
FPC 0 EA2_HMC2 Logic die      80 degrees C / 176 degrees F
FPC 0 EA2_HMC2 DRAM botm      77 degrees C / 170 degrees F
FPC 0 EA3_HMC0 Logic die      77 degrees C / 170 degrees F
FPC 0 EA3_HMC0 DRAM botm      74 degrees C / 165 degrees F
FPC 0 EA3_HMC1 Logic die      78 degrees C / 172 degrees F
FPC 0 EA3_HMC1 DRAM botm      75 degrees C / 167 degrees F
FPC 0 EA3_HMC2 Logic die      77 degrees C / 170 degrees F
FPC 0 EA3_HMC2 DRAM botm      74 degrees C / 165 degrees F
FPC 0 EA4_HMC0 Logic die      80 degrees C / 176 degrees F
FPC 0 EA4_HMC0 DRAM botm      77 degrees C / 170 degrees F
FPC 0 EA4_HMC1 Logic die      81 degrees C / 177 degrees F
FPC 0 EA4_HMC1 DRAM botm      78 degrees C / 172 degrees F
FPC 0 EA4_HMC2 Logic die      80 degrees C / 176 degrees F
FPC 0 EA4_HMC2 DRAM botm      77 degrees C / 170 degrees F
FPC 0 EA5_HMC0 Logic die      69 degrees C / 156 degrees F
FPC 0 EA5_HMC0 DRAM botm      66 degrees C / 150 degrees F
FPC 0 EA5_HMC1 Logic die      68 degrees C / 154 degrees F
FPC 0 EA5_HMC1 DRAM botm      65 degrees C / 149 degrees F
FPC 0 EA5_HMC2 Logic die      68 degrees C / 154 degrees F
FPC 0 EA5_HMC2 DRAM botm      65 degrees C / 149 degrees F
Power
  12V SS 1      12259 mV      9841 mA      120642 mW
  12V SS 2      12259 mV      21054 mA      258104 mW
  12V SS 3      12285 mV      9841 mA      120902 mW
  12V SS 4      12232 mV      20968 mA      256496 mW
  12V SS 5      12179 mV      14993 mA      182614 mW
  VDD 1.0V_A    1000 mV      95375 mA      95375 mW
  VDD 1.0V_B      0 mV      0 mA      0 mW
  VDD 3.3V      3298 mV      12500 mA      41235 mW
  VDD 0.9V      894 mV      3569 mA      3192 mW
  ETH SW 1V      980 mV      4500 mA      4410 mW
  VDD 1.8V      1809 mV      895 mA      1619 mW
  PVCC          951 mV      0 mA      0 mW
  PVNN          1009 mV      0 mA      0 mW
  V1P0          1006 mV      0 mA      0 mW
  V1P1          1070 mV      0 mA      0 mW
  V1P3          1351 mV      0 mA      0 mW
  VDDQ          1500 mV      0 mA      0 mW
  V1P8          1816 mV      0 mA      0 mW
  VDD3V3        3296 mV      0 mA      0 mW
  V5V0_BIAS      5025 mV      0 mA      0 mW
  VDD12V0       12174 mV      0 mA      0 mW
  EA0 Core 0.9V    900 mV      40625 mA      36578 mW
  EA0 AVDD 1.0V   1000 mV      32500 mA      32500 mW
  EA0 HMC Core 0.9V 894 mV      10081 mA      9017 mW
  EA0 1.2V       1189 mV      15081 mA      17945 mW
  EA01_HMC_VDDM 1.2V 1193 mV      -151 mA      -180 mW
  EA0_XR 0.906V   905 mV      13802 mA      12496 mW
  EA1 Core 0.9V    900 mV      41000 mA      36916 mW
  EA1 AVDD 1.0V   1000 mV      28000 mA      28000 mW
  EA1 HMC Core 0.9V 897 mV      9848 mA      8835 mW
  EA1 1.2V       1197 mV      15313 mA      18332 mW
  EA0_PLL_1V0     1003 mV      0 mA      0 mW
  EA0_1V04        1032 mV      0 mA      0 mW
  EA0_2V5         2445 mV      0 mA      0 mW
  EA0_1V5         1512 mV      0 mA      0 mW
  EA1_PLL_1V0     1000 mV      0 mA      0 mW
  EA1_1V04        1051 mV      0 mA      0 mW
  EA1_2V5         2516 mV      0 mA      0 mW

```

|                    |         |          |          |
|--------------------|---------|----------|----------|
| EA1_1V5            | 1503 mV | 0 mA     | 0 mW     |
| EA1_XR 0.906V      | 908 mV  | 14151 mA | 12850 mW |
| EA2 Core 0.9V      | 899 mV  | 40625 mA | 36538 mW |
| EA2 AVDD 1.0V      | 1000 mV | 27250 mA | 27276 mW |
| EA2 HMC Core 0.9V  | 897 mV  | 9616 mA  | 8627 mW  |
| EA2 1.2V           | 1193 mV | 15779 mA | 18832 mW |
| EA23_HMC_VDDM 1.2V | 1197 mV | 81 mA    | 97 mW    |
| EA2_XR 0.906V      | 908 mV  | 14848 mA | 13484 mW |
| EA3 Core 0.9V      | 899 mV  | 40625 mA | 36538 mW |
| EA3 AVDD 1.0V      | 1000 mV | 28000 mA | 28000 mW |
| EA3 HMC Core 0.9V  | 897 mV  | 10546 mA | 9461 mW  |
| EA3 1.2V           | 1197 mV | 15895 mA | 19028 mW |
| EA2_PLL_1V0        | 1025 mV | 0 mA     | 0 mW     |
| EA2_1V04           | 1048 mV | 0 mA     | 0 mW     |
| EA2_2V5            | 2516 mV | 0 mA     | 0 mW     |
| EA2_1V5            | 1500 mV | 0 mA     | 0 mW     |
| EA3_PLL_1V0        | 1009 mV | 0 mA     | 0 mW     |
| EA3_1V04           | 1032 mV | 0 mA     | 0 mW     |
| EA3_2V5            | 2551 mV | 0 mA     | 0 mW     |
| EA3_1V5            | 1496 mV | 0 mA     | 0 mW     |
| EA3_XR 0.906V      | 908 mV  | 15895 mA | 14434 mW |
| EA4 Core 0.9V      | 900 mV  | 41000 mA | 36916 mW |
| EA4 AVDD 1.0V      | 999 mV  | 31250 mA | 31219 mW |
| EA4 HMC Core 0.9V  | 894 mV  | 9965 mA  | 8913 mW  |
| EA4 1.2V           | 1197 mV | 15779 mA | 18889 mW |
| EA45_HMC_VDDM 1.2V | 1197 mV | 546 mA   | 654 mW   |
| EA4_XR 0.906V      | 908 mV  | 15197 mA | 13801 mW |
| EA5 Core 0.9V      | 900 mV  | 39750 mA | 35790 mW |
| EA5 AVDD 1.0V      | 1000 mV | 28000 mA | 28000 mW |
| EA5 HMC Core 0.9V  | 897 mV  | 9965 mA  | 8940 mW  |
| EA5 1.2V           | 1197 mV | 15546 mA | 18610 mW |
| EA4_PLL_1V0        | 1003 mV | 0 mA     | 0 mW     |
| EA4_1V04           | 1041 mV | 0 mA     | 0 mW     |
| EA4_2V5            | 2541 mV | 0 mA     | 0 mW     |
| EA4_1V5            | 1506 mV | 0 mA     | 0 mW     |
| EA5_PLL_1V0        | 1022 mV | 0 mA     | 0 mW     |
| EA5_1V04           | 1048 mV | 0 mA     | 0 mW     |
| EA5_2V5            | 2532 mV | 0 mA     | 0 mW     |
| EA5_1V5            | 1509 mV | 0 mA     | 0 mW     |
| VDD2V5             | 2503 mV | 0 mA     | 0 mW     |
| VDD1V5             | 1509 mV | 0 mA     | 0 mW     |
| VDD1V2             | 1206 mV | 0 mA     | 0 mW     |
| EA5_XR 0.906V      | 902 mV  | 14500 mA | 13088 mW |

FPC 2 status:

|                             |        |                              |
|-----------------------------|--------|------------------------------|
| State                       | Online |                              |
| FPC 2 Intake-A Temp Sensor  |        | 33 degrees C / 91 degrees F  |
| FPC 2 Exhaust-A Temp Sensor |        | 52 degrees C / 125 degrees F |
| FPC 2 Exhaust-B Temp Sensor |        | 50 degrees C / 122 degrees F |
| FPC 2 EA0 Temp Sensor       |        | 72 degrees C / 161 degrees F |
| FPC 2 EA0_XR0 Temp Sensor   |        | 76 degrees C / 168 degrees F |
| FPC 2 EA0_XR1 Temp Sensor   |        | 79 degrees C / 174 degrees F |
| FPC 2 EA1 Temp Sensor       |        | 64 degrees C / 147 degrees F |
| FPC 2 EA1_XR0 Temp Sensor   |        | 68 degrees C / 154 degrees F |
| FPC 2 EA1_XR1 Temp Sensor   |        | 66 degrees C / 150 degrees F |
| FPC 2 EA2 Temp Sensor       |        | 75 degrees C / 167 degrees F |
| FPC 2 EA2_XR0 Temp Sensor   |        | 81 degrees C / 177 degrees F |
| FPC 2 EA2_XR1 Temp Sensor   |        | 81 degrees C / 177 degrees F |
| FPC 2 EA3 Temp Sensor       |        | 67 degrees C / 152 degrees F |
| FPC 2 EA3_XR0 Temp Sensor   |        | 69 degrees C / 156 degrees F |
| FPC 2 EA3_XR1 Temp Sensor   |        | 69 degrees C / 156 degrees F |

|                           |                              |
|---------------------------|------------------------------|
| FPC 2 EA4 Temp Sensor     | 76 degrees C / 168 degrees F |
| FPC 2 EA4_XR0 Temp Sensor | 77 degrees C / 170 degrees F |
| FPC 2 EA4_XR1 Temp Sensor | 76 degrees C / 168 degrees F |
| FPC 2 EA5 Temp Sensor     | 60 degrees C / 140 degrees F |
| FPC 2 EA5_XR0 Temp Sensor | 65 degrees C / 149 degrees F |
| FPC 2 EA5_XR1 Temp Sensor | 65 degrees C / 149 degrees F |
| FPC 2 EA0_HMC0 Logic die  | 84 degrees C / 183 degrees F |
| FPC 2 EA0_HMC0 DRAM botm  | 81 degrees C / 177 degrees F |
| FPC 2 EA0_HMC1 Logic die  | 86 degrees C / 186 degrees F |
| FPC 2 EA0_HMC1 DRAM botm  | 83 degrees C / 181 degrees F |
| FPC 2 EA0_HMC2 Logic die  | 83 degrees C / 181 degrees F |
| FPC 2 EA0_HMC2 DRAM botm  | 80 degrees C / 176 degrees F |
| FPC 2 EA1_HMC0 Logic die  | 76 degrees C / 168 degrees F |
| FPC 2 EA1_HMC0 DRAM botm  | 73 degrees C / 163 degrees F |
| FPC 2 EA1_HMC1 Logic die  | 77 degrees C / 170 degrees F |
| FPC 2 EA1_HMC1 DRAM botm  | 74 degrees C / 165 degrees F |
| FPC 2 EA1_HMC2 Logic die  | 76 degrees C / 168 degrees F |
| FPC 2 EA1_HMC2 DRAM botm  | 73 degrees C / 163 degrees F |
| FPC 2 EA2_HMC0 Logic die  | 87 degrees C / 188 degrees F |
| FPC 2 EA2_HMC0 DRAM botm  | 84 degrees C / 183 degrees F |
| FPC 2 EA2_HMC1 Logic die  | 89 degrees C / 192 degrees F |
| FPC 2 EA2_HMC1 DRAM botm  | 86 degrees C / 186 degrees F |
| FPC 2 EA2_HMC2 Logic die  | 88 degrees C / 190 degrees F |
| FPC 2 EA2_HMC2 DRAM botm  | 85 degrees C / 185 degrees F |
| FPC 2 EA3_HMC0 Logic die  | 80 degrees C / 176 degrees F |
| FPC 2 EA3_HMC0 DRAM botm  | 77 degrees C / 170 degrees F |
| FPC 2 EA3_HMC1 Logic die  | 81 degrees C / 177 degrees F |
| FPC 2 EA3_HMC1 DRAM botm  | 78 degrees C / 172 degrees F |
| FPC 2 EA3_HMC2 Logic die  | 81 degrees C / 177 degrees F |
| FPC 2 EA3_HMC2 DRAM botm  | 78 degrees C / 172 degrees F |
| FPC 2 EA4_HMC0 Logic die  | 88 degrees C / 190 degrees F |
| FPC 2 EA4_HMC0 DRAM botm  | 85 degrees C / 185 degrees F |
| FPC 2 EA4_HMC1 Logic die  | 90 degrees C / 194 degrees F |
| FPC 2 EA4_HMC1 DRAM botm  | 87 degrees C / 188 degrees F |
| FPC 2 EA4_HMC2 Logic die  | 81 degrees C / 177 degrees F |
| FPC 2 EA4_HMC2 DRAM botm  | 78 degrees C / 172 degrees F |
| FPC 2 EA5_HMC0 Logic die  | 73 degrees C / 163 degrees F |
| FPC 2 EA5_HMC0 DRAM botm  | 70 degrees C / 158 degrees F |
| FPC 2 EA5_HMC1 Logic die  | 69 degrees C / 156 degrees F |
| FPC 2 EA5_HMC1 DRAM botm  | 66 degrees C / 150 degrees F |
| FPC 2 EA5_HMC2 Logic die  | 73 degrees C / 163 degrees F |
| FPC 2 EA5_HMC2 DRAM botm  | 70 degrees C / 158 degrees F |
| Power                     |                              |
| 12V SS 1                  | 12285 mV 9408 mA 115582 mW   |
| 12V SS 2                  | 12338 mV 20881 mA 257637 mW  |
| 12V SS 3                  | 12351 mV 10317 mA 127430 mW  |
| 12V SS 4                  | 12285 mV 21054 mA 258660 mW  |
| 12V SS 5                  | 12153 mV 13954 mA 169591 mW  |
| VDD 1.0V_A                | 1000 mV 91000 mA 91000 mW    |
| VDD 1.0V_B                | 0 mV 0 mA 0 mW               |
| VDD 3.3V                  | 3298 mV 9125 mA 30101 mW     |
| VDD 0.9V                  | 897 mV 3337 mA 2993 mW       |
| ETH SW 1V                 | 0 mV 0 mA 0 mW               |
| VDD 1.8V                  | 1809 mV 1127 mA 2040 mW      |
| PVCC                      | 835 mV 0 mA 0 mW             |
| PVNN                      | 1000 mV 0 mA 0 mW            |
| V1P0                      | 1003 mV 0 mA 0 mW            |
| V1P1                      | 1070 mV 0 mA 0 mW            |
| V1P3                      | 1348 mV 0 mA 0 mW            |
| VDDQ                      | 1493 mV 0 mA 0 mW            |

|                    |          |          |          |
|--------------------|----------|----------|----------|
| V1P8               | 1806 mV  | 0 mA     | 0 mW     |
| VDD3V3             | 3303 mV  | 0 mA     | 0 mW     |
| V5V0_BIAS          | 5000 mV  | 0 mA     | 0 mW     |
| VDD12V0            | 12116 mV | 0 mA     | 0 mW     |
| EA0 Core 0.9V      | 900 mV   | 38875 mA | 35002 mW |
| EA0 AVDD 1.0V      | 999 mV   | 31875 mA | 31843 mW |
| EA0 HMC Core 0.9V  | 894 mV   | 9034 mA  | 8081 mW  |
| EA0 1.2V           | 1197 mV  | 15430 mA | 18471 mW |
| EA01_HMC_VDDM 1.2V | 1200 mV  | -267 mA  | -321 mW  |
| EA0_XR 0.906V      | 908 mV   | 15430 mA | 14012 mW |
| EA1 Core 0.9V      | 900 mV   | 38875 mA | 35002 mW |
| EA1 AVDD 1.0V      | 1000 mV  | 28250 mA | 28250 mW |
| EA1 HMC Core 0.9V  | 899 mV   | 8802 mA  | 7920 mW  |
| EA1 1.2V           | 1197 mV  | 15081 mA | 18054 mW |
| EA0_PLL_1V0        | 1003 mV  | 0 mA     | 0 mW     |
| EA0_1V04           | 1048 mV  | 0 mA     | 0 mW     |
| EA0_2V5            | 2425 mV  | 0 mA     | 0 mW     |
| EA0_1V5            | 1483 mV  | 0 mA     | 0 mW     |
| EA1_PLL_1V0        | 1019 mV  | 0 mA     | 0 mW     |
| EA1_1V04           | 1019 mV  | 0 mA     | 0 mW     |
| EA1_2V5            | 2490 mV  | 0 mA     | 0 mW     |
| EA1_1V5            | 1480 mV  | 0 mA     | 0 mW     |
| EA1_XR 0.906V      | 908 mV   | 14965 mA | 13590 mW |
| EA2 Core 0.9V      | 900 mV   | 44000 mA | 39617 mW |
| EA2 AVDD 1.0V      | 1000 mV  | 28625 mA | 28625 mW |
| EA2 HMC Core 0.9V  | 891 mV   | 10546 mA | 9404 mW  |
| EA2 1.2V           | 1200 mV  | 15313 mA | 18387 mW |
| EA23_HMC_VDDM 1.2V | 1193 mV  | -267 mA  | -319 mW  |
| EA2_XR 0.906V      | 908 mV   | 15197 mA | 13801 mW |
| EA3 Core 0.9V      | 900 mV   | 39750 mA | 35790 mW |
| EA3 AVDD 1.0V      | 1000 mV  | 27750 mA | 27750 mW |
| EA3 HMC Core 0.9V  | 897 mV   | 9267 mA  | 8314 mW  |
| EA3 1.2V           | 1197 mV  | 15430 mA | 18471 mW |
| EA2_PLL_1V0        | 1009 mV  | 0 mA     | 0 mW     |
| EA2_1V04           | 1041 mV  | 0 mA     | 0 mW     |
| EA2_2V5            | 2496 mV  | 0 mA     | 0 mW     |
| EA2_1V5            | 1493 mV  | 0 mA     | 0 mW     |
| EA3_PLL_1V0        | 1003 mV  | 0 mA     | 0 mW     |
| EA3_1V04           | 1041 mV  | 0 mA     | 0 mW     |
| EA3_2V5            | 2490 mV  | 0 mA     | 0 mW     |
| EA3_1V5            | 1500 mV  | 0 mA     | 0 mW     |
| EA3_XR 0.906V      | 908 mV   | 15081 mA | 13695 mW |
| EA4 Core 0.9V      | 899 mV   | 45750 mA | 41148 mW |
| EA4 AVDD 1.0V      | 1000 mV  | 32250 mA | 32250 mW |
| EA4 HMC Core 0.9V  | 897 mV   | 10779 mA | 9670 mW  |
| EA4 1.2V           | 1193 mV  | 16011 mA | 19110 mW |
| EA45_HMC_VDDM 1.2V | 1200 mV  | -267 mA  | -321 mW  |
| EA4_XR 0.906V      | 905 mV   | 15779 mA | 14286 mW |
| EA5 Core 0.9V      | 900 mV   | 38375 mA | 34552 mW |
| EA5 AVDD 1.0V      | 1000 mV  | 27750 mA | 27777 mW |
| EA5 HMC Core 0.9V  | 899 mV   | 8453 mA  | 7606 mW  |
| EA5 1.2V           | 1200 mV  | 14732 mA | 17689 mW |
| EA4_PLL_1V0        | 1012 mV  | 0 mA     | 0 mW     |
| EA4_1V04           | 1029 mV  | 0 mA     | 0 mW     |
| EA4_2V5            | 2496 mV  | 0 mA     | 0 mW     |
| EA4_1V5            | 1490 mV  | 0 mA     | 0 mW     |
| EA5_PLL_1V0        | 1003 mV  | 0 mA     | 0 mW     |
| EA5_1V04           | 1032 mV  | 0 mA     | 0 mW     |
| EA5_2V5            | 2503 mV  | 0 mA     | 0 mW     |
| EA5_1V5            | 1480 mV  | 0 mA     | 0 mW     |



```

VDD2V5          2461 mV      0 mA      0 mW
VDD1V5          1490 mV      0 mA      0 mW
VDD1V2          1212 mV      0 mA      0 mW
EA5_XR 0.906V   910 mV     13686 mA  12466 mW
FPC 3 status:
State           Online
FPC 3 Intake-A Temp Sensor      30 degrees C / 86 degrees F
FPC 3 Exhaust-A Temp Sensor     48 degrees C / 118 degrees F
FPC 3 Exhaust-B Temp Sensor     45 degrees C / 113 degrees F
FPC 3 EA0 Temp Sensor           60 degrees C / 140 degrees F
FPC 3 EA0_XR0 Temp Sensor       65 degrees C / 149 degrees F
FPC 3 EA0_XR1 Temp Sensor       67 degrees C / 152 degrees F
FPC 3 EA1 Temp Sensor           54 degrees C / 129 degrees F
FPC 3 EA1_XR0 Temp Sensor       60 degrees C / 140 degrees F
FPC 3 EA1_XR1 Temp Sensor       58 degrees C / 136 degrees F
FPC 3 EA2 Temp Sensor           62 degrees C / 143 degrees F
FPC 3 EA2_XR0 Temp Sensor       67 degrees C / 152 degrees F
FPC 3 EA2_XR1 Temp Sensor       67 degrees C / 152 degrees F
FPC 3 EA3 Temp Sensor           55 degrees C / 131 degrees F
FPC 3 EA3_XR0 Temp Sensor       57 degrees C / 134 degrees F
FPC 3 EA3_XR1 Temp Sensor       57 degrees C / 134 degrees F
FPC 3 EA4 Temp Sensor           69 degrees C / 156 degrees F
FPC 3 EA4_XR0 Temp Sensor       71 degrees C / 159 degrees F
FPC 3 EA4_XR1 Temp Sensor       70 degrees C / 158 degrees F
FPC 3 EA5 Temp Sensor           55 degrees C / 131 degrees F
FPC 3 EA5_XR0 Temp Sensor       58 degrees C / 136 degrees F
FPC 3 EA5_XR1 Temp Sensor       59 degrees C / 138 degrees F
FPC 3 EA0_HMC0 Logic die        69 degrees C / 156 degrees F
FPC 3 EA0_HMC0 DRAM botm        66 degrees C / 150 degrees F
FPC 3 EA0_HMC1 Logic die        70 degrees C / 158 degrees F
FPC 3 EA0_HMC1 DRAM botm        67 degrees C / 152 degrees F
FPC 3 EA0_HMC2 Logic die        70 degrees C / 158 degrees F
FPC 3 EA0_HMC2 DRAM botm        67 degrees C / 152 degrees F
FPC 3 EA1_HMC0 Logic die        68 degrees C / 154 degrees F
FPC 3 EA1_HMC0 DRAM botm        65 degrees C / 149 degrees F
FPC 3 EA1_HMC1 Logic die        65 degrees C / 149 degrees F
FPC 3 EA1_HMC1 DRAM botm        62 degrees C / 143 degrees F
FPC 3 EA1_HMC2 Logic die        64 degrees C / 147 degrees F
FPC 3 EA1_HMC2 DRAM botm        61 degrees C / 141 degrees F
FPC 3 EA2_HMC0 Logic die        74 degrees C / 165 degrees F
FPC 3 EA2_HMC0 DRAM botm        71 degrees C / 159 degrees F
FPC 3 EA2_HMC1 Logic die        77 degrees C / 170 degrees F
FPC 3 EA2_HMC1 DRAM botm        74 degrees C / 165 degrees F
FPC 3 EA2_HMC2 Logic die        74 degrees C / 165 degrees F
FPC 3 EA2_HMC2 DRAM botm        71 degrees C / 159 degrees F
FPC 3 EA3_HMC0 Logic die        70 degrees C / 158 degrees F
FPC 3 EA3_HMC0 DRAM botm        67 degrees C / 152 degrees F
FPC 3 EA3_HMC1 Logic die        68 degrees C / 154 degrees F
FPC 3 EA3_HMC1 DRAM botm        65 degrees C / 149 degrees F
FPC 3 EA3_HMC2 Logic die        68 degrees C / 154 degrees F
FPC 3 EA3_HMC2 DRAM botm        65 degrees C / 149 degrees F
FPC 3 EA4_HMC0 Logic die        82 degrees C / 179 degrees F
FPC 3 EA4_HMC0 DRAM botm        79 degrees C / 174 degrees F
FPC 3 EA4_HMC1 Logic die        80 degrees C / 176 degrees F
FPC 3 EA4_HMC1 DRAM botm        77 degrees C / 170 degrees F
FPC 3 EA4_HMC2 Logic die        81 degrees C / 177 degrees F
FPC 3 EA4_HMC2 DRAM botm        78 degrees C / 172 degrees F
FPC 3 EA5_HMC0 Logic die        69 degrees C / 156 degrees F
FPC 3 EA5_HMC0 DRAM botm        66 degrees C / 150 degrees F
FPC 3 EA5_HMC1 Logic die        70 degrees C / 158 degrees F

```

|                          |                              |
|--------------------------|------------------------------|
| FPC 3 EA5_HMC1 DRAM botm | 67 degrees C / 152 degrees F |
| FPC 3 EA5_HMC2 Logic die | 69 degrees C / 156 degrees F |
| FPC 3 EA5_HMC2 DRAM botm | 66 degrees C / 150 degrees F |
| Power                    |                              |
| 12V SS 1                 | 12259 mV 9538 mA 116927 mW   |
| 12V SS 2                 | 12259 mV 20491 mA 251202 mW  |
| 12V SS 3                 | 12298 mV 9711 mA 119433 mW   |
| 12V SS 4                 | 12219 mV 20491 mA 250391 mW  |
| 12V SS 5                 | 12206 mV 10447 mA 127520 mW  |
| VDD 1.0V_A               | 1000 mV 42250 mA 42291 mW    |
| VDD 1.0V_B               | 996 mV 8918 mA 8890 mW       |
| VDD 3.3V                 | 3301 mV 10375 mA 34255 mW    |
| VDD 0.9V                 | 897 mV 3569 mA 3202 mW       |
| ETH SW 1V                | 983 mV 4267 mA 4195 mW       |
| VDD 1.8V                 | 1812 mV 1825 mA 3309 mW      |
| PVCC                     | 974 mV 0 mA 0 mW             |
| PVNN                     | 1003 mV 0 mA 0 mW            |
| V1P0                     | 1003 mV 0 mA 0 mW            |
| V1P1                     | 1070 mV 0 mA 0 mW            |
| V1P3                     | 1351 mV 0 mA 0 mW            |
| VDDQ                     | 1496 mV 0 mA 0 mW            |
| V1P8                     | 1809 mV 0 mA 0 mW            |
| VDD3V3                   | 3309 mV 0 mA 0 mW            |
| V5V0_BIAS                | 4987 mV 0 mA 0 mW            |
| VDD12V0                  | 12212 mV 0 mA 0 mW           |
| EA0 Core 0.9V            | 900 mV 38125 mA 34327 mW     |
| EA0 AVDD 1.0V            | 999 mV 31125 mA 31094 mW     |
| EA0 HMC Core 0.9V        | 897 mV 9500 mA 8522 mW       |
| EA0 1.2V                 | 1193 mV 15430 mA 18416 mW    |
| EA01_HMC_VDDM 1.2V       | 1193 mV 313 mA 374 mW        |
| EA0_XR 0.906V            | 913 mV 14965 mA 13671 mW     |
| EA1 Core 0.9V            | 900 mV 39750 mA 35790 mW     |
| EA1 AVDD 1.0V            | 1000 mV 26000 mA 26000 mW    |
| EA1 HMC Core 0.9V        | 897 mV 8918 mA 8001 mW       |
| EA1 1.2V                 | 1200 mV 15779 mA 18946 mW    |
| EA0_PLL_1V0              | 1003 mV 0 mA 0 mW            |
| EA0_1V04                 | 1019 mV 0 mA 0 mW            |
| EA0_2V5                  | 2448 mV 0 mA 0 mW            |
| EA0_1V5                  | 1470 mV 0 mA 0 mW            |
| EA1_PLL_1V0              | 1016 mV 0 mA 0 mW            |
| EA1_1V04                 | 1035 mV 0 mA 0 mW            |
| EA1_2V5                  | 2506 mV 0 mA 0 mW            |
| EA1_1V5                  | 1483 mV 0 mA 0 mW            |
| EA1_XR 0.906V            | 908 mV 13918 mA 12639 mW     |
| EA2 Core 0.9V            | 900 mV 38625 mA 34777 mW     |
| EA2 AVDD 1.0V            | 1000 mV 26375 mA 26400 mW    |
| EA2 HMC Core 0.9V        | 897 mV 9383 mA 8418 mW       |
| EA2 1.2V                 | 1200 mV 15779 mA 18946 mW    |
| EA23_HMC_VDDM 1.2V       | 1193 mV 81 mA 97 mW          |
| EA2_XR 0.906V            | 908 mV 13918 mA 12639 mW     |
| EA3 Core 0.9V            | 899 mV 40250 mA 36201 mW     |
| EA3 AVDD 1.0V            | 1000 mV 26750 mA 26776 mW    |
| EA3 HMC Core 0.9V        | 894 mV 9267 mA 8289 mW       |
| EA3 1.2V                 | 1197 mV 16127 mA 19306 mW    |
| EA2_PLL_1V0              | 993 mV 0 mA 0 mW             |
| EA2_1V04                 | 1045 mV 0 mA 0 mW            |
| EA2_2V5                  | 2474 mV 0 mA 0 mW            |
| EA2_1V5                  | 1490 mV 0 mA 0 mW            |
| EA3_PLL_1V0              | 980 mV 0 mA 0 mW             |
| EA3_1V04                 | 1032 mV 0 mA 0 mW            |

|                    |         |          |          |
|--------------------|---------|----------|----------|
| EA3_2V5            | 2506 mV | 0 mA     | 0 mW     |
| EA3_1V5            | 1474 mV | 0 mA     | 0 mW     |
| EA3_XR 0.906V      | 910 mV  | 14732 mA | 13419 mW |
| EA4 Core 0.9V      | 900 mV  | 42500 mA | 38266 mW |
| EA4 AVDD 1.0V      | 1000 mV | 32250 mA | 32281 mW |
| EA4 HMC Core 0.9V  | 899 mV  | 10081 mA | 9071 mW  |
| EA4 1.2V           | 1193 mV | 16360 mA | 19526 mW |
| EA45_HMC_VDDM 1.2V | 1193 mV | 662 mA   | 791 mW   |
| EA4_XR 0.906V      | 908 mV  | 15430 mA | 14012 mW |
| EA5 Core 0.9V      | 899 mV  | 37000 mA | 33278 mW |
| EA5 AVDD 1.0V      | 1000 mV | 26125 mA | 26150 mW |
| EA5 HMC Core 0.9V  | 897 mV  | 9267 mA  | 8314 mW  |
| EA5 1.2V           | 1197 mV | 15662 mA | 18750 mW |
| EA4_PLL_1V0        | 1000 mV | 0 mA     | 0 mW     |
| EA4_1V04           | 1029 mV | 0 mA     | 0 mW     |
| EA4_2V5            | 2487 mV | 0 mA     | 0 mW     |
| EA4_1V5            | 1496 mV | 0 mA     | 0 mW     |
| EA5_PLL_1V0        | 1009 mV | 0 mA     | 0 mW     |
| EA5_1V04           | 1032 mV | 0 mA     | 0 mW     |
| EA5_2V5            | 2503 mV | 0 mA     | 0 mW     |
| EA5_1V5            | 1496 mV | 0 mA     | 0 mW     |
| VDD2V5             | 2483 mV | 0 mA     | 0 mW     |
| VDD1V5             | 1470 mV | 0 mA     | 0 mW     |
| VDD1V2             | 1203 mV | 0 mA     | 0 mW     |
| EA5_XR 0.906V      | 908 mV  | 14500 mA | 13167 mW |

### show chassis environment fpc (T320, T640, and T1600 Routers)

```
user@host> show chassis environment fpc
```

#### FPC 0 status:

|                    |                              |
|--------------------|------------------------------|
| State              | Online                       |
| Temperature Top    | 42 degrees C / 107 degrees F |
| Temperature Bottom | 36 degrees C / 96 degrees F  |
| Temperature MMB1   | 39 degrees C / 102 degrees F |
| Power:             |                              |
| 1.8 V              | 1959 mV                      |
| 2.5 V              | 2495 mV                      |
| 3.3 V              | 3344 mV                      |
| 5.0 V              | 5047 mV                      |
| 1.8 V bias         | 1787 mV                      |
| 3.3 V bias         | 3291 mV                      |
| 5.0 V bias         | 4998 mV                      |
| 8.0 V bias         | 7343 mV                      |
| BUS Revision       | 40                           |

#### FPC 1 status:

|                    |                              |
|--------------------|------------------------------|
| State              | Online                       |
| Temperature Top    | 42 degrees C / 107 degrees F |
| Temperature Bottom | 39 degrees C / 102 degrees F |
| Temperature MMB1   | 40 degrees C / 104 degrees F |
| Power:             |                              |
| 1.8 V              | 1956 mV                      |
| 2.5 V              | 2498 mV                      |
| 3.3 V              | 3340 mV                      |
| 5.0 V              | 5023 mV                      |
| 1.8 V bias         | 1782 mV                      |
| 3.3 V bias         | 3277 mV                      |
| 5.0 V bias         | 4989 mV                      |
| 8.0 V bias         | 7289 mV                      |
| BUS Revision       | 40                           |

```

FPC 2 status:
State                               Online
Temperature Top                     43 degrees C / 109 degrees F
Temperature Bottom                   39 degrees C / 102 degrees F
Temperature MMB1                     41 degrees C / 105 degrees F
Power:
  1.8 V                             1963 mV
  2.5 V                             2503 mV
  3.3 V                             3340 mV
  5.0 V                             5042 mV
  1.8 V bias                         1797 mV
  3.3 V bias                         3311 mV
  5.0 V bias                         5013 mV
  8.0 V bias                         7221 mV
BUS Revision                         40

```

### show chassis environment fpc (T4000 Router)

```
user@host> show chassis environment fpc
```

```

FPC 0 status:
State                               Online
Fan Intake                          34 degrees C / 93 degrees F
Fan Exhaust                         48 degrees C / 118 degrees F
PMB                                 47 degrees C / 116 degrees F
LMB0                                50 degrees C / 122 degrees F
LMB1                                41 degrees C / 105 degrees F
LMB2                                35 degrees C / 95 degrees F
PFE1 LU2                            46 degrees C / 114 degrees F
PFE1 LU0                            41 degrees C / 105 degrees F
PFE0 LU0                            57 degrees C / 134 degrees F
XF1                                 47 degrees C / 116 degrees F
XF0                                 52 degrees C / 125 degrees F
XM1                                 41 degrees C / 105 degrees F
XM0                                 50 degrees C / 122 degrees F
PFE0 LU1                            56 degrees C / 132 degrees F
PFE0 LU2                            45 degrees C / 113 degrees F
PFE1 LU1                            37 degrees C / 98 degrees F
Power 1
  1.0 V                             991 mV
  1.2 V bias                         1195 mV
  1.8 V                             1788 mV
  2.5 V                             2483 mV
  3.3 V                             3289 mV
  3.3 V bias                         3299 mV
  12.0 V A                           10608 mV
  12.0 V B                           10637 mV
Power 2
  0.9 V                             881 mV
  0.9 V PFE0                         916 mV
  0.9 V PFE1                         903 mV
  1.0 V PFE0                        1012 mV
  1.0 V PFE1                        1002 mV
  1.1 V                             1095 mV
  1.5 V_0                           1494 mV
  1.5 V_1                           1479 mV
Power 3
  1.0 V PFE0                        1000 mV
  1.0 V PFE1                        1002 mV
  1.0 V PFE0 *                       995 mV

```

```

1.0 V PFE1 *          995 mV
1.8 V PFE 0          1788 mV
1.8 V PFE 1          1789 mV
2.5 V                2482 mV
12.0 V              11614 mV
Power 4
1.0 V PFE0 LU0       1003 mV
1.0 V PFE1 LU0       1003 mV
1.0 V PFE1 LU2       1004 mV
1.0 V PFE0 LU0 *     995 mV
1.0 V PFE1 LU0 *     998 mV
1.0 V PFE1 LU2 *     996 mV
12.0 V              11643 mV
12.0 V C            11711 mV
Power (Base/PMB/MMB)
LMB0 VDD2V5         2488 mV
LMB0 VDD1V8         1788 mV
LMB0 VDD1V5         1496 mV
LMB0 PFE0 LU0 AVDD1V0 1002 mV
LMB0 PFE0 LU0 VDD1V0 1000 mV
LMB0 VDD12V0       10752 mV
LMB1 VDD2V5         2472 mV
LMB1 VDD1V8         1792 mV
LMB1 VDD1V5         1480 mV
LMB1 PFE0 LU2 AVDD1V0 994 mV
LMB1 PFE0 LU2 VDD1V0 1002 mV
LMB1 VDD12V0       10800 mV
LMB2 VDD2V5         2472 mV
LMB2 VDD1V8         1792 mV
LMB2 VDD1V5         1486 mV
LMB2 PFE1 LU1 AVDD1V0 996 mV
LMB2 PFE1 LU1 VDD1V0 998 mV
LMB2 VDD12V0       10704 mV
PMB 1.05v           1049 mV
PMB 1.5v            1500 mV
PMB 2.5v            2500 mV
PMB 3.3v            3299 mV
Bus Revision        113
FPC 3 status:
State               Online
Fan Intake          37 degrees C / 98 degrees F
Fan Exhaust         51 degrees C / 123 degrees F
PMB                 43 degrees C / 109 degrees F
LMB0                57 degrees C / 134 degrees F
LMB1                 54 degrees C / 129 degrees F
LMB2                 38 degrees C / 100 degrees F
PFE1 LU2            63 degrees C / 145 degrees F
PFE1 LU0            45 degrees C / 113 degrees F
PFE0 LU0            69 degrees C / 156 degrees F
XF1                  62 degrees C / 143 degrees F
XF0                  63 degrees C / 145 degrees F
XM1                  43 degrees C / 109 degrees F
XM0                  67 degrees C / 152 degrees F
PFE0 LU1            63 degrees C / 145 degrees F
PFE0 LU2            66 degrees C / 150 degrees F
PFE1 LU1            41 degrees C / 105 degrees F
Power 1
1.0 V               1002 mV
1.2 V bias          1201 mV
1.8 V               1785 mV

```

|                       |                              |
|-----------------------|------------------------------|
| 2.5 V                 | 2485 mV                      |
| 3.3 V                 | 3288 mV                      |
| 3.3 V bias            | 3285 mV                      |
| 12.0 V A              | 10412 mV                     |
| 12.0 V B              | 10515 mV                     |
| Power 2               |                              |
| 0.9 V                 | 882 mV                       |
| 0.9 V PFE0            | 920 mV                       |
| 0.9 V PFE1            | 905 mV                       |
| 1.0 V PFE0            | 1015 mV                      |
| 1.0 V PFE1            | 1001 mV                      |
| 1.1 V                 | 1094 mV                      |
| 1.5 V_0               | 1495 mV                      |
| 1.5 V_1               | 1478 mV                      |
| Power 3               |                              |
| 0.92 V PFE1           | 998 mV                       |
| 1.0 V PFE0            | 997 mV                       |
| 1.0 V PFE0 *          | 992 mV                       |
| 1.0 V PFE1 *          | 991 mV                       |
| 1.8 V PFE 0           | 1780 mV                      |
| 1.8 V PFE 1           | 1797 mV                      |
| 2.5 V                 | 2492 mV                      |
| 12.0 V                | 11604 mV                     |
| Power 4               |                              |
| 1.0 V PFE0 LU0        | 1003 mV                      |
| 1.0 V PFE1 LU0        | 1004 mV                      |
| 1.0 V PFE1 LU2        | 1003 mV                      |
| 1.0 V PFE0 LU0 *      | 1000 mV                      |
| 1.0 V PFE1 LU0 *      | 1001 mV                      |
| 1.0 V PFE1 LU2 *      | 1003 mV                      |
| 12.0 V                | 11653 mV                     |
| 12.0 V C              | 11672 mV                     |
| Power (Base/PMB/MMB)  |                              |
| LMB0 VDD2V5           | 2512 mV                      |
| LMB0 VDD1V8           | 1790 mV                      |
| LMB0 VDD1V5           | 1500 mV                      |
| LMB0 PFE0 LU0 AVDD1V0 | 1004 mV                      |
| LMB0 PFE0 LU0 VDD1V0  | 1002 mV                      |
| LMB0 VDD12V0          | 10608 mV                     |
| LMB1 VDD2V5           | 2472 mV                      |
| LMB1 VDD1V8           | 1788 mV                      |
| LMB1 VDD1V5           | 1480 mV                      |
| LMB1 PFE0 LU2 AVDD1V0 | 1000 mV                      |
| LMB1 PFE0 LU2 VDD1V0  | 1004 mV                      |
| LMB1 VDD12V0          | 10672 mV                     |
| LMB2 VDD2V5           | 2488 mV                      |
| LMB2 VDD1V8           | 1798 mV                      |
| LMB2 VDD1V5           | 1494 mV                      |
| LMB2 PFE1 LU1 AVDD1V0 | 1000 mV                      |
| LMB2 PFE1 LU1 VDD1V0  | 1004 mV                      |
| LMB2 VDD12V0          | 10528 mV                     |
| PMB 1.05v             | 1050 mV                      |
| PMB 1.5v              | 1500 mV                      |
| PMB 2.5v              | 2499 mV                      |
| PMB 3.3v              | 3299 mV                      |
| Bus Revision          | 113                          |
| FPC 5 status:         |                              |
| State                 | Online                       |
| Temperature Top       | 39 degrees C / 102 degrees F |
| Temperature Bottom    | 38 degrees C / 100 degrees F |

```

Power
  1.8 V                1804 mV
  1.8 V bias           1802 mV
  3.3 V                3294 mV
  3.3 V bias           3277 mV
  5.0 V bias           5008 mV
  5.0 V TOP            5067 mV
  8.0 V bias           6642 mV
Power (Base/PMB/MMB)
  1.2 V                1202 mV
  1.5 V                1504 mV
  5.0 V BOT            5079 mV
  12.0 V TOP Base     11848 mV
  12.0 V BOT Base     11780 mV
  1.1 V PMB            1111 mV
  1.2 V PMB            1189 mV
  1.5 V PMB            1494 mV
  1.8 V PMB            1819 mV
  2.5 V PMB            2503 mV
  3.3 V PMB            3294 mV
  5.0 V PMB            5035 mV
  12.0 V PMB          11788 mV
  0.75 MMB TOP        766 mV
  1.5 V MMB TOP        1484 mV
  1.8 V MMB TOP        1772 mV
  2.5 V MMB TOP        2485 mV
  1.2 V MMB TOP        1137 mV
  5.0 V MMB TOP        4946 mV
  12.0 V MMB TOP      11772 mV
  3.3 V MMB TOP        3289 mV
  0.75 MMB BOT         759 mV
  1.5 V MMB BOT        1482 mV
  1.8 V MMB BOT        1792 mV
  2.5 V MMB BOT        2490 mV
  1.2 V MMB BOT        1145 mV
  5.0 V MMB BOT        4922 mV
  12.0 V MMB BOT      11625 mV
  3.3 V MMB BOT        3282 mV
  APS 00               2495 mV
  APS 01               3308 mV
  APS 02               3301 mV
  5.0 V PIC 0          4967 mV
  APS 10               2512 mV
  APS 11               3316 mV
  APS 12               3304 mV
  5.0 V PIC 1          5081 mV
Bus Revision           49
FPC 6 status:
State                  Online
Fan Intake             34 degrees C / 93 degrees F
Fan Exhaust            49 degrees C / 120 degrees F
PMB                    40 degrees C / 104 degrees F
LMB0                   60 degrees C / 140 degrees F
LMB1                   58 degrees C / 136 degrees F
LMB2                   40 degrees C / 104 degrees F
PFE1 LU2              69 degrees C / 156 degrees F
PFE1 LU0              45 degrees C / 113 degrees F
PFE0 LU0              71 degrees C / 159 degrees F
XF1                    58 degrees C / 136 degrees F
XF0                    65 degrees C / 149 degrees F

```

|                       |                              |
|-----------------------|------------------------------|
| XM1                   | 40 degrees C / 104 degrees F |
| XM0                   | 66 degrees C / 150 degrees F |
| PFE0 LU1              | 69 degrees C / 156 degrees F |
| PFE0 LU2              | 68 degrees C / 154 degrees F |
| PFE1 LU1              | 42 degrees C / 107 degrees F |
| Power 1               |                              |
| 1.0 V                 | 998 mV                       |
| 1.2 V bias            | 1191 mV                      |
| 1.8 V                 | 1781 mV                      |
| 2.5 V                 | 2487 mV                      |
| 3.3 V                 | 3302 mV                      |
| 3.3 V bias            | 3300 mV                      |
| 12.0 V A              | 10388 mV                     |
| 12.0 V B              | 10388 mV                     |
| Power 2               |                              |
| 0.9 V                 | 902 mV                       |
| 0.9 V PFE0            | 921 mV                       |
| 0.9 V PFE1            | 907 mV                       |
| 1.0 V PFE0            | 996 mV                       |
| 1.0 V PFE1            | 974 mV                       |
| 1.1 V                 | 1095 mV                      |
| 1.5 V_0               | 1495 mV                      |
| 1.5 V_1               | 1478 mV                      |
| Power 3               |                              |
| 1.0 V PFE0            | 997 mV                       |
| 1.0 V PFE1            | 998 mV                       |
| 1.0 V PFE0 *          | 993 mV                       |
| 1.0 V PFE1 *          | 991 mV                       |
| 1.8 V PFE 0           | 1796 mV                      |
| 1.8 V PFE 1           | 1789 mV                      |
| 2.5 V                 | 2465 mV                      |
| 12.0 V                | 11609 mV                     |
| Power 4               |                              |
| 1.0 V PFE0 LU0        | 1003 mV                      |
| 1.0 V PFE1 LU0        | 1006 mV                      |
| 1.0 V PFE1 LU2        | 1002 mV                      |
| 1.0 V PFE0 LU0 *      | 1000 mV                      |
| 1.0 V PFE1 LU0 *      | 998 mV                       |
| 1.0 V PFE1 LU2 *      | 998 mV                       |
| 12.0 V                | 11638 mV                     |
| 12.0 V C              | 11702 mV                     |
| Power (Base/PMB/MMB)  |                              |
| LMB0 VDD2V5           | 2484 mV                      |
| LMB0 VDD1V8           | 1780 mV                      |
| LMB0 VDD1V5           | 1496 mV                      |
| LMB0 PFE0 LU0 AVDD1V0 | 998 mV                       |
| LMB0 PFE0 LU0 VDD1V0  | 1004 mV                      |
| LMB0 VDD12V0          | 10528 mV                     |
| LMB1 VDD2V5           | 2472 mV                      |
| LMB1 VDD1V8           | 1776 mV                      |
| LMB1 VDD1V5           | 1474 mV                      |
| LMB1 PFE0 LU2 AVDD1V0 | 994 mV                       |
| LMB1 PFE0 LU2 VDD1V0  | 1004 mV                      |
| LMB1 VDD12V0          | 10544 mV                     |
| LMB2 VDD2V5           | 2476 mV                      |
| LMB2 VDD1V8           | 1790 mV                      |
| LMB2 VDD1V5           | 1492 mV                      |
| LMB2 PFE1 LU1 AVDD1V0 | 996 mV                       |
| LMB2 PFE1 LU1 VDD1V0  | 1010 mV                      |
| LMB2 VDD12V0          | 10528 mV                     |



|              |         |
|--------------|---------|
| PMB 1.05v    | 1050 mV |
| PMB 1.5v     | 1499 mV |
| PMB 2.5v     | 2500 mV |
| PMB 3.3v     | 3300 mV |
| Bus Revision | 80      |

### show chassis environment fpc lcc (TX Matrix Router)

```
user@host> show chassis environment fpc lcc 0
```

```
lcc0-re0:
```

```
-----
```

```
FPC 1 status:
```

|                    |                             |
|--------------------|-----------------------------|
| State              | Online                      |
| Temperature Top    | 30 degrees C / 86 degrees F |
| Temperature Bottom | 25 degrees C / 77 degrees F |
| Temperature MMB0   | Absent                      |
| Temperature MMB1   | 27 degrees C / 80 degrees F |
| Power:             |                             |
| 1.8 V              | 1813 mV                     |
| 2.5 V              | 2504 mV                     |
| 3.3 V              | 3338 mV                     |
| 5.0 V              | 5037 mV                     |
| 1.8 V bias         | 1797 mV                     |
| 3.3 V bias         | 3301 mV                     |
| 5.0 V bias         | 5013 mV                     |
| 8.0 V bias         | 7345 mV                     |
| BUS Revision       | 40                          |

```
FPC 2 status:
```

|                    |                             |
|--------------------|-----------------------------|
| State              | Online                      |
| Temperature Top    | 37 degrees C / 98 degrees F |
| Temperature Bottom | 26 degrees C / 78 degrees F |
| Temperature MMB0   | 32 degrees C / 89 degrees F |
| Temperature MMB1   | 27 degrees C / 80 degrees F |
| Power:             |                             |
| 1.8 V              | 1791 mV                     |
| 2.5 V              | 2517 mV                     |
| 3.3 V              | 3308 mV                     |
| 5.0 V              | 5052 mV                     |
| 1.8 V bias         | 1797 mV                     |
| 3.3 V bias         | 3289 mV                     |
| 5.0 V bias         | 4991 mV                     |
| 8.0 V bias         | 7477 mV                     |
| BUS Revision       | 40                          |

### show chassis environment fpc lcc (TX Matrix Plus Router)

```
user@host> show chassis environment fpc lcc 0
```

```
lcc0-re0:
```

```
-----
```

```
FPC 1 status:
```

|                    |                              |
|--------------------|------------------------------|
| State              | Online                       |
| Temperature Top    | 46 degrees C / 114 degrees F |
| Temperature Bottom | 47 degrees C / 116 degrees F |
| Power              |                              |
| 1.8 V              | 1788 mV                      |
| 1.8 V bias         | 1787 mV                      |
| 3.3 V              | 3321 mV                      |

|                      |          |
|----------------------|----------|
| 3.3 V bias           | 3306 mV  |
| 5.0 V bias           | 5018 mV  |
| 5.0 V TOP            | 5037 mV  |
| 8.0 V bias           | 7223 mV  |
| Power (Base/PMB/MMB) |          |
| 1.2 V                | 1205 mV  |
| 1.5 V                | 1503 mV  |
| 5.0 V BOT            | 5084 mV  |
| 12.0 V TOP Base      | 11775 mV |
| 12.0 V BOT Base      | 11794 mV |
| 1.1 V PMB            | 1108 mV  |
| 1.2 V PMB            | 1196 mV  |
| 1.5 V PMB            | 1499 mV  |
| 1.8 V PMB            | 1811 mV  |
| 2.5 V PMB            | 2515 mV  |
| 3.3 V PMB            | 3318 mV  |
| 5.0 V PMB            | 5030 mV  |
| 12.0 V PMB           | 11832 mV |
| 0.75 MMB TOP         | 752 mV   |
| 1.5 V MMB TOP        | 1489 mV  |
| 1.8 V MMB TOP        | 1782 mV  |
| 2.5 V MMB TOP        | 2498 mV  |
| 1.2 V MMB TOP        | 1155 mV  |
| 5.0 V MMB TOP        | 4902 mV  |
| 12.0 V MMB TOP       | 11721 mV |
| 3.3 V MMB TOP        | 3316 mV  |
| 0.75 MMB BOT         | 754 mV   |
| 1.5 V MMB BOT        | 1482 mV  |
| 1.8 V MMB BOT        | 1758 mV  |
| 2.5 V MMB BOT        | 2488 mV  |
| 1.2 V MMB BOT        | 1157 mV  |
| 5.0 V MMB BOT        | 4962 mV  |
| 12.0 V MMB BOT       | 11691 mV |
| 3.3 V MMB BOT        | 3308 mV  |
| APS 00               | 1484 mV  |
| APS 01               | 2503 mV  |
| APS 02               | 3313 mV  |
| 5.0 V PIC 0          | 5025 mV  |
| APS 10               | 1501 mV  |
| APS 11               | 2466 mV  |
| APS 12               | 3311 mV  |
| 5.0 V PIC 1          | 5081 mV  |
| Bus Revision         | 49       |

### show chassis environment fpc (QFX Series and OCX Series)

```
user@switch> show chassis environment fpc 0
```

```
FPC 0 status:
State                Online
Temperature           42 degrees C / 107 degrees F
```

### show chassis environment fpc interconnect-device (QFabric Systems)

```
user@switch> show chassis environment fpc interconnect-device interconnect1 0
```

```
FC 0 FPC 0 status:
State                Online
Left Intake Temperature 24 degrees C / 75 degrees F
```

```

Right Intake Temperature 24 degrees C / 75 degrees F
Left Exhaust Temperature 27 degrees C / 80 degrees F
Right Exhaust Temperature 27 degrees C / 80 degrees F
Power
  BIAS 3V3                3330 mV
  VDD 3V3                 3300 mV
  VDD 2V5                 2502 mV
  VDD 1V5                 1496 mV
  VDD 1V2                 1194 mV
  VDD 1V0                 1000 mV
  SW0 VDD 1V0             1020 mV
  SW0 CVDD 1V025          1032 mV
  SW1 VDD 1V0             1022 mV
  SW1 CVDD 1V025          1030 mV
  VDD 12V0 DIV3_33        3414 mV

```

### show chassis environment fpc 5 (PTX3000 Packet Transport Router)

```
user@host> show chassis environment fpc 5
```

```

FPC 5 status:
State                Online
Intake Temperature   31 degrees C / 87 degrees F
Exhaust Temperature  41 degrees C / 105 degrees F
Power
  FPC 12.0v          12221 mV
  FPC VCC 0.5-1.3v   1640 mV
  FPC VNN 0.5-1.3v   1640 mV
  FPC 1.0v            1640 mV
  FPC 1.1v            1640 mV
  FPC 1.35v           1640 mV
  FPC VDDQ 1.5v       1640 mV
  FPC 1.8v            1640 mV
  FPC 3.3v            3280 mV
  FPC 5.0v bias       5143 mV
  FPC 5.0v usb        5143 mV
  FPC VCC 12.0v       12289 mV
  FPC Vref 3.3v       3280 mV
  MAIN 12.0v-i        2265 mA

```

### show chassis environment fpc 0 (PTX5000 Packet Transport Router)

```
user@host> show chassis environment fpc 0
```

```

FPC 0 status:
State                Online
PMB Temperature      35 degrees C / 95 degrees F
Intake Temperature    33 degrees C / 91 degrees F
Exhaust A Temperature 51 degrees C / 123 degrees F
Exhaust B Temperature 43 degrees C / 109 degrees F
TL0 Temperature       48 degrees C / 118 degrees F
TQ0 Temperature       53 degrees C / 127 degrees F
TL1 Temperature       56 degrees C / 132 degrees F
TQ1 Temperature       58 degrees C / 136 degrees F
TL2 Temperature       55 degrees C / 131 degrees F
TQ2 Temperature       57 degrees C / 134 degrees F
TL3 Temperature       59 degrees C / 138 degrees F
TQ3 Temperature       59 degrees C / 138 degrees F
Power

```

|      |       |         |
|------|-------|---------|
| PMB  | 1.05v | 1049 mV |
| PMB  | 1.5v  | 1500 mV |
| PMB  | 2.5v  | 2500 mV |
| PMB  | 3.3v  | 3299 mV |
| PFE0 | 1.5v  | 1500 mV |
| PFE0 | 1.0v  | 999 mV  |
| TQ0  | 0.9v  | 900 mV  |
| TL0  | 0.9v  | 900 mV  |
| PFE1 | 1.5v  | 1499 mV |
| PFE1 | 1.0v  | 999 mV  |
| TQ1  | 0.9v  | 899 mV  |
| TL1  | 0.9v  | 900 mV  |
| PFE2 | 1.5v  | 1500 mV |
| PFE2 | 1.0v  | 1000 mV |
| TQ2  | 0.9v  | 900 mV  |
| TL2  | 0.9v  | 900 mV  |
| PFE3 | 1.5v  | 1499 mV |
| PFE3 | 1.0v  | 1000 mV |
| TQ3  | 0.9v  | 900 mV  |
| TL3  | 0.9v  | 900 mV  |
| Bias | 3.3v  | 3327 mV |
| FPC  | 3.3v  | 3300 mV |
| FPC  | 2.5v  | 2500 mV |
| SAM  | 0.9v  | 900 mV  |
| A    | 12.0v | 2014 mV |
| B    | 12.0v | 2030 mV |

#### show chassis environment fpc 07 (PTX5000 Packet Transport Router with FPC2-PTX-P1A)

```
user@host> show chassis environment fpc 07
```

```
FPC 7 status:
State Online
PMB TEMPO Temperature 32 degrees C / 89 degrees F
PMB TEMP1 Temperature 28 degrees C / 82 degrees F
PMB CPU Temperature 46 degrees C / 114 degrees F
Intake Temperature 35 degrees C / 95 degrees F
Exhaust A Temperature 55 degrees C / 131 degrees F
Exhaust B Temperature 54 degrees C / 129 degrees F
TL5 Temperature 59 degrees C / 138 degrees F
TQ5 Temperature 57 degrees C / 134 degrees F
TL6 Temperature 57 degrees C / 134 degrees F
TQ6 Temperature 51 degrees C / 123 degrees F
TL1 Temperature 76 degrees C / 168 degrees F
TQ1 Temperature 58 degrees C / 136 degrees F
TL2 Temperature 75 degrees C / 167 degrees F
TQ2 Temperature 57 degrees C / 134 degrees F
TL4 Temperature 52 degrees C / 125 degrees F
TQ4 Temperature 66 degrees C / 150 degrees F
TL7 Temperature 52 degrees C / 125 degrees F
TQ7 Temperature 60 degrees C / 140 degrees F
TL0 Temperature 72 degrees C / 161 degrees F
TQ0 Temperature 73 degrees C / 163 degrees F
TL3 Temperature 64 degrees C / 147 degrees F
TQ3 Temperature 70 degrees C / 158 degrees F
Power
PMB 1.05v 1049 mV
PMB 3.3v 3299 mV
PMB 1.1v-a 1100 mV
PMB 1.5v 1499 mV
```

```

PMB 1.1v-b 1100 mV
Base 3.3v 3300 mV
FPC Base 2.5v 2499 mV
TL1 0.9v 897 mV
TQ1 0.9v 897 mV
PFE1 1.0v 999 mV
PFE1 1.5v 1499 mV
TL2 0.9v 897 mV
TQ2 0.9v 897 mV
PFE2 1.0v 999 mV
PFE2 1.5v 1499 mV
FPC Base 1.0v 1000 mV
FPC Base 1.2v 1199 mV
TL5 0.9v 898 mV
TQ5 0.9v 898 mV
PFE5 1.0v 1000 mV
PFE5 1.5v 1500 mV
TL6 0.9v 897 mV
TQ6 0.9v 897 mV
PFE6 1.0v 1000 mV
PFE6 1.5v 1499 mV
Mezz Base 2.5v 2500 mV
TL0 0.9v 896 mV
TQ0 0.9v 896 mV
PFE0 1.0v 999 mV
PFE0 1.5v 1499 mV

```

### show chassis environment fpc (PTX10008 router)

```
user@host> show chassis environment fpc
```

```

FPC 0 status:
State Online
FPC 0 Intake-A Temp Sensor 37 degrees C / 98 degrees F
FPC 0 Intake-B Temp Sensor 34 degrees C / 93 degrees F
FPC 0 Exhaust-A Temp Sensor 37 degrees C / 98 degrees F
FPC 0 Exhaust-B Temp Sensor 38 degrees C / 100 degrees F
FPC 0 Exhaust-C Temp Sensor 40 degrees C / 104 degrees F
FPC 0 PE0 Temp Sensor 41 degrees C / 105 degrees F
FPC 0 PE1 Temp Sensor 42 degrees C / 107 degrees F
FPC 0 PE2 Temp Sensor 44 degrees C / 111 degrees F
FPC 0 LCPU Temp Sensor 40 degrees C / 104 degrees F
Power
PE0 Core 0.9V 872 mV 28777 mA 25146 mW
PE0 HMC0 Core 0.9V 899 mV 10359 mA 9328 mW
PE1 Core 0.9V 896 mV 29476 mA 26414 mW
PE1 HMC0 Core 0.9V 899 mV 10218 mA 9187 mW
PE2 Core 0.9V 872 mV 28839 mA 25199 mW
PE2 HMC0 Core 0.9V 900 mV 10296 mA 9265 mW
PE0 Serdes 1.0V 1020 mV 29000 mA 29593 mW
PE1 Serdes 1.0V 1019 mV 29109 mA 29718 mW
PE2 Serdes 1.0V 1019 mV 28484 mA 29078 mW
LCPU Platform 1.1V 1099 mV 3515 mA 3867 mW
LCPU Core 1.0V 1000 mV 8750 mA 8703 mW
PHY VDD B 1.0V 1000 mV 17062 mA 17031 mW
PHY VDD A 1.0V 999 mV 15640 mA 15625 mW
BCM Core 1.0V 999 mV 7054 mA 7054 mW
BCM PEX 1.0V 999 mV 3562 mA 3558 mW
HMC Core 1.2V 1199 mV 1280 mA 1513 mW
HMC Serdes 1.2V 1199 mV 32937 mA 39500 mW

```

|                             |                              |          |           |
|-----------------------------|------------------------------|----------|-----------|
| VDD 1.5V                    | 1500 mV                      | 2824 mA  | 4234 mW   |
| VDD 2.5V                    | 2449 mV                      | 3812 mA  | 9343 mW   |
| VDD 3.3V                    | 3299 mV                      | 5085 mA  | 16796 mW  |
| 12V                         | 12259 mV                     | 29609 mA | 368196 mW |
| FPC 1 status:               |                              |          |           |
| State                       | Online                       |          |           |
| FPC 1 Intake-A Temp Sensor  | 37 degrees C / 98 degrees F  |          |           |
| FPC 1 Intake-B Temp Sensor  | 34 degrees C / 93 degrees F  |          |           |
| FPC 1 Exhaust-A Temp Sensor | 38 degrees C / 100 degrees F |          |           |
| FPC 1 Exhaust-B Temp Sensor | 38 degrees C / 100 degrees F |          |           |
| FPC 1 Exhaust-C Temp Sensor | 40 degrees C / 104 degrees F |          |           |
| FPC 1 PE0 Temp Sensor       | 41 degrees C / 105 degrees F |          |           |
| FPC 1 PE1 Temp Sensor       | 42 degrees C / 107 degrees F |          |           |
| FPC 1 PE2 Temp Sensor       | 44 degrees C / 111 degrees F |          |           |
| FPC 1 LCPU Temp Sensor      | 39 degrees C / 102 degrees F |          |           |
| Power                       |                              |          |           |
| PE0 Core 0.9V               | 898 mV                       | 29351 mA | 26421 mW  |
| PE0 HMC0 Core 0.9V          | 899 mV                       | 9734 mA  | 8750 mW   |
| PE1 Core 0.9V               | 873 mV                       | 28539 mA | 24933 mW  |
| PE1 HMC0 Core 0.9V          | 899 mV                       | 9937 mA  | 8937 mW   |
| PE2 Core 0.9V               | 875 mV                       | 28906 mA | 25316 mW  |
| PE2 HMC0 Core 0.9V          | 899 mV                       | 10140 mA | 9125 mW   |
| PE0 Serdes 1.0V             | 1019 mV                      | 28312 mA | 28890 mW  |
| PE1 Serdes 1.0V             | 1020 mV                      | 28656 mA | 29234 mW  |
| PE2 Serdes 1.0V             | 1020 mV                      | 29437 mA | 30015 mW  |
| LCPU Platform 1.1V          | 1100 mV                      | 4617 mA  | 5078 mW   |
| LCPU Core 1.0V              | 1000 mV                      | 8781 mA  | 8781 mW   |
| PHY VDD B 1.0V              | 1000 mV                      | 15953 mA | 15984 mW  |
| PHY VDD A 1.0V              | 1000 mV                      | 15484 mA | 15484 mW  |
| BCM Core 1.0V               | 999 mV                       | 7945 mA  | 7937 mW   |
| BCM PEX 1.0V                | 999 mV                       | 3515 mA  | 3515 mW   |
| HMC Core 1.2V               | 1199 mV                      | 1269 mA  | 1521 mW   |
| HMC Serdes 1.2V             | 1199 mV                      | 33000 mA | 39593 mW  |
| VDD 1.5V                    | 1500 mV                      | 2691 mA  | 4062 mW   |
| VDD 2.5V                    | 2449 mV                      | 3582 mA  | 8781 mW   |
| VDD 3.3V                    | 3300 mV                      | 2563 mA  | 8458 mW   |
| 12V                         | 12311 mV                     | 29002 mA | 357577 mW |
| FPC 2 status:               |                              |          |           |
| State                       | Online                       |          |           |
| FPC 2 Intake-A Temp Sensor  | 43 degrees C / 109 degrees F |          |           |
| FPC 2 Intake-B Temp Sensor  | 30 degrees C / 86 degrees F  |          |           |
| FPC 2 Exhaust-A Temp Sensor | 50 degrees C / 122 degrees F |          |           |
| FPC 2 Exhaust-B Temp Sensor | 52 degrees C / 125 degrees F |          |           |
| FPC 2 Exhaust-C Temp Sensor | 51 degrees C / 123 degrees F |          |           |
| FPC 2 PE0 Temp Sensor       | 48 degrees C / 118 degrees F |          |           |
| FPC 2 PE1 Temp Sensor       | 56 degrees C / 132 degrees F |          |           |
| FPC 2 PE2 Temp Sensor       | 48 degrees C / 118 degrees F |          |           |
| FPC 2 PE3 Temp Sensor       | 57 degrees C / 134 degrees F |          |           |
| FPC 2 PE4 Temp Sensor       | 48 degrees C / 118 degrees F |          |           |
| FPC 2 PE5 Temp Sensor       | 60 degrees C / 140 degrees F |          |           |
| FPC 2 LCPU Temp Sensor      | 47 degrees C / 116 degrees F |          |           |
| Power                       |                              |          |           |
| PE0 Core 0.9V               | 874 mV                       | 28117 mA | 24617 mW  |
| PE1 Core 0.9V               | 899 mV                       | 29601 mA | 26632 mW  |
| PE0 Serdes 1.0V             | 1019 mV                      | 41031 mA | 41843 mW  |
| PE1 Serdes 1.0V             | 1019 mV                      | 35656 mA | 36343 mW  |
| PE0 HMC Core 0.9V           | 899 mV                       | 8125 mA  | 7312 mW   |
| PE0,1 HMC Memory 1.2V       | 1199 mV                      | 565 mA   | 688 mW    |
| PE1 HMC Core 0.9V           | 899 mV                       | 7921 mA  | 7125 mW   |
| PE0,1 HMC Serdes 1.2V       | 1199 mV                      | 21281 mA | 25562 mW  |

|                       |          |          |           |
|-----------------------|----------|----------|-----------|
| PE2 Core 0.9V         | 899 mV   | 29187 mA | 26242 mW  |
| PE3 Core 0.9V         | 899 mV   | 29976 mA | 27074 mW  |
| PE2 Serdes 1.0V       | 1019 mV  | 38562 mA | 39343 mW  |
| PE3 Serdes 1.0V       | 1019 mV  | 34937 mA | 35656 mW  |
| PE2 HMC Core 0.9V     | 899 mV   | 8093 mA  | 7281 mW   |
| PE2,3 HMC Memory 1.2V | 1199 mV  | 610 mA   | 732 mW    |
| PE3 HMC Core 0.9V     | 899 mV   | 7710 mA  | 6937 mW   |
| PE2,3 HMC Serdes 1.2V | 1199 mV  | 21500 mA | 25812 mW  |
| VDD 3.3V              | 3300 mV  | 7937 mA  | 26187 mW  |
| VDD 1.5V              | 1499 mV  | 3234 mA  | 4851 mW   |
| VDD 2.5V              | 2449 mV  | 4539 mA  | 11109 mW  |
| PE4 Core 0.9V         | 874 mV   | 29914 mA | 26183 mW  |
| PE5 Core 0.9V         | 874 mV   | 29820 mA | 26031 mW  |
| PE4 Serdes 1.0V       | 1020 mV  | 43968 mA | 44843 mW  |
| PE5 Serdes 1.0V       | 1019 mV  | 27453 mA | 28031 mW  |
| PE4 HMC Core 0.9V     | 900 mV   | 7937 mA  | 7140 mW   |
| PE4,5 HMC Memory 1.2V | 1200 mV  | 1185 mA  | 1421 mW   |
| PE5 HMC Core 0.9V     | 899 mV   | 8718 mA  | 7843 mW   |
| PE4,5 HMC Serdes 1.2V | 1199 mV  | 21125 mA | 25343 mW  |
| LCPU platform 1.1V    | 1099 mV  | 3777 mA  | 4156 mW   |
| LCPU core 1.0V        | 1000 mV  | 9062 mA  | 9062 mW   |
| BCM core 1.0V         | 1000 mV  | 9328 mA  | 9328 mW   |
| BCM & PEX Serdes 1.0V | 999 mV   | 4125 mA  | 4125 mW   |
| 12V                   | 12311 mV | 53347 mA | 660345 mW |

FPC 3 status:

|                             |                              |
|-----------------------------|------------------------------|
| State                       | Online                       |
| FPC 3 Intake-A Temp Sensor  | 43 degrees C / 109 degrees F |
| FPC 3 Intake-B Temp Sensor  | 30 degrees C / 86 degrees F  |
| FPC 3 Exhaust-A Temp Sensor | 48 degrees C / 118 degrees F |
| FPC 3 Exhaust-B Temp Sensor | 49 degrees C / 120 degrees F |
| FPC 3 Exhaust-C Temp Sensor | 47 degrees C / 116 degrees F |
| FPC 3 PE0 Temp Sensor       | 48 degrees C / 118 degrees F |
| FPC 3 PE1 Temp Sensor       | 55 degrees C / 131 degrees F |
| FPC 3 PE2 Temp Sensor       | 47 degrees C / 116 degrees F |
| FPC 3 PE3 Temp Sensor       | 54 degrees C / 129 degrees F |
| FPC 3 PE4 Temp Sensor       | 48 degrees C / 118 degrees F |
| FPC 3 PE5 Temp Sensor       | 58 degrees C / 136 degrees F |
| FPC 3 LCPU Temp Sensor      | 46 degrees C / 114 degrees F |

Power

|                       |         |          |          |
|-----------------------|---------|----------|----------|
| PE0 Core 0.9V         | 899 mV  | 29695 mA | 26718 mW |
| PE1 Core 0.9V         | 899 mV  | 29695 mA | 26710 mW |
| PE0 Serdes 1.0V       | 1020 mV | 40156 mA | 40906 mW |
| PE1 Serdes 1.0V       | 1020 mV | 35281 mA | 35968 mW |
| PE0 HMC Core 0.9V     | 900 mV  | 7492 mA  | 6742 mW  |
| PE0,1 HMC Memory 1.2V | 1199 mV | 569 mA   | 683 mW   |
| PE1 HMC Core 0.9V     | 899 mV  | 7570 mA  | 6812 mW  |
| PE0,1 HMC Serdes 1.2V | 1199 mV | 20562 mA | 24656 mW |
| PE2 Core 0.9V         | 899 mV  | 29734 mA | 26765 mW |
| PE3 Core 0.9V         | 900 mV  | 29960 mA | 26968 mW |
| PE2 Serdes 1.0V       | 1019 mV | 37718 mA | 38500 mW |
| PE3 Serdes 1.0V       | 1020 mV | 35250 mA | 35937 mW |
| PE2 HMC Core 0.9V     | 899 mV  | 7750 mA  | 6976 mW  |
| PE2,3 HMC Memory 1.2V | 1200 mV | 546 mA   | 656 mW   |
| PE3 HMC Core 0.9V     | 899 mV  | 7718 mA  | 6945 mW  |
| PE2,3 HMC Serdes 1.2V | 1199 mV | 20625 mA | 24750 mW |
| VDD 3.3V              | 3299 mV | 5917 mA  | 19515 mW |
| VDD 1.5V              | 1499 mV | 4015 mA  | 6015 mW  |
| VDD 2.5V              | 2449 mV | 4335 mA  | 10625 mW |
| PE4 Core 0.9V         | 899 mV  | 29835 mA | 26875 mW |
| PE5 Core 0.9V         | 924 mV  | 30554 mA | 28277 mW |

|                       |          |          |           |
|-----------------------|----------|----------|-----------|
| PE4 Serdes 1.0V       | 1019 mV  | 43281 mA | 44187 mW  |
| PE5 Serdes 1.0V       | 1020 mV  | 27140 mA | 27703 mW  |
| PE4 HMC Core 0.9V     | 899 mV   | 7476 mA  | 6726 mW   |
| PE4,5 HMC Memory 1.2V | 1199 mV  | 531 mA   | 637 mW    |
| PE5 HMC Core 0.9V     | 899 mV   | 7539 mA  | 6781 mW   |
| PE4,5 HMC Serdes 1.2V | 1199 mV  | 20375 mA | 24468 mW  |
| LCPU platform 1.1V    | 1099 mV  | 3453 mA  | 3796 mW   |
| LCPU core 1.0V        | 999 mV   | 8984 mA  | 8984 mW   |
| BCM core 1.0V         | 999 mV   | 7929 mA  | 7921 mW   |
| BCM & PEX Serdes 1.0V | 1000 mV  | 4046 mA  | 4046 mW   |
| 12V                   | 12351 mV | 51918 mA | 644880 mW |

## FPC 5 status:

```

State                               Online
FPC 5 Intake-A Temp Sensor Failed
FPC 5 Intake-B Temp Sensor Failed
FPC 5 Exhaust-A Temp Sensor41 degrees C / 105 degrees F
FPC 5 Exhaust-B Temp Sensor41 degrees C / 105 degrees F
FPC 5 Exhaust-C Temp Sensor42 degrees C / 107 degrees F
FPC 5 PE0 Temp Sensor      47 degrees C / 116 degrees F
FPC 5 PE1 Temp Sensor      49 degrees C / 120 degrees F
FPC 5 PE2 Temp Sensor      53 degrees C / 127 degrees F
FPC 5 LCPU Temp Sensor     Failed

```

## Power

|                    |          |          |           |
|--------------------|----------|----------|-----------|
| PE0 Core 0.9V      | 923 mV   | 30976 mA | 28578 mW  |
| PE0 HMC0 Core 0.9V | 899 mV   | 10093 mA | 9078 mW   |
| PE1 Core 0.9V      | 897 mV   | 29398 mA | 26414 mW  |
| PE1 HMC0 Core 0.9V | 899 mV   | 9734 mA  | 8750 mW   |
| PE2 Core 0.9V      | 922 mV   | 30226 mA | 27886 mW  |
| PE2 HMC0 Core 0.9V | 899 mV   | 9984 mA  | 8968 mW   |
| PE0 Serdes 1.0V    | 1019 mV  | 29296 mA | 29890 mW  |
| PE1 Serdes 1.0V    | 1020 mV  | 28687 mA | 29296 mW  |
| PE2 Serdes 1.0V    | 1020 mV  | 28187 mA | 28765 mW  |
| LCPU Platform 1.1V | 1100 mV  | 3664 mA  | 4031 mW   |
| LCPU Core 1.0V     | 999 mV   | 9125 mA  | 9125 mW   |
| PHY VDD B 1.0V     | 999 mV   | 15593 mA | 15593 mW  |
| PHY VDD A 1.0V     | 1000 mV  | 15453 mA | 15453 mW  |
| BCM Core 1.0V      | 999 mV   | 7773 mA  | 7765 mW   |
| BCM PEX 1.0V       | 1000 mV  | 3460 mA  | 3464 mW   |
| HMC Core 1.2V      | 1199 mV  | 1328 mA  | 1628 mW   |
| HMC Serdes 1.2V    | 1199 mV  | 32203 mA | 38625 mW  |
| VDD 1.5V           | 1499 mV  | 2675 mA  | 4007 mW   |
| VDD 2.5V           | 2450 mV  | 3675 mA  | 9000 mW   |
| VDD 3.3V           | 3300 mV  | 1814 mA  | 5980 mW   |
| 12V                | 12272 mV | 29045 mA | 361369 mW |

## FPC 6 status:

```

State                               Online
FPC 6 Intake-A Temp Sensor 41 degrees C / 105 degrees F
FPC 6 Intake-B Temp Sensor 37 degrees C / 98 degrees F
FPC 6 Exhaust-A Temp Sensor40 degrees C / 104 degrees F
FPC 6 Exhaust-B Temp Sensor40 degrees C / 104 degrees F
FPC 6 Exhaust-C Temp Sensor40 degrees C / 104 degrees F
FPC 6 PE0 Temp Sensor      45 degrees C / 113 degrees F
FPC 6 PE1 Temp Sensor      47 degrees C / 116 degrees F
FPC 6 PE2 Temp Sensor      51 degrees C / 123 degrees F
FPC 6 LCPU Temp Sensor     41 degrees C / 105 degrees F

```

## Power

|                    |        |          |          |
|--------------------|--------|----------|----------|
| PE0 Core 0.9V      | 897 mV | 30214 mA | 27179 mW |
| PE0 HMC0 Core 0.9V | 899 mV | 10000 mA | 8984 mW  |
| PE1 Core 0.9V      | 873 mV | 29332 mA | 25601 mW |
| PE1 HMC0 Core 0.9V | 899 mV | 9828 mA  | 8828 mW  |



|                    |          |          |           |
|--------------------|----------|----------|-----------|
| PE2 Core 0.9V      | 898 mV   | 30781 mA | 27675 mW  |
| PE2 HMC0 Core 0.9V | 899 mV   | 10328 mA | 9296 mW   |
| PE0 Serdes 1.0V    | 1019 mV  | 28921 mA | 29531 mW  |
| PE1 Serdes 1.0V    | 1020 mV  | 29437 mA | 30046 mW  |
| PE2 Serdes 1.0V    | 1019 mV  | 29671 mA | 30281 mW  |
| LCPU Platform 1.1V | 1100 mV  | 3671 mA  | 4039 mW   |
| LCPU Core 1.0V     | 1000 mV  | 8218 mA  | 8187 mW   |
| PHY VDD B 1.0V     | 1000 mV  | 15984 mA | 15984 mW  |
| PHY VDD A 1.0V     | 999 mV   | 16093 mA | 16093 mW  |
| BCM Core 1.0V      | 1000 mV  | 8046 mA  | 8062 mW   |
| BCM PEX 1.0V       | 1000 mV  | 3500 mA  | 3500 mW   |
| HMC Core 1.2V      | 1199 mV  | 1327 mA  | 1579 mW   |
| HMC Serdes 1.2V    | 1199 mV  | 33031 mA | 39593 mW  |
| VDD 1.5V           | 1499 mV  | 2722 mA  | 4078 mW   |
| VDD 2.5V           | 2449 mV  | 3539 mA  | 8671 mW   |
| VDD 3.3V           | 3299 mV  | 8082 mA  | 26656 mW  |
| 12V                | 12311 mV | 31124 mA | 385270 mW |

### show chassis environment fpc (PTX10016 router)

```
user@host> show chassis environment fpc
```

FPC 1 status:

| State                       | Online                       |
|-----------------------------|------------------------------|
| FPC 1 Intake-A Temp Sensor  | 36 degrees C / 96 degrees F  |
| FPC 1 Intake-B Temp Sensor  | 32 degrees C / 89 degrees F  |
| FPC 1 Exhaust-A Temp Sensor | 37 degrees C / 98 degrees F  |
| FPC 1 Exhaust-B Temp Sensor | 36 degrees C / 96 degrees F  |
| FPC 1 Exhaust-C Temp Sensor | 36 degrees C / 96 degrees F  |
| FPC 1 PE0 Temp Sensor       | 45 degrees C / 113 degrees F |
| FPC 1 PE1 Temp Sensor       | 46 degrees C / 114 degrees F |
| FPC 1 PE2 Temp Sensor       | 53 degrees C / 127 degrees F |
| FPC 1 LCPU Temp Sensor      | 35 degrees C / 95 degrees F  |

Power

|                    |          |          |           |
|--------------------|----------|----------|-----------|
| PE0 Core 0.9V      | 897 mV   | 28992 mA | 26027 mW  |
| PE0 HMC0 Core 0.9V | 899 mV   | 10156 mA | 9156 mW   |
| PE1 Core 0.9V      | 871 mV   | 28800 mA | 25164 mW  |
| PE1 HMC0 Core 0.9V | 899 mV   | 10125 mA | 9109 mW   |
| PE2 Core 0.9V      | 898 mV   | 29914 mA | 26906 mW  |
| PE2 HMC0 Core 0.9V | 899 mV   | 10343 mA | 9296 mW   |
| PE0 Serdes 1.0V    | 1019 mV  | 27515 mA | 28093 mW  |
| PE1 Serdes 1.0V    | 1020 mV  | 27968 mA | 28546 mW  |
| PE2 Serdes 1.0V    | 1019 mV  | 27796 mA | 28359 mW  |
| LCPU Platform 1.1V | 1100 mV  | 3347 mA  | 3289 mW   |
| LCPU Core 1.0V     | 1000 mV  | 7960 mA  | 7960 mW   |
| PHY VDD B 1.0V     | 1000 mV  | 16437 mA | 16437 mW  |
| PHY VDD A 1.0V     | 999 mV   | 15656 mA | 15656 mW  |
| BCM Core 1.0V      | 1000 mV  | 7289 mA  | 7335 mW   |
| BCM PEX 1.0V       | 999 mV   | 3453 mA  | 3453 mW   |
| HMC Core 1.2V      | 1199 mV  | 1218 mA  | 1453 mW   |
| HMC Serdes 1.2V    | 1199 mV  | 32093 mA | 38562 mW  |
| VDD 1.5V           | 1500 mV  | 2859 mA  | 4289 mW   |
| VDD 2.5V           | 2449 mV  | 3875 mA  | 9500 mW   |
| VDD 3.3V           | 3299 mV  | 2806 mA  | 9257 mW   |
| 12V                | 12351 mV | 28569 mA | 354877 mW |

FPC 3 status:

| State                       | Online                      |
|-----------------------------|-----------------------------|
| FPC 3 Intake-A Temp Sensor  | 35 degrees C / 95 degrees F |
| FPC 3 Intake-B Temp Sensor  | 31 degrees C / 87 degrees F |
| FPC 3 Exhaust-A Temp Sensor | 36 degrees C / 96 degrees F |

```

FPC 3 Exhaust-B Temp Sensor34 degrees C / 93 degrees F
FPC 3 Exhaust-C Temp Sensor33 degrees C / 91 degrees F
FPC 3 PE0 Temp Sensor      43 degrees C / 109 degrees F
FPC 3 PE1 Temp Sensor      45 degrees C / 113 degrees F
FPC 3 PE2 Temp Sensor      49 degrees C / 120 degrees F
FPC 3 LCPU Temp Sensor     35 degrees C / 95 degrees F

```

## Power

|                    |          |          |           |
|--------------------|----------|----------|-----------|
| PE0 Core 0.9V      | 897 mV   | 28832 mA | 25871 mW  |
| PE0 HMC0 Core 0.9V | 899 mV   | 10359 mA | 9328 mW   |
| PE1 Core 0.9V      | 873 mV   | 28230 mA | 24671 mW  |
| PE1 HMC0 Core 0.9V | 899 mV   | 10468 mA | 9421 mW   |
| PE2 Core 0.9V      | 898 mV   | 29539 mA | 26539 mW  |
| PE2 HMC0 Core 0.9V | 899 mV   | 10656 mA | 9593 mW   |
| PE0 Serdes 1.0V    | 1020 mV  | 27484 mA | 28031 mW  |
| PE1 Serdes 1.0V    | 1019 mV  | 27515 mA | 28078 mW  |
| PE2 Serdes 1.0V    | 1020 mV  | 27625 mA | 28187 mW  |
| LCPU Platform 1.1V | 1099 mV  | 3050 mA  | 3355 mW   |
| LCPU Core 1.0V     | 999 mV   | 7820 mA  | 7804 mW   |
| PHY VDD B 1.0V     | 999 mV   | 15406 mA | 15406 mW  |
| PHY VDD A 1.0V     | 1000 mV  | 14953 mA | 14953 mW  |
| BCM Core 1.0V      | 1000 mV  | 7648 mA  | 7648 mW   |
| BCM PEX 1.0V       | 1000 mV  | 3531 mA  | 3531 mW   |
| HMC Core 1.2V      | 1200 mV  | 1234 mA  | 1476 mW   |
| HMC Serdes 1.2V    | 1199 mV  | 34671 mA | 41593 mW  |
| VDD 1.5V           | 1499 mV  | 3484 mA  | 5226 mW   |
| VDD 2.5V           | 2449 mV  | 3218 mA  | 7890 mW   |
| VDD 3.3V           | 3299 mV  | 2468 mA  | 8148 mW   |
| 12V                | 12311 mV | 28785 mA | 355950 mW |

## FPC 6 status:

```

State                               Online

```

```

FPC 6 Intake-A Temp Sensor 34 degrees C / 93 degrees F
FPC 6 Intake-B Temp Sensor 31 degrees C / 87 degrees F
FPC 6 Exhaust-A Temp Sensor34 degrees C / 93 degrees F
FPC 6 Exhaust-B Temp Sensor35 degrees C / 95 degrees F
FPC 6 Exhaust-C Temp Sensor35 degrees C / 95 degrees F
FPC 6 PE0 Temp Sensor      42 degrees C / 107 degrees F
FPC 6 PE1 Temp Sensor      43 degrees C / 109 degrees F
FPC 6 PE2 Temp Sensor      47 degrees C / 116 degrees F
FPC 6 LCPU Temp Sensor     34 degrees C / 93 degrees F

```

## Power

|                    |         |          |          |
|--------------------|---------|----------|----------|
| PE0 Core 0.9V      | 922 mV  | 29394 mA | 27160 mW |
| PE0 HMC0 Core 0.9V | 899 mV  | 10078 mA | 9062 mW  |
| PE1 Core 0.9V      | 923 mV  | 29636 mA | 27304 mW |
| PE1 HMC0 Core 0.9V | 899 mV  | 9890 mA  | 8890 mW  |
| PE2 Core 0.9V      | 898 mV  | 29734 mA | 26757 mW |
| PE2 HMC0 Core 0.9V | 899 mV  | 9968 mA  | 8968 mW  |
| PE0 Serdes 1.0V    | 1020 mV | 26968 mA | 27515 mW |
| PE1 Serdes 1.0V    | 1019 mV | 27421 mA | 27984 mW |
| PE2 Serdes 1.0V    | 1019 mV | 27625 mA | 28171 mW |
| LCPU Platform 1.1V | 1099 mV | 3230 mA  | 4742 mW  |
| LCPU Core 1.0V     | 999 mV  | 8171 mA  | 8171 mW  |
| PHY VDD B 1.0V     | 1000 mV | 15671 mA | 15687 mW |
| PHY VDD A 1.0V     | 999 mV  | 15703 mA | 15703 mW |
| BCM Core 1.0V      | 999 mV  | 7500 mA  | 7492 mW  |
| BCM PEX 1.0V       | 1000 mV | 3480 mA  | 3468 mW  |
| HMC Core 1.2V      | 1199 mV | 1199 mA  | 1440 mW  |
| HMC Serdes 1.2V    | 1199 mV | 31046 mA | 37250 mW |
| VDD 1.5V           | 1499 mV | 2804 mA  | 4203 mW  |
| VDD 2.5V           | 2449 mV | 3746 mA  | 9171 mW  |
| VDD 3.3V           | 3300 mV | 3173 mA  | 10476 mW |

```

12V                                12311 mV   28786 mA   355654 mW
FPC 8 status:
State                               Online
FPC 8 Intake-A Temp Sensor 34 degrees C / 93 degrees F
FPC 8 Intake-B Temp Sensor 30 degrees C / 86 degrees F
FPC 8 Exhaust-A Temp Sensor37 degrees C / 98 degrees F
FPC 8 Exhaust-B Temp Sensor37 degrees C / 98 degrees F
FPC 8 Exhaust-C Temp Sensor37 degrees C / 98 degrees F
FPC 8 PE0 Temp Sensor       42 degrees C / 107 degrees F
FPC 8 PE1 Temp Sensor       44 degrees C / 111 degrees F
FPC 8 PE2 Temp Sensor       47 degrees C / 116 degrees F
FPC 8 LCPU Temp Sensor      33 degrees C / 91 degrees F
Power
PE0 Core 0.9V                897 mV    29382 mA   26437 mW
PE0 HMC0 Core 0.9V           899 mV    10265 mA    9250 mW
PE1 Core 0.9V                872 mV    28867 mA   25175 mW
PE1 HMC0 Core 0.9V           899 mV    10171 mA    9109 mW
PE2 Core 0.9V                899 mV    30210 mA   27214 mW
PE2 HMC0 Core 0.9V           900 mV    10187 mA    9171 mW
PE0 Serdes 1.0V              1020 mV    27843 mA   28421 mW
PE1 Serdes 1.0V              1020 mV    28265 mA   28828 mW
PE2 Serdes 1.0V              1019 mV    28406 mA   29000 mW
LCPU Platform 1.1V           1099 mV     3000 mA    3300 mW
LCPU Core 1.0V               1000 mV     7937 mA    7937 mW
PHY VDD B 1.0V               1000 mV    15843 mA   15843 mW
PHY VDD A 1.0V               1000 mV    15250 mA   15250 mW
BCM Core 1.0V                999 mV     6914 mA    6898 mW
BCM PEX 1.0V                 999 mV     3445 mA    3445 mW
HMC Core 1.2V                1199 mV     1162 mA    1390 mW
HMC Serdes 1.2V              1199 mV    33437 mA   40125 mW
VDD 1.5V                     1499 mV     2851 mA    4273 mW
VDD 2.5V                     2450 mV     3867 mA    9484 mW
VDD 3.3V                     3300 mV     3258 mA   10753 mW
12V                           12338 mV    28656 mA   356171 mW
FPC 9 status:
State                               Online
FPC 9 Intake-A Temp Sensor 44 degrees C / 111 degrees F
FPC 9 Intake-B Temp Sensor 28 degrees C / 82 degrees F
FPC 9 Exhaust-A Temp Sensor51 degrees C / 123 degrees F
FPC 9 Exhaust-B Temp Sensor52 degrees C / 125 degrees F
FPC 9 Exhaust-C Temp Sensor48 degrees C / 118 degrees F
FPC 9 PE0 Temp Sensor        52 degrees C / 125 degrees F
FPC 9 PE1 Temp Sensor        65 degrees C / 149 degrees F
FPC 9 PE2 Temp Sensor        50 degrees C / 122 degrees F
FPC 9 PE3 Temp Sensor        65 degrees C / 149 degrees F
FPC 9 PE4 Temp Sensor        50 degrees C / 122 degrees F
FPC 9 PE5 Temp Sensor        67 degrees C / 152 degrees F
FPC 9 LCPU Temp Sensor       45 degrees C / 113 degrees F
Power
PE0 Core 0.9V                875 mV    28316 mA   24808 mW
PE1 Core 0.9V                875 mV    28546 mA   24996 mW
PE0 Serdes 1.0V              1019 mV    38906 mA   39687 mW
PE1 Serdes 1.0V              1020 mV    33078 mA   33781 mW
PE0 HMC Core 0.9V            899 mV     7718 mA    6945 mW
PE0,1 HMC Memory 1.2V       1199 mV      579 mA     695 mW
PE1 HMC Core 0.9V            899 mV     7289 mA    6570 mW
PE0,1 HMC Serdes 1.2V       1199 mV    20187 mA   24250 mW
PE2 Core 0.9V                924 mV    29062 mA   26894 mW
PE3 Core 0.9V                900 mV    28914 mA   26039 mW
PE2 Serdes 1.0V              1020 mV    36375 mA   37093 mW

```

|                       |          |          |           |
|-----------------------|----------|----------|-----------|
| PE3 Serdes 1.0V       | 1019 mV  | 32640 mA | 33296 mW  |
| PE2 HMC Core 0.9V     | 900 mV   | 7695 mA  | 6921 mW   |
| PE2,3 HMC Memory 1.2V | 1199 mV  | 562 mA   | 674 mW    |
| PE3 HMC Core 0.9V     | 899 mV   | 7554 mA  | 6796 mW   |
| PE2,3 HMC Serdes 1.2V | 1199 mV  | 20156 mA | 24218 mW  |
| VDD 3.3V              | 3300 mV  | 8964 mA  | 29609 mW  |
| VDD 1.5V              | 1499 mV  | 3968 mA  | 5945 mW   |
| VDD 2.5V              | 2449 mV  | 4414 mA  | 10890 mW  |
| PE4 Core 0.9V         | 900 mV   | 28527 mA | 25679 mW  |
| PE5 Core 0.9V         | 899 mV   | 28902 mA | 26035 mW  |
| PE4 Serdes 1.0V       | 1019 mV  | 41281 mA | 42125 mW  |
| PE5 Serdes 1.0V       | 1019 mV  | 25781 mA | 26328 mW  |
| PE4 HMC Core 0.9V     | 900 mV   | 7382 mA  | 6648 mW   |
| PE4,5 HMC Memory 1.2V | 1199 mV  | 626 mA   | 750 mW    |
| PE5 HMC Core 0.9V     | 899 mV   | 7562 mA  | 6796 mW   |
| PE4,5 HMC Serdes 1.2V | 1199 mV  | 20312 mA | 24375 mW  |
| LCPU platform 1.1V    | 1099 mV  | 3687 mA  | 4054 mW   |
| LCPU core 1.0V        | 1000 mV  | 9000 mA  | 9000 mW   |
| BCM core 1.0V         | 999 mV   | 7843 mA  | 7835 mW   |
| BCM & PEX Serdes 1.0V | 999 mV   | 4062 mA  | 4062 mW   |
| 12V                   | 12417 mV | 51659 mA | 643215 mW |

### show chassis environment FPC 1 (MX Routers with Media Services Blade [MSB])

```
user@switch> show chassis environment fpc 1
```

FPC 1 status:

|                       |                              |
|-----------------------|------------------------------|
| State                 | Online                       |
| Temperature Intake    | 36 degrees C / 96 degrees F  |
| Temperature Exhaust A | 39 degrees C / 102 degrees F |
| Temperature LU TSen   | 52 degrees C / 125 degrees F |
| Temperature LU Chip   | 54 degrees C / 129 degrees F |
| Temperature XM TSen   | 52 degrees C / 125 degrees F |
| Temperature XM Chip   | 60 degrees C / 140 degrees F |
| Temperature PCIE TSen | 52 degrees C / 125 degrees F |
| Temperature PCIE Chip | 69 degrees C / 156 degrees F |
| Power                 |                              |
| MPC-BIAS3V3-z12106    | 3302 mV                      |
| MPC-VDD3V3-z16100     | 3325 mV                      |
| MPC-AVDD1V0-z16100    | 1007 mV                      |
| MPC-PCIE_1V0-z16100   | 904 mV                       |
| MPC-LU0_1V0-z12004    | 996 mV                       |
| MPC-VDD_1V5-z12004    | 1498 mV                      |
| MPC-12VA-BMR453       | 11733 mV                     |
| MPC-12VB-BMR453       | 11728 mV                     |
| MPC-XM_0V9-vt273m     | 900 mV                       |
| I2C Slave Revision    | 81                           |

### show chassis environment FPC (Junos OS Evolved)

```
user@switch> show chassis environment fpc
```

FPC 0 status:

|                       |                              |
|-----------------------|------------------------------|
| State                 | Online                       |
| Intake Temperature    | 32 degrees C / 89 degrees F  |
| Exhaust-A Temperature | 43 degrees C / 109 degrees F |
| Exhaust-B Temperature | 32 degrees C / 89 degrees F  |
| PE0 Temperature       | 34 degrees C / 93 degrees F  |

|                 |                              |
|-----------------|------------------------------|
| PE1 Temperature | 38 degrees C / 100 degrees F |
| PE2 Temperature | 38 degrees C / 100 degrees F |
| PE3 Temperature | 36 degrees C / 96 degrees F  |
| PE4 Temperature | 35 degrees C / 95 degrees F  |
| PE5 Temperature | 35 degrees C / 95 degrees F  |
| Power 1         |                              |
| RT_1 1.0v       | 1018 mV                      |
| RT_2 1.0v       | 1018 mV                      |
| Power 2         |                              |
| FPC 1 1.0v      | 999 mV                       |
| FPC 2 1.0v      | 998 mV                       |
| Power 3         |                              |
| FPC 2.5v        | 2499 mV                      |
| FPC 3.3v        | 3299 mV                      |
| Power 4         |                              |
| FPC 0.9v        | 899 mV                       |
| FPC 1.5v        | 1499 mV                      |
| Power 5         |                              |
| PE0 1 1.0v      | 1039 mV                      |
| PE0 2 1.0v      | 1039 mV                      |
| Power 6         |                              |
| PE0 1 0.9v      | 900 mV                       |
| PE0 2 0.9v      | 900 mV                       |
| Power 7         |                              |
| PE0 3 0.9v      | 902 mV                       |
| PE0 4 0.9v      | 902 mV                       |
| Power 8         |                              |
| PE0 H 0.9v      | 899 mV                       |
| PE0 H 1.2v      | 1199 mV                      |
| Power 9         |                              |
| PE1 1 1.0v      | 1040 mV                      |
| PE1 2 1.0v      | 1039 mV                      |
| Power 10        |                              |
| PE1 1 0.9v      | 901 mV                       |
| PE1 2 0.9v      | 901 mV                       |
| Power 11        |                              |
| PE1 3 0.9v      | 900 mV                       |
| PE1 4 0.9v      | 900 mV                       |
| Power 12        |                              |
| PE1 H 0.9v      | 899 mV                       |
| PE1 H 1.2v      | 1199 mV                      |
| Power 13        |                              |
| PE2 1 1.0v      | 1039 mV                      |
| PE2 2 1.0v      | 1039 mV                      |
| Power 14        |                              |
| PE2 1 0.9v      | 900 mV                       |
| PE2 2 0.9v      | 900 mV                       |
| Power 15        |                              |
| PE2 3 0.9v      | 900 mV                       |
| PE2 4 0.9v      | 900 mV                       |
| Power 16        |                              |
| PE2 H 0.9v      | 899 mV                       |
| PE2 H 1.2v      | 1199 mV                      |
| Power 17        |                              |
| PE3 1 1.0v      | 1039 mV                      |
| PE3 2 1.0v      | 1039 mV                      |
| Power 18        |                              |
| PE3 1 0.9v      | 899 mV                       |
| PE3 2 0.9v      | 900 mV                       |
| Power 19        |                              |

```

    PE3 3 0.9v          899 mV
    PE3 4 0.9v          900 mV
Power 20
    PE3 H 0.9v          899 mV
    PE3 H 1.2v          1199 mV
Power 21
    PE4 1 1.0v          1039 mV
    PE4 2 1.0v          1039 mV
Power 22
    PE4 1 0.9v          900 mV
    PE4 2 0.9v          900 mV
Power 23
    PE4 3 0.9v          901 mV
    PE4 4 0.9v          901 mV
Power 24
    PE4 H 0.9v          899 mV
    PE4 H 1.2v          1199 mV
Power 25
    PE5 1 1.0v          1040 mV
    PE5 2 1.0v          1039 mV
Power 26
    PE5 1 0.9v          901 mV
    PE5 2 0.9v          901 mV
Power 27
    PE5 3 0.9v          901 mV
    PE5 4 0.9v          901 mV
Power 28
    PE5 H 0.9v          899 mV
    PE5 H 1.2v          1199 mV
Power 29
    PIC0 12.0v          12342 mV
Power 30
    PIC1 12.0v          12342 mV
Power 31
    A    12.0v          12375 mV
    B    12.0v          1008 mV
Bus Revision            115
FPC 1 status:
State                   Online
Intake Temperature      33 degrees C / 91 degrees F
Exhaust-A Temperature   44 degrees C / 111 degrees F
Exhaust-B Temperature   33 degrees C / 91 degrees F
PE0 Temperature         34 degrees C / 93 degrees F
PE1 Temperature         38 degrees C / 100 degrees F
PE2 Temperature         37 degrees C / 98 degrees F
PE3 Temperature         36 degrees C / 96 degrees F
PE4 Temperature         34 degrees C / 93 degrees F
PE5 Temperature         36 degrees C / 96 degrees F
Power 1
    RT_1 1.0v          1018 mV
    RT_2 1.0v          1018 mV
Power 2
    FPC 1 1.0v          999 mV
    FPC 2 1.0v          999 mV
Power 3
    FPC 2.5v          2499 mV
    FPC 3.3v          3300 mV
Power 4
    FPC 0.9v          899 mV
    FPC 1.5v          1500 mV

```

```

Power 5
  PE0 1 1.0v      1039 mV
  PE0 2 1.0v      1039 mV
Power 6
  PE0 1 0.9v      925 mV
  PE0 2 0.9v      925 mV
Power 7
  PE0 3 0.9v      925 mV
  PE0 4 0.9v      926 mV
Power 8
  PE0 H 0.9v      899 mV
  PE0 H 1.2v     1199 mV
Power 9
  PE1 1 1.0v      1040 mV
  PE1 2 1.0v      1039 mV
Power 10
  PE1 1 0.9v      900 mV
  PE1 2 0.9v      901 mV
Power 11
  PE1 3 0.9v      899 mV
  PE1 4 0.9v      900 mV
Power 12
  PE1 H 0.9v      899 mV
  PE1 H 1.2v     1199 mV
Power 13
  PE2 1 1.0v      1040 mV
  PE2 2 1.0v      1039 mV
Power 14
  PE2 1 0.9v      926 mV
  PE2 2 0.9v      926 mV
Power 15
  PE2 3 0.9v      927 mV
  PE2 4 0.9v      927 mV
Power 16
  PE2 H 0.9v      899 mV
  PE2 H 1.2v     1199 mV
Power 17
  PE3 1 1.0v      1039 mV
  PE3 2 1.0v      1039 mV
Power 18
  PE3 1 0.9v      926 mV
  PE3 2 0.9v      927 mV
Power 19
  PE3 3 0.9v      925 mV
  PE3 4 0.9v      926 mV
Power 20
  PE3 H 0.9v      899 mV
  PE3 H 1.2v     1199 mV
Power 21
  PE4 1 1.0v      1039 mV
  PE4 2 1.0v      1040 mV
Power 22
  PE4 1 0.9v      925 mV
  PE4 2 0.9v      925 mV
Power 23
  PE4 3 0.9v      925 mV
  PE4 4 0.9v      926 mV
Power 24
  PE4 H 0.9v      900 mV
  PE4 H 1.2v     1199 mV

```

```

Power 25
  PE5 1 1.0v          1039 mV
  PE5 2 1.0v          1039 mV
Power 26
  PE5 1 0.9v          898 mV
  PE5 2 0.9v          899 mV
Power 27
  PE5 3 0.9v          900 mV
  PE5 4 0.9v          900 mV
Power 28
  PE5 H 0.9v          899 mV
  PE5 H 1.2v          1199 mV
Power 29
  PICO 12.0v          0 mV
Power 30
  PIC1 12.0v          12402 mV
Power 31
  A    12.0v          12344 mV
  B    12.0v          1008 mV
Bus Revision          115
FPC 2 status:
State                 Online
Intake Temperature    31 degrees C / 87 degrees F
Exhaust-A Temperature 38 degrees C / 100 degrees F
Exhaust-B Temperature 28 degrees C / 82 degrees F
PE0 Temperature       28 degrees C / 82 degrees F
PE1 Temperature       33 degrees C / 91 degrees F
PE2 Temperature       34 degrees C / 93 degrees F
PE3 Temperature       31 degrees C / 87 degrees F
Power 1
  RT_1 1.0v          1018 mV
  RT_2 1.0v          1018 mV
Power 2
  FPC 1 1.0v          999 mV
  FPC 2 1.0v          999 mV
Power 3
  FPC 2.5v          2499 mV
  FPC 3.3v          3299 mV
Power 4
  FPC 0.9v          899 mV
  FPC 1.5v          1500 mV
Power 5
  PE0 1 1.0v          1039 mV
  PE0 2 1.0v          1040 mV
Power 6
  PE0 1 0.9v          900 mV
  PE0 2 0.9v          901 mV
Power 7
  PE0 3 0.9v          900 mV
  PE0 4 0.9v          900 mV
Power 8
  PE0 H 0.9v          899 mV
  PE0 H 1.2v          1199 mV
Power 9
  PE1 1 1.0v          1039 mV
  PE1 2 1.0v          1039 mV
Power 10
  PE1 1 0.9v          875 mV
  PE1 2 0.9v          876 mV
Power 11

```



```

    PE1 3 0.9v          875 mV
    PE1 4 0.9v          875 mV
    Power 12
    PE1 H 0.9v          899 mV
    PE1 H 1.2v          1199 mV
    Power 13
    PE2 1 1.0v          1039 mV
    PE2 2 1.0v          1039 mV
    Power 14
    PE2 1 0.9v          900 mV
    PE2 2 0.9v          900 mV
    Power 15
    PE2 3 0.9v          900 mV
    PE2 4 0.9v          900 mV
    Power 16
    PE2 H 0.9v          899 mV
    PE2 H 1.2v          1199 mV
    Power 17
    PE3 1 1.0v          1039 mV
    PE3 2 1.0v          1039 mV
    Power 18
    PE3 1 0.9v          875 mV
    PE3 2 0.9v          875 mV
    Power 19
    PE3 3 0.9v          875 mV
    PE3 4 0.9v          875 mV
    Power 20
    PE3 H 0.9v          899 mV
    PE3 H 1.2v          1200 mV
    Power 21
    PIC0 12.0v          12281 mV
    Power 22
    PIC1 12.0v           0 mV
    Power 23
    A    12.0v          12406 mV
    B    12.0v          1006 mV
    Bus Revision          115
FPC 3 status:
State                    Online
Intake Temperature       33 degrees C / 91 degrees F
Exhaust-A Temperature    44 degrees C / 111 degrees F
Exhaust-B Temperature    30 degrees C / 86 degrees F
PE0 Temperature          33 degrees C / 91 degrees F
PE1 Temperature          37 degrees C / 98 degrees F
PE2 Temperature          38 degrees C / 100 degrees F
PE3 Temperature          34 degrees C / 93 degrees F
PE4 Temperature          33 degrees C / 91 degrees F
PE5 Temperature          36 degrees C / 96 degrees F
Power 1
    RT_1 1.0v          1018 mV
    RT_2 1.0v          1018 mV
Power 2
    FPC 1 1.0v          999 mV
    FPC 2 1.0v          999 mV
Power 3
    FPC 2.5v          2500 mV
    FPC 3.3v          3299 mV
Power 4
    FPC 0.9v          899 mV
    FPC 1.5v          1500 mV

```

|            |         |
|------------|---------|
| Power 5    |         |
| PE0 1 1.0v | 1039 mV |
| PE0 2 1.0v | 1039 mV |
| Power 6    |         |
| PE0 1 0.9v | 900 mV  |
| PE0 2 0.9v | 900 mV  |
| Power 7    |         |
| PE0 3 0.9v | 898 mV  |
| PE0 4 0.9v | 899 mV  |
| Power 8    |         |
| PE0 H 0.9v | 899 mV  |
| PE0 H 1.2v | 1199 mV |
| Power 9    |         |
| PE1 1 1.0v | 1040 mV |
| PE1 2 1.0v | 1039 mV |
| Power 10   |         |
| PE1 1 0.9v | 926 mV  |
| PE1 2 0.9v | 926 mV  |
| Power 11   |         |
| PE1 3 0.9v | 925 mV  |
| PE1 4 0.9v | 925 mV  |
| Power 12   |         |
| PE1 H 0.9v | 900 mV  |
| PE1 H 1.2v | 1199 mV |
| Power 13   |         |
| PE2 1 1.0v | 1039 mV |
| PE2 2 1.0v | 1039 mV |
| Power 14   |         |
| PE2 1 0.9v | 873 mV  |
| PE2 2 0.9v | 873 mV  |
| Power 15   |         |
| PE2 3 0.9v | 875 mV  |
| PE2 4 0.9v | 875 mV  |
| Power 16   |         |
| PE2 H 0.9v | 899 mV  |
| PE2 H 1.2v | 1199 mV |
| Power 17   |         |
| PE3 1 1.0v | 1039 mV |
| PE3 2 1.0v | 1039 mV |
| Power 18   |         |
| PE3 1 0.9v | 899 mV  |
| PE3 2 0.9v | 900 mV  |
| Power 19   |         |
| PE3 3 0.9v | 899 mV  |
| PE3 4 0.9v | 899 mV  |
| Power 20   |         |
| PE3 H 0.9v | 899 mV  |
| PE3 H 1.2v | 1199 mV |
| Power 21   |         |
| PE4 1 1.0v | 1040 mV |
| PE4 2 1.0v | 1040 mV |
| Power 22   |         |
| PE4 1 0.9v | 949 mV  |
| PE4 2 0.9v | 950 mV  |
| Power 23   |         |
| PE4 3 0.9v | 950 mV  |
| PE4 4 0.9v | 951 mV  |
| Power 24   |         |
| PE4 H 0.9v | 899 mV  |
| PE4 H 1.2v | 1199 mV |

```
Power 25
  PE5 1 1.0v          1039 mV
  PE5 2 1.0v          1039 mV
Power 26
  PE5 1 0.9v          900 mV
  PE5 2 0.9v          900 mV
Power 27
  PE5 3 0.9v          900 mV
  PE5 4 0.9v          900 mV
Power 28
  PE5 H 0.9v          899 mV
  PE5 H 1.2v          1199 mV
Power 29
  PIC0 12.0v          0 mV
Power 30
  PIC1 12.0v          0 mV
Power 31
  A    12.0v          12406 mV
  B    12.0v          1008 mV
Bus Revision          115
FPC 6 status:
State                 Onlining
Bus Revision          115
```

## show chassis environment pem

**List of Syntax**

- Syntax on page 328
- Syntax (ACX4000 Router) on page 328
- Syntax (TX Matrix Routers) on page 328
- Syntax (TX Matrix Plus Routers) on page 328
- Syntax (MX Series Router) on page 328
- Syntax (PTX Series Router) on page 328
- Syntax (MX104 Universal Routing Platforms) on page 328
- Syntax (MX10003 , MX204, and MX10008 Universal Routing Platforms) on page 329
- Syntax (QFX Series) on page 329
- Syntax (OCX Series) on page 329
- Syntax (EX9251, EX9253 Switches) on page 329

**Syntax** show chassis environment pem  
<slot>

**Syntax (ACX4000 Router)** show chassis environment pem


**Syntax (TX Matrix Routers)** show chassis environment pem  
<lcc number | scc>  
<slot>

**Syntax (TX Matrix Plus Routers)** show chassis environment pem  
<lcc number | sfc number>  
<slot>

**Syntax (MX Series Router)** show chassis environment pem  
<slot>  
<all-members>  
<local>  
<member member-id>

**Syntax (PTX Series Router)** show chassis environment pem  
<slot>  
<all-members>  
<local>  
<member member-id>

**Syntax (MX104 Universal Routing Platforms)** show chassis environment pem  
<slot>  
<satellite [fpc-slot slot-id [device-alias alias-name]]

|   |  |
|---|--|
| Syntax (MX10003 , MX204, and MX10008 Universal Routing Platforms) | show chassis environment pem<br><slot>   |
| Syntax (QFX Series)   | show chassis environment pem<br><slot (interconnect-device <i>name slot</i> )   (node-device <i>name</i> )>  |
| Syntax (OCX Series)   | show chassis environment pem<br><slot>   |
| Syntax (EX9251, EX9253 Switches)                                  | show chassis environment pem<br><slot>   |
| Release Information   | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Command introduced in Junos OS Release 12.3R2 for EX Series.</p> <p>Command introduced in Junos OS Release 13.2 for MX104 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p> <p><b>satellite</b> option introduced in Junos OS Release 14.2R3.</p> <p>Command introduced in Junos OS Release 17.2 for PTX10008 Routers.</p> <p>Command introduced in Junos OS Release 17.3 for MX10003 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 17.4 for MX204 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 17.3 for MX150 Router Appliance.</p> <p>Command introduced in Junos OS Release 18.1R1 for EX9251 Switches.</p> <p>Command introduced in Junos OS Release 18.2 for EX9253 Switches.</p> <p>Command introduced in Junos OS Release 18.2R1 for MX10008 Routers</p> |
| Description   | <p>Display Power Entry Module (PEM) environmental status information.</p> <div>  <p><b>NOTE:</b> The new high-capacity (4100W) enhanced DC PEM on MX960 routers includes a new design that can condition the input voltage. This results in the output voltage differing from the input voltage. The earlier generation of DC PEMs coupled the input power directly to the output, thereby making it safe to assume that the output voltage was equal to the input voltage.</p> </div>  |
| Options   | <p><b>none</b>—Display environmental information about both PEMs. For the TX Matrix router, display environmental information about the PEMs, the TX Matrix router, and its attached T640 routers. For the TX Matrix Plus router, display environmental information about the PEMs, the TX Matrix Plus router, and its attached routers.</p> <p><b>all-members</b>—(MX Series routers only) (Optional) Display environmental information about the PEMs in all the member routers of the Virtual Chassis configuration.</p>  |

**interconnect-device *name***—(QFabric systems only) (Optional) Display chassis environmental information about the PEMs in 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 environmental information about the PEM in the local Virtual Chassis member.

**member *member-id***—(MX Series routers only) (Optional) Display environmental information about the PEM in 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 chassis environmental information about the PEMs in the Node device.

**satellite [*fpc-slot slot-id* | device-alias *alias-name*]**—(Junos Fusion only)(Optional) Display environmental information about the PEM in the specified satellite device in a Junos Fusion, or for all satellite devices in the Junos Fusion if no satellite devices are specified.

**scc**—(TX Matrix routers only) (Optional) Display environmental information about the PEM in the TX Matrix router (or switch-card chassis).

**sfc**—(TX Matrix Plus routers only) (Optional) Display environmental information about the PEM in the TX Matrix Plus router (or switch-fabric chassis).

**slot** —(Optional) Display environmental information about an individual PEM. Replace *slot* with 0 or 1.

**Required Privilege Level** view

**Related Documentation** • [show chassis hardware on page 387](#)

**List of Sample Output** [show chassis environment pem \(M40e Router\) on page 332](#)  
[show chassis environment pem \(M120 Router\) on page 332](#)

[show chassis environment pem \(M160 Router\) on page 333](#)  
[show chassis environment pem \(M320 Router\) on page 333](#)  
[show chassis environment pem \(MX150\) on page 333](#)  
[show chassis environment pem \(MX104 Router\) on page 333](#)  
[show chassis environment pem \(MX240 Router\) on page 334](#)  
[show chassis environment pem \(MX480 Router\) on page 334](#)  
[show chassis environment pem \(MX960 Router\) on page 334](#)  
[show chassis environment pem \(MX10003 Router\) on page 334](#)  
[show chassis environment pem \(MX204 Router\) on page 335](#)  
[show chassis environment pem \(MX10008 Router\) on page 335](#)  
[show chassis environment pem \(PTX10016 Router\) on page 336](#)  
[show chassis environment pem \(T320 Router\) on page 337](#)  
[show chassis environment pem \(T640 Router\) on page 337](#)  
[show chassis environment pem \(T4000 Router\) on page 338](#)  
[show chassis environment pem \(T640/T1600/T4000 Routers With Six-Input DC Power Supply\) on page 338](#)  
[show chassis environment pem lcc \(TX Matrix Routing Matrix\) on page 338](#)  
[show chassis environment pem scc \(TX Matrix Routing Matrix\) on page 339](#)  
[show chassis environment pem sfc \(TX Matrix Plus Routing Matrix\) on page 339](#)  
[show chassis environment pem lcc \(TX Matrix Plus Routing Matrix\) on page 339](#)  
[show chassis environment pem node-device \(QFabric System\) on page 340](#)  
[show chassis environment pem \(QFX Series and OCX Series\) on page 340](#)  
[show chassis environment pem \(QFX 10016\) on page 341](#)  
[show chassis environment pem interconnect-device \(QFabric System\) on page 341](#)  
[show chassis environment pem \(EX9251 Switches\) on page 341](#)  
[show chassis environment pem \(EX9253 Switches\) on page 341](#)  
[show chassis environment pem \(PTX1000 Packet Transport Routers\) on page 342](#)

**Output Fields** [Table 11 on page 331](#) lists the output fields for the **show chassis environment pem** command. Output fields are listed in the approximate order in which they appear.

*Table 11: show chassis environment pem Output Fields*

| Field Name    | Field Description                                    |
|---------------|--|
| PEMslotstatus | Number of the PEM slot.                              |
| State         | Status of the PEM.                                   |
| Temperature   | Temperature of the air flowing past the PEM.         |
| AC Input      | Status of the AC input for the specified component   |
| AC Output     | Status of the AC output for the specified component. |
| DC input      | Status of the DC input for the specified component.  |
| DC output     | Status of the DC output for the specified component. |

Table 11: show chassis environment pem Output Fields (continued)

| Field Name | Field Description   |
|------------|---|
| Load       | (Not available on M40e or M160 routers) Information about the load on supply, in percentage of rated current being used.  |
| Voltage    | (M120, M160, M320, T640, T1600, TX Matrix, and TX Matrix Plus routers only) Information about voltage supplied to the PEM.<br><br>(MX104 routers only) Information about voltage supplied by the PEM to the system. |
| Current    | (T640, T1600, TX Matrix, and TX Matrix Plus routers only) Information about the PEM current.  |
| Power      | (T640, T1600, TX Matrix, and TX Matrix Plus routers only) Information about the PEM power.  |
| SCG/CB/SIB | (T640, T1600, TX Matrix, and TX Matrix Plus routers only) SONET Clock Generator/Control Board/Switch Interface Board.   |
| FAN        | (T640, T1600, and T4000 routers with six-input DC power supply only) Information about the DC output to the fan.  |

## Sample Output

### show chassis environment pem (M40e Router)

```
user@host> show chassis environment pem
```

```
PEM 0 status:
  State           Online
  Temperature      OK
  AC input         OK
  DC output        OK
```

### show chassis environment pem (M120 Router)

```
user@host> show chassis environment pem
```

```
PEM 0 status:
  State           Online
  Temperature      OK
  DC Input:       OK
  DC Output:      OK
  Load           Less than 20 percent
  Voltage:
    48.0 V input   52864 mV
    48.0 V fan supply 41655 mV
    3.3 V         3399 mV
PEM 1 status:
  State           Online
  Temperature      OK
  DC Input:       OK
  DC Output:      OK
  Load           Less than 20 percent
  Voltage:
    48.0 V input   54537 mV
```



|                   |          |
|-------------------|----------|
| 48.0 V fan supply | 42910 mV |
| 3.3 V             | 3506 mV  |

### show chassis environment pem (M160 Router)

```
user@host> show chassis environment pem
```

```

PEM 0 status:
  State                Online
  Temperature           OK
  DC input              OK
  DC output             OK
  Load                Less than 20 percent
  Voltage:
    48.0 V input        54833 mV
    48.0 V fan supply    50549 mV
    8.0 V bias          8239 mV
    5.0 V bias          5006 mV

```

### show chassis environment pem (M320 Router)

```
user@host> show chassis environment pem
```

```

PEM 2 status:
  State                Online
  Temperature           OK
  DC input              OK
  Load                Less than 40 percent
    48.0 V input        51853 mV
    48.0 V fan supply    48877 mV
    8.0 V bias          8449 mV
    5.0 V bias          4998 mV
PEM 3 status:
  State                Online
  Temperature           OK
  DC input              OK
  Load                Less than 40 percent
    48.0 V input        51717 mV
    48.0 V fan supply    49076 mV
    8.0 V bias          8442 mV
    5.0 V bias          4998 mV

```

### show chassis environment pem (MX150)

```
user@host> show chassis environment pem
```

```

FPC 0 PEM 0 status:
  State                Online
  Airflow              Front to Back
  Temperature           OK

```

### show chassis environment pem (MX104 Router)

```
user@host> show chassis environment pem
```

```

PEM 0 status:
  State                Online
  Temperature           OK

```

```

DC Output:           OK
Voltage:
  12.0 V output      12281 mV
  3.3 V output       3353 mV
PEM 1 status:
  State              Empty

```

### show chassis environment pem (MX240 Router)

```
user@host> show chassis environment pem
```

```

PEM 0 status:
  State              Online
  Temperature        OK
  DC Output:         OK
PEM 1 status:
  State              Online
  Temperature        OK
  DC Output:         OK

```

### show chassis environment pem (MX480 Router)

```
user@host> show chassis environment pem
```

```

PEM 0 status:
  State              Online
  Temperature        OK
  DC Input:          OK
  DC Output:         OK
  Voltage:
PEM 1 status:
  State              Online
  Temperature        OK
  DC Input:          OK
  DC Output:         OK
  Voltage:

```

### show chassis environment pem (MX960 Router)

```
user@host> show chassis environment pem
```

```

PEM 2 status:
  State              Present
PEM 3 status:
  State              Online
  Temperature        OK
  DC Output:         OK

```

### show chassis environment pem (MX10003 Router)

```
user@host> show chassis environment pem
```

```

PEM 0 status:
  State              Online
  Airflow            Front to Back
  Temperature        OK   34 degrees C / 93 degrees F
  Temperature        OK   26 degrees C / 78 degrees F
  Temperature        OK   24 degrees C / 75 degrees F

```

```

Firmware version      0x22
Cooling Fan           8752 RPM
DC Output              Voltage(V) Current(A) Power(W) Load(%)
                       12.00      26          312      10

PEM 1 status:
State                 Online
Airflow               Front to Back
Temperature            OK   35 degrees C / 95 degrees F
Temperature            OK   26 degrees C / 78 degrees F
Temperature            OK   25 degrees C / 77 degrees F
Firmware version      0x22
Cooling Fan           8480 RPM
DC Output              Voltage(V) Current(A) Power(W) Load(%)
                       12.00      27          324      11

PEM 2 status:
State                 Online
Airflow               Front to Back
Temperature            OK   37 degrees C / 98 degrees F
Temperature            OK   29 degrees C / 84 degrees F
Temperature            OK   25 degrees C / 77 degrees F
Firmware version      0x22
Cooling Fan           8656 RPM
DC Output              Voltage(V) Current(A) Power(W) Load(%)
                       12.00      25          300      10

PEM 3 status:
State                 Online
Airflow               Front to Back
Temperature            OK   35 degrees C / 95 degrees F
Temperature            OK   26 degrees C / 78 degrees F
Temperature            OK   25 degrees C / 77 degrees F
Firmware version      0x22
Cooling Fan           8448 RPM
DC Output              Voltage(V) Current(A) Power(W) Load(%)
                       12.00      26          312      10

PEM 4 status:
State                 Empty
PEM 5 status:
State                 Empty

```

#### show chassis environment pem (MX204 Router)

```
user@host> show chassis environment pem
```

```

PEM 0 status:
State                 Empty
PEM 1 status:
State                 Online
Airflow               Front to Back
Temperature            OK   48 degrees C / 118 degrees F
Temperature            OK   51 degrees C / 123 degrees F
Fan Sensor             5400 RPM
DC Output              Voltage(V) Current(A) Power(W) Load(%)
                       11.94      16          191      29

```

#### show chassis environment pem (MX10008 Router)

```
user@host> show chassis environment pem
```

```

PEM 0 status:
  State                Online
  Airflow              Front to Back
  Temperature          OK    29 degrees C / 84 degrees F
  Firmware version     0x36
  Fan 0               5880 RPM
  DC Output            Voltage(V) Current(A) Power(W) Load(%)
                       12.00      104      1248    46
PEM 1 status:
  State                Online
  Airflow              Front to Back
  Temperature          OK    27 degrees C / 80 degrees F
  Firmware version     0x36
  Fan 0               5940 RPM
  DC Output            Voltage(V) Current(A) Power(W) Load(%)
                       12.00      104      1248    46
PEM 2 status:
  State                Online
  Airflow              Front to Back
  Temperature          OK    30 degrees C / 86 degrees F
  Firmware version     0x36
  Fan 0               5940 RPM
  DC Output            Voltage(V) Current(A) Power(W) Load(%)
                       12.00      105      1260    46
PEM 3 status:
  State                Present
PEM 4 status:
  State                Present
PEM 5 status:
  State                Present

```

### show chassis environment pem (PTX10016 Router)

```
user@host> show chassis environment pem
```

```

PEM 0 status:
  State                Online
  Airflow              Front to Back
  Temperature          OK    21 degrees C / 69 degrees F
  Firmware version     0x36
  Fan 0               5760 RPM
  DC Output            Voltage(V) Current(A) Power(W) Load(%)
                       12.00      51      612     22
PEM 1 status:
  State                Online
  Airflow              Front to Back
  Temperature          OK    23 degrees C / 73 degrees F
  Firmware version     0x36
  Fan 0               5760 RPM
  DC Output            Voltage(V) Current(A) Power(W) Load(%)
                       12.00      52      624     23
PEM 2 status:
  State                Online
  Airflow              Front to Back
  Temperature          OK    23 degrees C / 73 degrees F
  Firmware version     0x36
  Fan 0               5760 RPM
  DC Output            Voltage(V) Current(A) Power(W) Load(%)
                       12.00      51      612     22
PEM 3 status:

```

```

State                Online
Airflow              Front to Back
Temperature           OK   21 degrees C / 69 degrees F
Firmware version     0x36
Fan 0                 5760 RPM
DC Output             Voltage(V) Current(A) Power(W) Load(%)
                    12.00      51      612      22
PEM 4 status:
State                Online
Airflow              Front to Back
Temperature           OK   22 degrees C / 71 degrees F
Firmware version     0x36
Fan 0                 5760 RPM
DC Output             Voltage(V) Current(A) Power(W) Load(%)
                    12.00      52      624      23
PEM 5 status:
State                Online
Airflow              Front to Back
Temperature           OK   24 degrees C / 75 degrees F
Firmware version     0x36
Fan 0                 5700 RPM
DC Output             Voltage(V) Current(A) Power(W) Load(%)
                    12.00      51      612      22
PEM 6 status:
State                Online
Airflow              Front to Back
Temperature           OK   21 degrees C / 69 degrees F
Firmware version     0x36
Fan 0                 5700 RPM
DC Output             Voltage(V) Current(A) Power(W) Load(%)
                    12.00      50      600      22

```

#### show chassis environment pem (T320 Router)

```
user@host> show chassis environment pem
```

```

PEM 0 status:
State                Online
Temperature           OK
DC input:            OK

```

#### show chassis environment pem (T640 Router)

```
user@host> show chassis environment pem
```

```

PEM 0 status:
State                Online
Temperature           22 degrees C / 71 degrees F
AC input: OK
DC output:           Voltage Current Power Load
FPC 0                56875    606    34    4
FPC 1                57016    525    29    3
FPC 2                  0      0      0    0
FPC 3                  0      0      0    0
FPC 4                  0      0      0    0
FPC 5                  0      0      0    0
FPC 6                57158   1581    90   12
FPC 7                  0      0      0    0
SCG/CB/SIB           56750   1125    63    5

```

### show chassis environment pem (T4000 Router)

```
user@host> show chassis environment pem
```

```
PEM 0 status:
State          Online
Temperature    33 degrees C / 91 degrees F
DC Input:      OK
                Voltage(V) Current(A) Power(W) Load(%)
INPUT 0        54.625      9.812    535    22
INPUT 1        54.625     10.250    559    23
INPUT 2        55.125      0.125      6     0
INPUT 3        54.500     10.062    548    22
INPUT 4        54.750      9.375    513    21
INPUT 5        54.750     10.187    557    23
DC Output      Voltage(V) Current(A) Power(W) Load(%)
FPC 0          55.750     10.125    564    37
FPC 1          51.625      0.000      0     0
FPC 2          52.000      0.000      0     0
FPC 3          55.062     10.437    574    38
FPC 4          52.125      0.000      0     0
FPC 5          55.000      9.375    515    34
FPC 6          55.187      9.687    534    35
FPC 7          51.437      0.000      0     0
SCG/CB/SIB     55.375     15.750    872    35
FAN            54.562     14.750    804    42
```

### show chassis environment pem (T640/T1600/T4000 Routers With Six-Input DC Power Supply)

```
user@host> show chassis environment pem
```

```
PEM 1 status:
State          Online
Temperature    36 degrees C / 96 degrees F
DC Input:      OK
                Voltage(V) Current(A) Power(W) Load(%)
INPUT 0         0.000      0.000      0     0
INPUT 1        54.875      3.812     209    27
INPUT 2        55.375      3.937     218    29
INPUT 3        54.625      3.750     204    27
INPUT 4        55.125      3.375     186    24
INPUT 5        55.125      3.375     186    24
DC Output      Voltage(V) Current(A) Power(W) Load(%)
FPC 0          52.312      0.000      0     0
FPC 1          52.687      0.000      0     0
FPC 2          52.812      0.000      0     0
FPC 3          55.812      7.062     394    52
FPC 4          52.625      0.000      0     0
FPC 5          52.625      0.000      0     0
FPC 6          52.750      0.000      0     0
FPC 7          52.750      0.000      0     0
SCG/CB/SIB     55.937     11.937     667    55
FAN            55.812      4.937     275    36
```

### show chassis environment pem lcc (TX Matrix Routing Matrix)

```
user@host> show chassis environment pem 0 lcc 0
```

```
lcc0-re0:
```

```

PEM 0 status:
State                Present
Temperature          27 degrees C / 80 degrees F
DC input:            Check
DC output:           Voltage Current      Power      Load
    FPC 0             0         0          0         0
    FPC 1             0         0          0         0
    FPC 2             0         0          0         0
    FPC 3             0         0          0         0
    FPC 4             0         0          0         0
    FPC 5             0         0          0         0
    FPC 6             0         0          0         0
    FPC 7             0         0          0         0
SCG/CB/SIB           0         0          0         0

```

#### show chassis environment pem scc (TX Matrix Routing Matrix)

```

user@host> show chassis environment pem scc

scc-re0:
-----
PEM 1 status:
State                Online
Temperature          24 degrees C / 75 degrees F
DC input:            OK
DC output:           Voltage Current      Power      Load
    SIB 0             0         0          0         0
    SIB 1             0         0          0         0
    SIB 2             0         0          0         0
    SIB 3             56550      0          0         0
    SIB 4             55958      6912       386        51

```

#### show chassis environment pem sfc (TX Matrix Plus Routing Matrix)

```

user@host> show chassis environment pem sfc 0

sfc0-re0:
-----
PEM 0 status:
State                Online
Temperature          35 degrees C / 95 degrees F
DC Input:            OK
DC Output           Voltage Current      Power      Load
    Channel 0         53820    14140       761        59
    Channel 1         53550    12720       681        53
    Channel 2         53840    12930       696        54
    Channel 3         53690    14990       804        63
    Channel 4         53620    15070       808        63
    Channel 5         53900    14820       798        62
    Channel 6         54120     5020       271        21

```

#### show chassis environment pem lcc (TX Matrix Plus Routing Matrix)

```

user@host> show chassis environment lcc 0

```

```

lcc0-re1:
-----

```

```

PEM 0 status:

```

```

State                               Online
Temperature                         38 degrees C / 100 degrees F
DC Input:                           OK
DC Output                           Voltage    Current    Power    Load
FPC 0                              0         0         0        0
FPC 1                              0         0         0        0
FPC 2                              0         0         0        0
FPC 3                              0         0         0        0
FPC 4                             56408      7575      427      56
FPC 5                              0         0         0        0
FPC 6                             56266      7956      447      59
FPC 7                             56283      6100      343      45
SCG/CB/SIB                         55916      8950      500      41

```

PEM 1 status:

```

State                               Present
Temperature                         35 degrees C / 95 degrees F
DC Input:                           Check
DC Output                           Voltage    Current    Power    Load
FPC 0                              0         0         0        0
FPC 1                              0         0         0        0
FPC 2                              0         0         0        0
FPC 3                              0         0         0        0
FPC 4                              0         0         0        0
FPC 5                              0         0         0        0
FPC 6                              0         0         0        0
FPC 7                              0         0         0        0
SCG/CB/SIB                         0         0         0        0

```

#### 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 pem (QFX Series and OCX Series)

```

user@switch> show chassis environment pem

```

```

FPC 0 PEM 1 status:
State                               Online
Airflow                             Front to Back
Temperature                           OK
AC Input:                           OK
DC Output                           Voltage(V) Current(A) Power(W) Load(%)
                                   12         17         204      31

```



**show chassis environment pem (QFX 10016)**

```
user@router> show chassis environment pem 1
```

```

PEM 1 status:
  State                Present
  Input                Voltage(V) Current(A) Power(W)
  INP 1                229.9      0.4      96.6
  INP 2                233.7      0.4      98.2
  Health check Information:
    Status:             Scheduled
    Last Result:         Pass
    Last Execution:      2019-04-23 15:09:54
    Next Scheduled Run:  2019-04-23 15:32:59

```

**show chassis environment pem interconnect-device (QFabric System)**

```
user@switch> show chassis environment pem interconnect-device IC11
```

```

IC1 PEM 1 status:
  State                Online
  Airflow              Front to Back
  Temperature           OK
  AC Input:            OK
  DC Output            Voltage(V) Current(A) Power(W) Load(%)
                      12          18          216      33

```

**show chassis environment pem (EX9251 Switches)**

```
user@switch> show chassis environment pem
```

```

PEM 0 status:
  State                Present
PEM 1 status:
  State                Online
  Airflow              Front to Back
  Temperature           OK   36 degrees C / 96 degrees F
  Temperature           OK   35 degrees C / 95 degrees F
  Fan Sensor            5940 RPM
  DC Output            Voltage(V) Current(A) Power(W) Load(%)
                      11.85      17          201      30

```

**show chassis environment pem (EX9253 Switches)**

```
user@switch> show chassis environment pem
```

```

PEM 0 status:
  State                Online
  Airflow              Front to Back
  Temperature           OK   56 degrees C / 132 degrees F
  Temperature           OK   46 degrees C / 114 degrees F
  Temperature           OK   28 degrees C / 82 degrees F
  Firmware version      04.10
  Cooling Fan           9056 RPM
  DC Output            Voltage(V) Current(A) Power(W) Load(%)
                      12.00      47          564      19
PEM 1 status:
  State                Present
PEM 2 status:

```

```

State                               Empty
PEM 3 status:
State                               Empty
PEM 4 status:
State                               Present
PEM 5 status:
State                               Online
Airflow                             Front to Back
Temperature                         OK    61 degrees C / 141 degrees F
Temperature                         OK    49 degrees C / 120 degrees F
Temperature                         OK    28 degrees C / 82 degrees F
Firmware version                    04.10
Cooling Fan                         8656 RPM
DC Output                           Voltage(V) Current(A) Power(W) Load(%)
                                   12.00      51      612      21

```

### show chassis environment pem (PTX1000 Packet Transport Routers)

```
user@router> show chassis environment pem
```

```

PEM 0 status:
State                               Online
Airflow                             Front to Back
Temp Sensor 0                       OK    22 degrees C / 71 degrees F
Temp Sensor 1                       OK    23 degrees C / 73 degrees F
Fan 0                               9184 RPM
Fan 1                               7936 RPM
DC Output                           Voltage(V) Current(A) Power(W) Load(%)
                                   12          24      288      18
PEM 2 status:
State                               Online
Airflow                             Front to Back
Temp Sensor 0                       OK    22 degrees C / 71 degrees F
Temp Sensor 1                       OK    26 degrees C / 78 degrees F
Fan 0                               9056 RPM
Fan 1                               7808 RPM
DC Output                           Voltage(V) Current(A) Power(W) Load(%)
                                   12          24      288      18

```

On PTX1000 Packet Transport Routers, you cannot view the **show chassis environment pem** output at the PEM slot level, by using the command **show chassis environment pem slot**.

## show chassis environment routing-engine

|   |   |
|---|---|
| <b>List of Syntax</b>   | <a href="#">Syntax on page 343</a><br><a href="#">Syntax (TX Matrix Routers) on page 343</a><br><a href="#">Syntax (TX Matrix Plus Routers) on page 343</a><br><a href="#">Syntax (MX104, MX2010, MX2020, MX10003, MX204, and MX2008 Universal Routing Platforms) on page 343</a><br><a href="#">Syntax (MX Series Routers) on page 343</a><br><a href="#">Syntax (PTX Series Routers) on page 343</a><br><a href="#">Syntax (QFX Series) on page 344</a><br><a href="#">Syntax (OCX Series) on page 344</a><br><a href="#">Syntax (ACX5048 and ACX5096 Routers) on page 344</a><br><a href="#">Syntax (ACX500 Routers) on page 344</a><br><a href="#">Syntax (EX9251, EX9253 Switches) on page 344</a> |
| <b>Syntax</b>   | <pre>show chassis environment routing-engine &lt;slot&gt;</pre>   |
| <b>Syntax (TX Matrix Routers)</b>   | <pre>show chassis environment routing-engine &lt;lcc number   scc&gt; &lt;slot&gt;</pre>  |
| <b>Syntax (TX Matrix Plus Routers)</b>  | <pre>show chassis environment routing-engine &lt;lcc number   sfc number&gt; &lt;slot&gt;</pre>   |
| <b>Syntax (MX104, MX2010, MX2020, MX10003, MX204, and MX2008 Universal Routing Platforms)</b> | <pre>show chassis environment routing-engine &lt;slot&gt; &lt;satellite [fpc-slot slot-id   device-alias alias-name]</pre>  |
| <b>Syntax (MX Series Routers)</b>   | <pre>show chassis environment routing-engine &lt;slot&gt; &lt;all-members&gt; &lt;local&gt; &lt;member member-id&gt;</pre>  |
| <b>Syntax (PTX Series Routers)</b>  | <pre>show chassis environment routing-engine &lt;slot&gt; &lt;all-members&gt; &lt;local&gt; &lt;member member-id&gt;</pre>  |

|   |  |
|---|--|
| <b>Syntax (QFX Series)</b>                  | show chassis environment routing-engine<br>interconnect-device <i>name</i>   |
| <b>Syntax (OCX Series)</b>                  | show chassis environment routing-engine<br>interconnect-device <i>name</i>   |
| <b>Syntax (ACX5048 and ACX5096 Routers)</b> | show chassis environment routing-engine  |
| <b>Syntax (ACX500 Routers)</b>              | show chassis environment routing-engine  |
| <b>Syntax (EX9251, EX9253 Switches)</b>     | show chassis environment 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>sfc option introduced in Junos OS Release 9.6 for the TX Matrix Plus router.</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 and T4000 Core Routers.</p> <p>Command introduced in Junos OS Release 12.3 for MX2010 and MX2020 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 13.2 for MX104 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 15.1X54-D20 for ACX5048 and ACX5096 Routers.</p> <p>Command introduced in Junos OS Release 17.2 for MX2008 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 17.2 for PTX10008 Routers.</p> <p>Command introduced in Junos OS Release 17.3 for MX150 Router Appliance.</p> <p>Command introduced in Junos OS Release 17.4 for MX204 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 17.3 for MX10003 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 18.1R1 for EX9251 Switches.</p> <p>Command introduced in Junos OS Release 18.2 for EX9253 Switches.</p> <p>Command introduced in Junos OS Release 18.2R1 for MX10008 Routers.</p> |
| <b>Description</b>                          | Display Routing Engine environmental status information.   |
| <b>Options</b>                              | <p><b>none</b>—Display environmental information about all Routing Engines. For a TX Matrix router, display environmental information about all Routing Engines on the TX Matrix router and its attached T640 routers. For a TX Matrix Plus router, display environmental information about all Routing Engines on the TX Matrix Plus router and its attached routers.</p> <p><b>all-members</b>—(MX Series routers only) (Optional) Display environmental information about the Routing Engines in all member routers in the Virtual Chassis configuration.</p>   |

**interconnect-device *name***—(QFabric systems only) (Optional) Display environmental information about the Routing Engines 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 environmental information about the Routing Engines in the local Virtual Chassis member.

**member *member-id***—(MX Series routers only) (Optional) Display environmental information about the Routing Engines in the specified member in the Virtual Chassis configuration. Replace *member-id* with the value of 0 or 1.

**satellite [*fpc-slot slot-id* | *device-alias alias-name*]**—(Junos Fusion only)(Optional) Display environmental information for the specified satellite device in a Junos Fusion, or for all satellite devices in the Junos Fusion if no satellite devices are specified.

**scc**—(TX Matrix router only) (Optional) Display environmental information about the Routing Engine in the TX Matrix router (switch-card chassis).

**sfc**—(TX Matrix Plus router only) (Optional) Display environmental information about the Routing Engine in the TX Matrix Plus router (or switch-fabric chassis).

**slot**—(Optional) Display environmental information about an individual Routing Engine. On M10i, M20, M40e, M120, M160, M320, MX Series, MX104 routers, MX2010 routers, MX2020 routers, MX2008 routers, and T Series routers, replace *slot* with 0 or 1. On M5, M7i, M10, and M40 routers, replace *slot* with 0. On EX3200 and EX4200 standalone switches, replace *slot* with 0. On EX4200 switches in a Virtual Chassis configuration and on EX8208 and EX8216 switches, replace *slot* with 0 or 1. On the QFX3500 switch, there is only one Routing Engine, so you do not need to specify the slot number. On PTX Series Packet Transport Routers, replace *slot* with 0 or 1

**Required Privilege Level** view

**Related Documentation**

- [request chassis routing-engine master](#)
- [show chassis routing-engine on page 406](#)

- List of Sample Output**
- [show chassis environment routing-engine \(Nonredundant\) on page 347](#)
  - [show chassis environment routing-engine \(Redundant\) on page 347](#)
  - [show chassis environment routing-engine \(MX150\) on page 347](#)
  - [show chassis environment routing-engine \(MX104 Router\) on page 347](#)
  - [show chassis environment routing-engine \(MX2010 Router\) on page 347](#)
  - [show chassis environment routing-engine \(MX2020 Router\) on page 347](#)
  - [show chassis environment routing-engine \(MX2008 Router\) on page 348](#)
  - [show chassis environment routing-engine \(TX Matrix Plus Router\) on page 348](#)
  - [show chassis environment routing-engine \(T4000 Core Router\) on page 348](#)
  - [show chassis environment routing-engine \(QFX Series and OCX Series\) on page 348](#)
  - [show chassis environment routing-engine interconnect-device \(QFabric System\) on page 349](#)
  - [show chassis environment routing-engine \(PTX5000 Packet Transport Router\) on page 349](#)
  - [show chassis environment routing-engine \(PTX10008 Router\) on page 349](#)
  - [show chassis environment routing-engine \(PTX10016 Router\) on page 349](#)
  - [show chassis environment routing-engine \(ACX5048 and ACX5096 Routers\) on page 349](#)
  - [show chassis environment routing-engine \(ACX500 Routers\) on page 350](#)
  - [show chassis environment routing-engine \(PTX5000 \(RE-PTX-X8-64G\), MX240 \(RE-S-X6-64G\), MX480 \(RE-S-X6-64G\), MX960 \(RE-S-X6-64G\), MX2010 \(RE-MX2K-X8-64G\), MX2020 \(RE-MX2K-X8-64G\) on page 350](#)
  - [show chassis environment routing-engine \(MX204 Routers\) on page 350](#)
  - [show chassis environment routing-engine \(MX10008 Routers\) on page 350](#)
  - [show chassis environment routing-engine \(EX9251 Switches\) on page 350](#)
  - [show chassis environment routing-engine \(EX9253 Switches\) on page 350](#)

**Output Fields** [Table 12 on page 346](#) lists the output fields for the **show chassis environment routing-engine** command. Output fields are listed in the approximate order in which they appear.

*Table 12: show chassis environment routing-engine Output Fields*

| Field Name                        | Field Description  |
|-----------------------------------|--|
| Routing engine <i>slot</i> status | Number of the Routing Engine slot: 0 or 1.   |
| State                             | Status of the Routing Engine: <ul style="list-style-type: none"> <li>• Online Master—Routing Engine is online, operating as Master.</li> <li>• Online Standby—Routing Engine is online, operating as Standby.</li> <li>• Offline—Routing Engine is offline.</li> </ul> |
| Temperature                       | Temperature of the air flowing past the Routing Engine.  |
| CPU Temperature                   | (PTX Series and T4000 Core Routers only) Temperature of the air flowing past the Routing Engine CPU.   |

## Sample Output

### show chassis environment routing-engine (Nonredundant)

```
user@host> show chassis environment routing-engine

Routing Engine 0 status:
  State                Online Master
  Temperature           27 degrees C / 80 degrees
```

### show chassis environment routing-engine (Redundant)

```
user@host> show chassis environment routing-engine

Route Engine 0 status:
  State                Online Master
  Temperature           26 degrees C / 78 degrees F
Route Engine 1 status:
  State                Online Standby
  Temperature           26 degrees C / 78 degrees F
```

### show chassis environment routing-engine (MX150)

```
user@ host >show chassis environment routing-engine

Routing Engine 0 status:
  State                Online Master
  CPU Temperature       42 degrees C / 107 degrees F
```

### show chassis environment routing-engine (MX104 Router)

```
user@ host >show chassis environment routing-engine

Routing Engine 0 status:
  State                Online Master
  Temperature           34 degrees C / 93 degrees F
  CPU Temperature       43 degrees C / 109 degrees F
Routing Engine 1 status:
  State                Online Standby
  Temperature           33 degrees C / 91 degrees F
  CPU Temperature       39 degrees C / 102 degrees F
```

### show chassis environment routing-engine (MX2010 Router)

```
user@host> show chassis environment routing-engine

Routing Engine 0 status:
  State                Online Master
  Temperature           37 degrees C / 98 degrees F
  CPU Temperature       37 degrees C / 98 degrees F
Routing Engine 1 status:
  State                Online Standby
  Temperature           35 degrees C / 95 degrees F
  CPU Temperature       34 degrees C / 93 degrees F
```

### show chassis environment routing-engine (MX2020 Router)

```
user@host> show chassis environment routing-engine
```

```

Routing Engine 0 status:
  State           Online Master
  Temperature      35 degrees C / 95 degrees F
  CPU Temperature  34 degrees C / 93 degrees F
Routing Engine 1 status:
  State           Online Standby
  Temperature      44 degrees C / 111 degrees F
  CPU Temperature  43 degrees C / 109 degrees F

```

#### show chassis environment routing-engine (MX2008 Router)

```

user@host> show chassis environment routing-engine

Routing Engine 0 status:
  State           Online Master
  CPU Temperature  75 degrees C / 167 degrees F
Routing Engine 1 status:
  State           Online Standby
  CPU Temperature  47 degrees C / 116 degrees F

```

#### show chassis environment routing-engine (TX Matrix Plus Router)

```

user@host> show chassis environment routing-engine

sfc0-re0:
-----
Routing Engine 0 status:
  State           Online Master
  Temperature      26 degrees C / 78 degrees F
Routing Engine 1 status:
  State           Online Standby
  Temperature      28 degrees C / 82 degrees F

lcc0-re0:
-----
Routing Engine 0 status:
  State           Online Master
  Temperature      30 degrees C / 86 degrees F
Routing Engine 1 status:
  State           Online Standby
  Temperature      29 degrees C / 84 degrees F

```

#### show chassis environment routing-engine (T4000 Core Router)

```

user@host> show chassis environment routing-engine

Routing Engine 0 status:
  State           Online Master
  Temperature      33 degrees C / 91 degrees F
  CPU Temperature  50 degrees C / 122 degrees F
Routing Engine 1 status:
  State           Online Standby
  Temperature      33 degrees C / 91 degrees F
  CPU Temperature  46 degrees C / 114 degrees F

```

#### show chassis environment routing-engine (QFX Series and OCX Series)

```

user@switch> show chassis environment routing-engine

```



```
Routing Engine 0 status:
  State           Online Master
  Temperature      42 degrees C / 107 degrees F
```

### show chassis environment routing-engine interconnect-device (QFabric System)

```
user@switch> show chassis environment routing-engine interconnect-device interconnect1
routing-engine interconnect-device interconnect1
Routing Engine 0 status:
  State           Online Standby
  Temperature      52 degrees C / 125 degrees F
Routing Engine 1 status:
  State           Online Master
  Temperature      57 degrees C / 134 degrees F
```

### show chassis environment routing-engine (PTX5000 Packet Transport Router)

```
user@switch> show chassis environment routing-engine
Routing Engine 0 status:
  State           Online Master
  Temperature      55 degrees C / 131 degrees F
  CPU Temperature  66 degrees C / 150 degrees F
Routing Engine 1 status:
  State           Online Standby
  Temperature      52 degrees C / 125 degrees F
  CPU Temperature  64 degrees C / 147 degrees F
```

### show chassis environment routing-engine (PTX10008 Router)

```
user@switch> show chassis environment routing-engine
Routing Engine 0 status:
  State           Online Master
  CPU Temperature  40 degrees C / 104 degrees F
Routing Engine 1 status:
  State           Online Standby
  CPU Temperature  40 degrees C / 104 degrees F
```

### show chassis environment routing-engine (PTX10016 Router)

```
user@switch> show chassis environment routing-engine
Routing Engine 0 status:
  State           Online Master
  CPU Temperature  33 degrees C / 91 degrees F
Routing Engine 1 status:
  State           Online Standby
  CPU Temperature  38 degrees C / 100 degrees F
```

### show chassis environment routing-engine (ACX5048 and ACX5096 Routers)

```
user@host> show chassis environment routing-engine
Routing Engine 0 status:
  State           Online Master
  Temperature      33 degrees C / 91 degrees F
```

### show chassis environment routing-engine (ACX500 Routers)

```
user@host> show chassis environment routing-engine

Routing Engine 0 status:
  State                Online Master
  Temperature           54 degrees C / 129 degrees F
```

### Sample Output

show chassis environment routing-engine (PTX5000 (RE-PTX-X8-64G), MX240 (RE-S-X6-64G), MX480 (RE-S-X6-64G), MX960 (RE-S-X6-64G), MX2010 (RE-MX2K-X8-64G), MX2020 (RE-MX2K-X8-64G))

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

Routing Engine 0 status:
  State                Online Master
  Temperature           37 degrees C / 98 degrees F
  CPU Temperature       52 degrees C / 125 degrees F
Routing Engine 1 status:
  State                Online Standby
  Temperature           37 degrees C / 98 degrees F
  CPU Temperature       51 degrees C / 123 degrees F
```

### show chassis environment routing-engine (MX204 Routers)

```
user@host> show chassis environment routing-engine

Routing Engine 0 status:
  State                Online Master
```

### show chassis environment routing-engine (MX10008 Routers)

```
Routing Engine 0 status:
  State                Online Master
  CPU Temperature      41 degrees C / 105 degrees F
Routing Engine 1 status:
  State                Online Standby
  CPU Temperature      40 degrees C / 104 degrees F
```

### show chassis environment routing-engine (EX9251 Switches)

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

Routing Engine 0 status:
  State                Online Master
```

### show chassis environment routing-engine (EX9253 Switches)

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

Routing Engine 0 status:
  State                Online Master
Routing Engine 1 status:
  State                Present
```



## show chassis firmware

---

|                       |  |
|-----------------------|--|
| <b>List of Syntax</b> | <a href="#">Syntax on page 352</a>   |
|                       | <a href="#">Syntax (TX Matrix Routers) on page 352</a>   |
|                       | <a href="#">Syntax (TX Matrix Plus Routers) on page 352</a>  |
|                       | <a href="#">Syntax (MX Series Routers) on page 352</a>   |
|                       | <a href="#">Syntax (MX104, MX204, MX2010, MX2020, MX10003, and MX2008 Universal Routing Platforms) on page 352</a> |
|                       | <a href="#">Syntax (MX10008 Universal Routing Platforms) on page 352</a>   |
|                       | <a href="#">Syntax (PTX Series) on page 352</a>  |
|                       | <a href="#">Syntax (QFX Series) on page 353</a>  |
|                       | <a href="#">Syntax (OCX Series) on page 353</a>  |
|                       | <a href="#">Syntax (ACX Series Universal Metro Routers) on page 353</a>  |
|                       | <a href="#">Syntax (ACX5048 and ACX5096 Routers) on page 353</a>   |
|                       | <a href="#">Syntax (ACX500 Routers) on page 353</a>  |
|                       | <a href="#">Syntax (EX Series Switches) on page 353</a>  |

|               |                       |
|---------------|-----------------------|
| <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 (MX104, MX204, MX2010, MX2020, MX10003, and MX2008 Universal Routing Platforms)</b> | show chassis firmware<br><satellite [slot-id <i>slot-id</i>   device-alias <i>alias-name</i> ]> |
|---|---|

|   |                       |
|---|-----------------------|
| <b>Syntax (MX10008 Universal Routing Platforms)</b> | show chassis firmware |
|---|-----------------------|

|                            |                       |
|----------------------------|-----------------------|
| <b>Syntax (PTX Series)</b> | show chassis firmware |
|----------------------------|-----------------------|

|   |  |
|---|--|
| Syntax (QFX Series)                               | show chassis firmware<br>interconnect-device <i>name</i><br>node-device <i>name</i>  |
| Syntax (OCX Series)                               | show chassis firmware  |
| Syntax (ACX Series<br>Universal Metro<br>Routers) | show chassis firmware  |
| Syntax (ACX5048 and<br>ACX5096 Routers)           | show chassis firmware<br>interconnect-device <i>name</i><br>node-device <i>name</i>  |
| Syntax (ACX500<br>Routers)                        | show chassis firmware  |
| Syntax (EX Series<br>Switches)                    | show chassis firmware<br><detail><br><satellite [slot-id <i>slot-id</i>  device-alias <i>alias-name</i> ]>   |
| Release Information                               | <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>sfc option introduced in Junos OS Release 9.6 for the TX Matrix Plus router.</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 Metro Routers.</p> <p>Command introduced in Junos OS Release 12.3 for MX2010 and MX2020 Universal Routing Platforms, and ACX4000 Universal Metro Routers.</p> <p>Command introduced in Junos OS Release 13.2 for MX104 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p> <p>Command introduced in Junos OS Release 15.1X54-D20 for ACX5048 and ACX5096 Routers.</p> <p><b>satellite</b> option introduced in Junos OS Release 14.2R3.</p> <p>Command introduced in Junos OS Release 17.2 for MX2008 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 17.2 for PTX10008 Routers.</p> <p>Command introduced in Junos OS Release 17.3 for MX10003 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 17.4 for MX204 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 17.3 for MX150 Router Appliance.</p> <p>Command introduced in Junos OS Release 18.1R1 for EX9251 switches.</p> <p>Command introduced in Junos OS Release 18.2 for EX9253 Switches.</p> <p>Command introduced in Junos OS Release 18.2 for MX10008 Universal Routing Platforms.</p> |

**Description** 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).

On EX2200, EX3200, EX4200, QFX Series, and OCX Series switches, 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 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.

**satellite [*slot-id slot-id* | *device-alias alias-name*]**—(Junos Fusion only) (Optional) Display version levels of the firmware running for the specified satellite device or devices in a Junos Fusion, or for all satellite devices if no satellite devices are specified.

**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

**List of Sample Output**

- [show chassis firmware \(M10 Router\) on page 357](#)
- [show chassis firmware \(M20 Router\) on page 357](#)
- [show chassis firmware \(M40 Router\) on page 357](#)
- [show chassis firmware \(M120 Router\) on page 357](#)
- [show chassis firmware \(M160 Router\) on page 357](#)
- [show chassis firmware \(MX150\) on page 358](#)
- [show chassis firmware \(MX104 Router\) on page 358](#)
- [show chassis firmware \(MX240 Router\) on page 358](#)
- [show chassis firmware \(MX480 Router\) on page 358](#)
- [show chassis firmware \(MX960 Router\) on page 358](#)
- [show chassis firmware \(MX2010 Router\) on page 358](#)
- [show chassis firmware \(MX2020 Router\) on page 359](#)
- [show chassis firmware \(MX2008 Router\) on page 360](#)
- [show chassis firmware \(MX10003\) on page 360](#)
- [show chassis firmware \(MX204 Router\) on page 360](#)
- [show chassis firmware \(MX10008 Router\) on page 361](#)
- [show chassis firmware \(MX240, MX480, MX960 Router with Application Services Modular Line Card\) on page 362](#)
- [show chassis firmware \(EX4200 Switch\) on page 362](#)
- [show chassis firmware \(EX8200 Switch\) on page 362](#)
- [show chassis firmware \(EX9200 Switch\) on page 362](#)
- [show chassis firmware \(EX9251 Switch\) on page 362](#)
- [show chassis firmware \(EX9253 Switch\) on page 363](#)
- [show chassis firmware lcc \(TX Matrix Router\) on page 363](#)
- [show chassis firmware scc \(TX Matrix Router\) on page 363](#)
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[show chassis firmware lcc \(TX Matrix Plus Router\) on page 365](#)  
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[show chassis firmware \(QFX Series and OCX Series\) on page 366](#)  
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[show chassis firmware \(MX Routers with Media Services Blade \[MSB\]\) on page 367](#)  
[show chassis firmware \(ACX5048 Router\) on page 367](#)  
[show chassis firmware \(ACX5096 Router\) on page 368](#)  
[show chassis firmware \(ACX500 Router\) on page 368](#)

**Output Fields** [Table 13 on page 356](#) lists the output fields for the show chassis firmware command. Output fields are listed in the approximate order in which they appear.

*Table 13: show chassis firmware Output Fields*

| Field Name                | Field Description  |
|---------------------------|--|
| <b>Part</b>               | (MX Series, MX2010, MX2020, and MX2008 routers) Chassis part name.   |
| <b>Type</b>               | (MX Series, MX2010, MX2020, and MX2008 routers) Type of firmware: On routers: ROM or O/S. On switches: uboot or loader.  |
| <b>Version</b>            | (MX Series, MX2010, MX2020, and MX2008 routers) Version of firmware running on the chassis part.   |
| <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>AFEB</b>               | (MX104 routers) Version of the compact Forwarding Engine Board.  |
| <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 Packet Forwarding Engine 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 usera 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 userc on 2000-02-29 2 |
| FPC 1               | ROM  | Juniper ROM Monitor Version 3.0b1       |
|                     | O/S  | Version 3.4I4 by userc on 2000-02-25 21 |
| FPC 2               | ROM  | Juniper ROM Monitor Version 3.0b1       |
|                     | O/S  | Version 3.4I4 by userc 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 userb on 2006-10-18 16:2 |
| FPC 3 | ROM | Juniper ROM Monitor Version 8.0b29        |
|       | O/S | Version 8.2B1 by userb on 2006-10-18 16:2 |
| FPC 4 | ROM | Juniper ROM Monitor Version 8.0b29        |
|       | O/S | Version 8.2B1 by userb on 2006-10-18 16:2 |
| FEB 3 | ROM | Juniper ROM Monitor Version 8.0b29        |
|       | O/S | Version 8.2B1 by userb on 2006-10-18 16:1 |
| FEB 4 | ROM | Juniper ROM Monitor Version 8.0b29        |
|       | O/S | Version 8.2B1 by userb 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 usera on 2000-02-29 11:50 |
| SFM 1 | ROM  | Juniper ROM Monitor Version 4.0b2          |
|       | O/S  | Version 4.0I1 by usera on 2000-02-29 11:50 |
| FPC 0 | ROM  | Juniper ROM Monitor Version 4.0b2          |
|       | O/S  | Version 4.0I1 by usera on 2000-02-29 11:56 |
| FPC 1 | ROM  | Juniper ROM Monitor Version 4.0b2          |

|       |     |  |
|-------|-----|--|
| FPC 2 | O/S | Version 4.0I1 by usera on 2000-02-29 11:56 |
|       | ROM | Juniper ROM Monitor Version 4.0b3          |
|       | O/S | Version 4.0I1 by usera on 2000-02-29 11:56 |

**show chassis firmware (MX150)**

```
user@host > show chassis firmware
```

| Part                       | Type | Version                                     |
|----------------------------|------|---|
| FPC                        | ROM  | PC Bios                                     |
|                            | O/S  | Version 17.2I20170220_0929_rohitn by rohitn |
| on 2017-02-20 09:38:59 UTC |      |   |

**show chassis firmware (MX104 Router)**

```
user@host > show chassis firmware
```

| Part  | Type | Version                                   |
|-------|------|---|
| FPC 0 | ROM  | Juniper ROM Monitor Version 13.1b24       |
|       | O/S  | Version 13.2-20130514.1 by userb on 2013- |
| FPC 1 | ROM  | Juniper ROM Monitor Version 13.1b24       |
|       | O/S  | Version 13.2-20130514.1 by userb on 2013- |
| FPC 2 | ROM  | Juniper ROM Monitor Version 13.1b24       |
|       | O/S  | Version 13.2-20130514.1 by userb on 2013- |
| AFEB  | ROM  | Juniper ROM Monitor Version 13.1b24       |
|       | O/S  | Version 13.2-20130514.1 by userb on 2013- |

**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 userb on 2008-0 |
| FPC 2 | ROM  | Juniper ROM Monitor Version 8.3b1         |
|       | O/S  | Version 9.0-20080103.0 by userb 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 userb 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 user3 on 2006-10-31 19:22 |
| FPC 7 | ROM  | Juniper ROM Monitor Version 8.2b1           |
|       | O/S  | Version 8.2-20061026.1 by userb 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 userb on 2012- |
| FPC 1  | ROM  | Juniper ROM Monitor Version 10.1b3        |
|        | O/S  | Version 12.3-20121220.0 by userb on 2012- |
| FPC 2  | ROM  | Juniper ROM Monitor Version 10.1b3        |
|        | O/S  | Version 12.3-20121220.0 by userb on 2012- |
| FPC 3  | ROM  | Juniper ROM Monitor Version 10.1b3        |
|        | O/S  | Version 12.3-20121220.0 by userb on 2012- |
| FPC 4  | ROM  | Juniper ROM Monitor Version 10.0b39       |
|        | O/S  | Version 12.3-20121220.0 by userb on 2012- |
| FPC 5  | ROM  | Juniper ROM Monitor Version 10.0b39       |
|        | O/S  | Version 12.3-20121220.0 by userb on 2012- |
| FPC 6  | ROM  | Juniper ROM Monitor Version 10.4b1        |
|        | O/S  | Version 12.3-20121220.0 by userb on 2012- |
| FPC 7  | ROM  | Juniper ROM Monitor Version 10.1b3        |
|        | O/S  | Version 12.3-20121220.0 by userb on 2012- |
| FPC 8  | ROM  | Juniper ROM Monitor Version 10.4b1        |
|        | O/S  | Version 12.3-20121220.0 by userb on 2012- |
| FPC 9  | ROM  | Juniper ROM Monitor Version 10.4b1        |
|        | O/S  | Version 12.3-20121220.0 by userb on 2012- |
| SPMB 0 | ROM  | Juniper ROM Monitor Version 12.1b1        |
|        | O/S  | Version 12.3-20121220.0 by userb on 2012- |
| SPMB 1 | ROM  | Juniper ROM Monitor Version 12.1b1        |
|        | O/S  | Version 12.3-20121220.0 by userb 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 userb on 2013- |
| FPC 1  | ROM  | Juniper ROM Monitor Version 10.0b39       |
|        | O/S  | Version 12.3-20130415.0 by userb on 2013- |
| FPC 2  | ROM  | Juniper ROM Monitor Version 10.0b39       |
|        | O/S  | Version 12.3-20130415.0 by userb on 2013- |
| FPC 3  | ROM  | Juniper ROM Monitor Version 10.0b39       |
|        | O/S  | Version 12.3-20130415.0 by userb on 2013- |
| FPC 4  | ROM  | Juniper ROM Monitor Version 10.0b39       |
|        | O/S  | Version 12.3-20130415.0 by userb on 2013- |
| FPC 5  | ROM  | Juniper ROM Monitor Version 10.0b39       |
|        | O/S  | Version 12.3-20130415.0 by userb on 2013- |
| FPC 6  | ROM  | Juniper ROM Monitor Version 10.0b39       |
|        | O/S  | Version 12.3-20130415.0 by userb on 2013- |
| FPC 7  | ROM  | Juniper ROM Monitor Version 10.0b39       |
|        | O/S  | Version 12.3-20130415.0 by userb on 2013- |
| FPC 8  | ROM  | Juniper ROM Monitor Version 10.0b39       |
|        | O/S  | Version 12.3-20130415.0 by userb on 2013- |
| FPC 9  | ROM  | Juniper ROM Monitor Version 10.0b39       |
|        | O/S  | Version 12.3-20130415.0 by userb on 2013- |
| FPC 10 | ROM  | Juniper ROM Monitor Version 10.0b39       |
|        | O/S  | Version 12.3-20130415.0 by userb on 2013- |
| FPC 11 | ROM  | Juniper ROM Monitor Version 10.0b39       |
|        | O/S  | Version 12.3-20130415.0 by userb on 2013- |
| FPC 12 | ROM  | Juniper ROM Monitor Version 10.0b39       |
|        | O/S  | Version 12.3-20130415.0 by userb on 2013- |
| FPC 13 | ROM  | Juniper ROM Monitor Version 10.0b39       |
|        | O/S  | Version 12.3-20130415.0 by userb on 2013- |
| FPC 14 | ROM  | Juniper ROM Monitor Version 10.0b39       |

|        |     |   |
|--------|-----|---|
| FPC 15 | O/S | Version 12.3-20130415.0 by userb on 2013- |
|        | ROM | Juniper ROM Monitor Version 10.0b39       |
| FPC 16 | O/S | Version 12.3-20130415.0 by userb on 2013- |
|        | ROM | Juniper ROM Monitor Version 10.0b39       |
| FPC 17 | O/S | Version 12.3-20130415.0 by userb on 2013- |
|        | ROM | Juniper ROM Monitor Version 10.0b39       |
| FPC 18 | O/S | Version 12.3-20130415.0 by userb on 2013- |
|        | ROM | Juniper ROM Monitor Version 10.0b39       |
| FPC 19 | O/S | Version 12.3-20130415.0 by userb on 2013- |
|        | ROM | Juniper ROM Monitor Version 10.0b39       |
| SPMB 0 | O/S | Version 12.3-20130415.0 by userb on 2013- |
|        | ROM | Juniper ROM Monitor Version 12.1b1        |
| SPMB 1 | O/S | Version 12.3-20130415.0 by userb on 2013- |
|        | ROM | Juniper ROM Monitor Version 12.1b1        |
|        | O/S | Version 12.3-20130415.0 by userb on 2013- |

### show chassis firmware (MX2008 Router)

```
user@host> show chassis firmware
```

| Part                    | Type | Version                               |
|-------------------------|------|---------------------------------------|
| FPC 0                   | ROM  | Juniper ROM Monitor Version 10.1b3    |
|                         | O/S  | Version 17.2-20170412.0 by builder on |
| 2017-04-12 01:15:48 UTC |      |                                       |
| FPC 3                   | ROM  | Juniper ROM Monitor Version 13.3b1    |
|                         | O/S  | Version 17.2-20170412.0 by builder on |
| 2017-04-12 01:16:31 UTC |      |                                       |
| FPC 5                   | ROM  | Juniper ROM Monitor Version 13.3b1    |
|                         | O/S  | Version 17.2-20170412.0 by builder on |
| 2017-04-12 01:16:31 UTC |      |                                       |
| FPC 7                   | ROM  | Juniper ROM Monitor Version 11.4b2    |
|                         | O/S  | Version 17.2-20170412.0 by builder on |
| 2017-04-12 01:15:48 UTC |      |                                       |
| FPC 9                   | ROM  | Juniper ROM Monitor Version 13.2b1    |
|                         | O/S  | Version 17.2-20170412.0 by builder on |
| 2017-04-12 01:15:58 UTC |      |                                       |

### show chassis firmware (MX10003)

```
user@host> show chassis firmware
```

| Part                    | Type     | Version                               |
|-------------------------|----------|---------------------------------------|
| RE 0                    | PRI BIOS | CBEP_P_SUM0_00.11.01                  |
|                         | RE-FPGA  | 402                                   |
| RE 1                    | PRI BIOS | CBEP_P_SUM0_00.11.01                  |
|                         | RE-FPGA  | 301                                   |
| FPC 0                   | ROM      | PC Bios                               |
|                         | O/S      | Version 17.3-20170719.0 by builder on |
| 2017-07-19 01:27:58 UTC |          |                                       |
| FPC 1                   | ROM      | PC Bios                               |
|                         | O/S      | Version 17.3-20170719.0 by builder on |
| 2017-07-19 01:27:58 UTC |          |                                       |

### show chassis firmware (MX204 Router)

```
user@host> show chassis firmware
```

| Part | Type     | Version  |
|------|----------|--|
| RE 0 | PRI BIOS | CBEP_P_SUM1_00.11.01   |
|      | RE-FPGA  | 300  |
| FPC  | ROM      | PC Bios  |
|      | O/S      | Version 17.4I20171105_0609_aahluwalia by aahluwalia on 2017-11-05 06:09:28 UTC |

### show chassis firmware (MX10008 Router)

user@host> show chassis firmware

| Part  | Type        | Version  |
|-------|-------------|--|
| RE 0  | PRI BIOS    | CBEP_P_VAL0_00.14.1  |
|       | FPGA        | 264.0  |
|       | RE-FPGA     | 41.0   |
|       | RE-SSD1     | SF-SBR12050  |
|       | RE-SSD2     | SF-SBR12050  |
|       | i40e-NVM    | 6.01   |
| RE 1  | PRI BIOS    | CBEP_P_VAL0_00.13.01   |
|       | FPGA        | 261.0  |
|       | RE-FPGA     | 41.0   |
|       | RE-SSD1     | SF-SBR12034  |
|       | RE-SSD2     | SF-SBR12034  |
|       | i40e-NVM    | 5.02   |
| FPC 0 | ROM         | PC Bios  |
|       | O/S         | Version 18.4-20180716_dev_common.0 by builder on 2018-07-16 00:43:35 UTC |
|       | ROM Monitor | 0 9.14.0   |
|       | PCIE Sw(0)  | 1.0.0  |
|       | MPCS(0)     | 0.2.0  |
|       | I2CS CPLD   | 0.4.0  |
|       | BOOT CPLD   | 0.4.0  |
| FPC 2 | ROM         | PC Bios  |
|       | O/S         | Version 18.4-20180716_dev_common.0 by builder on 2018-07-16 00:43:35 UTC |
|       | ROM Monitor | 0 9.14.0   |
|       | PCIE Sw(0)  | 1.0.0  |
|       | MPCS(0)     | 0.2.0  |
|       | I2CS CPLD   | 0.4.0  |
|       | BOOT CPLD   | 0.4.0  |
| FPC 3 | ROM         | PC Bios  |
|       | O/S         | Version 18.4-20180716_dev_common.0 by builder on 2018-07-16 00:43:35 UTC |
|       | ROM Monitor | 0 9.14.0   |
|       | PCIE Sw(0)  | 1.0.0  |
|       | MPCS(0)     | 0.4.0  |
|       | I2CS CPLD   | 0.8.0  |
|       | BOOT CPLD   | 0.8.0  |
| FPM   | FPGA        | 1.9  |
| FTC 0 | FPGA        | 2.0  |
| FTC 1 | FPGA        | 2.0  |
| SFB 0 | FPGA        | 3.0  |
| SFB 1 | FPGA        | 3.0  |
| SFB 2 | FPGA        | 3.0  |
| SFB 3 | FPGA        | 3.0  |
| SFB 4 | FPGA        | 3.0  |
| SFB 5 | FPGA        | 3.0  |

**show chassis firmware (MX240, MX480, MX960 Router with Application Services Modular Line Card)**

```
user@host> show chassis firmware
```

| Part  | Type       | Version  |
|-------|------------|--|
| FPC 1 | ROM<br>O/S | Juniper ROM Monitor Version 12.1b1<br>Version 12.2I21 by user1 on 2012-06-19 17: |

**show chassis firmware (EX4200 Switch)**

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

| Part  | Type            | Version   |
|-------|-----------------|---|
| FPC 0 | uboot<br>loader | U-Boot 1.1.6 (Feb 6 2008 - 11:27:42)<br>FreeBSD/PowerPC U-Boot bootstrap loader 2.1 |
| FPC 1 | uboot<br>loader | U-Boot 1.1.6 (Feb 6 2008 - 11:27:42)<br>FreeBSD/PowerPC U-Boot bootstrap loader 2.1 |
| FPC 2 | uboot<br>loader | U-Boot 1.1.6 (Feb 6 2008 - 11:27:42)<br>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<br>loader | U-Boot 1.1.6 (Mar 25 2009 - 06:13:12) 2.4.0<br>FreeBSD/PowerPC U-Boot bootstrap loader 2.2 |
| FPC 3            | U-Boot<br>loader | U-Boot 1.1.6 (Dec 4 2009 - 13:17:34) 3.1.0<br>FreeBSD/PowerPC U-Boot bootstrap loader 2.2  |
| FPC 5            | U-Boot<br>loader | U-Boot 1.1.6 (Mar 25 2009 - 06:13:12) 2.4.0<br>FreeBSD/PowerPC U-Boot bootstrap loader 2.2 |
| FPC 7            | U-Boot<br>loader | U-Boot 1.1.6 (Feb 6 2009 - 05:31:46) 2.4.0<br>FreeBSD/PowerPC U-Boot bootstrap loader 2.2  |
| Routing Engine 0 | U-Boot<br>loader | U-Boot 1.1.6 (Mar 25 2009 - 06:13:12) 2.4.0<br>FreeBSD/PowerPC U-Boot bootstrap loader 2.2 |
| Routing Engine 1 | U-Boot<br>loader | U-Boot 1.1.6 (Mar 25 2009 - 06:13:12) 2.4.0<br>FreeBSD/PowerPC U-Boot bootstrap loader 2.2 |

**show chassis firmware (EX9200 Switch)**

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

| Part  | Type       | Version   |
|-------|------------|---|
| FPC 2 | ROM<br>O/S | Juniper ROM Monitor Version 11.4b2<br>Version 14.1I20140312_0741 by userd o |
| FPC 3 | ROM<br>O/S | Juniper ROM Monitor Version 10.4b1<br>Version 14.1I20140312_0741 by userd o |

**show chassis firmware (EX9251 Switch)**

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

| Part | Type     | Version              |
|------|----------|----------------------|
| RE 0 | PRI BIOS | CBEP_P_SUM1_00.11.01 |

```

FPC                                RE-FPGA  301
                                ROM        PC Bios
                                O/S        Version 18.1R1.4 by builder on 2018-03-06
00:31:54 UTC

```

### show chassis firmware (EX9253 Switch)

```

user@switch> show chassis firmware
Part      Type      Version
RE 0      PRI BIOS  CBEP_P_SUM1_00.11.01
          RE-FPGA  402
RE 1      PRI BIOS  CBEP_P_SUM1_00.11.01
          RE-FPGA  402
FPC 0      ROM      PC Bios
          O/S      Version 18.2-20180129_dev_common.1 by builder
on 2018-01-29 13:35:11 UTC
FPC 1      ROM      PC Bios
          O/S      Version 18.2-20180129_dev_common.1 by builder
on 2018-01-29 13:35:11 UTC

```

### 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 userb on 2004-0
FPC 2      ROM      Juniper ROM Monitor Version 6.4b20
          O/S      Version 7.0-20040804.0 by userb on 2004-0
SPMB 0      ROM      Juniper ROM Monitor Version 6.4b18
          O/S      Version 7.0-20040804.0 by userb 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 userb 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 userb on 2009-0
SPMB 1          ROM      Juniper ROM Monitor Version 9.5b1
                  O/S      Version 9.6-20090507.0 by userb 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 userb on 2009-0
FPC 6           ROM      Juniper ROM Monitor Version 9.0b2
                  O/S      Version 9.6-20090507.0 by userb on 2009-0
FPC 7           ROM      Juniper ROM Monitor Version 9.0b2
                  O/S      Version 9.6-20090507.0 by userb on 2009-0
SPMB 0          ROM      Juniper ROM Monitor Version 9.5b1
                  O/S      Version 9.6-20090507.0 by userb on 2009-0
SPMB 1          ROM      Juniper ROM Monitor Version 9.5b1
                  O/S      Version 9.6-20090507.0 by userb 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 userb on 2009-0
FPC 6           ROM      Juniper ROM Monitor Version 9.0b2
                  O/S      Version 9.6-20090507.0 by userb on 2009-0
FPC 7           ROM      Juniper ROM Monitor Version 9.0b2
                  O/S      Version 9.6-20090507.0 by userb on 2009-0
SPMB 0          ROM      Juniper ROM Monitor Version 9.5b1
                  O/S      Version 9.6-20090507.0 by userb on 2009-0
SPMB 1          ROM      Juniper ROM Monitor Version 9.5b1
                  O/S      Version 9.6-20090507.0 by userb 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 userb on 2009-0
FPC 5           ROM      Juniper ROM Monitor Version 9.0b2
                  O/S      Version 9.6-20090507.0 by userb on 2009-0
FPC 6           ROM      Juniper ROM Monitor Version 9.0b2
                  O/S      Version 9.6-20090507.0 by userb on 2009-0
FPC 7           ROM      Juniper ROM Monitor Version 7.5b4
                  O/S      Version 9.6-20090507.0 by userb on 2009-0
SPMB 0          ROM      Juniper ROM Monitor Version 9.5b1
                  O/S      Version 9.6-20090507.0 by userb on 2009-0
SPMB 1          ROM      Juniper ROM Monitor Version 9.5b1
                  O/S      Version 9.6-20090507.0 by userb 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 userb on 2009-0 |
| FPC 1  | ROM  | Juniper ROM Monitor Version 9.0b2         |
|        | O/S  | Version 9.6-20090507.0 by userb on 2009-0 |
| FPC 2  | ROM  | Juniper ROM Monitor Version 9.0b2         |
|        | O/S  | Version 9.6-20090507.0 by userb on 2009-0 |
| FPC 4  | ROM  | Juniper ROM Monitor Version 7.5b4         |
|        | O/S  | Version 9.6-20090507.0 by userb on 2009-0 |
| FPC 5  | ROM  | Juniper ROM Monitor Version 9.0b2         |
|        | O/S  | Version 9.6-20090507.0 by userb on 2009-0 |
| FPC 7  | ROM  | Juniper ROM Monitor Version 9.0b2         |
|        | O/S  | Version 9.6-20090507.0 by userb on 2009-0 |
| SPMB 0 | ROM  | Juniper ROM Monitor Version 9.5b1         |
|        | O/S  | Version 9.6-20090507.0 by userb on 2009-0 |
| SPMB 1 | ROM  | Juniper ROM Monitor Version 9.5b1         |
|        | O/S  | Version 9.6-20090507.0 by userb 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 userb on 2009-0 |
| FPC 6  | ROM  | Juniper ROM Monitor Version 9.0b2         |
|        | O/S  | Version 9.6-20090507.0 by userb on 2009-0 |
| FPC 7  | ROM  | Juniper ROM Monitor Version 9.0b2         |
|        | O/S  | Version 9.6-20090507.0 by userb on 2009-0 |
| SPMB 0 | ROM  | Juniper ROM Monitor Version 9.5b1         |
|        | O/S  | Version 9.6-20090507.0 by userb on 2009-0 |
| SPMB 1 | ROM  | Juniper ROM Monitor Version 9.5b1         |
|        | O/S  | Version 9.6-20090507.0 by userb 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 userb on 2009-0 |
| SPMB 1 | ROM | Juniper ROM Monitor Version 9.5b1         |
|        | O/S | Version 9.6-20090507.0 by userb on 2009-0 |

### show chassis firmware (QFX Series and OCX Series)

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

| Part             | Type          | Version   |
|------------------|---------------|---|
| FPC 0            |               |   |
| Routing Engine 0 | U-Boot loader | U-Boot 1.1.6 (Sep 15 2010 - 02:11:11) 1.0.5<br>FreeBSD/MIPS U-Boot bootstrap loader 0.1 |

### show chassis firmware (PTX1000 Packet Transport Routers)

```
user@host> show chassis firmware
```

| Part  | Type          | Version                                  |
|-------|---------------|--|
| FPC 0 | U-Boot loader | ***<br>FreeBSD/i386 bootstrap loader 1.2 |
|       | BIOS          | V0018.2U                                 |
|       | EC FPGA       | 2.0                                      |
|       | MAIN_CPLD     | 1.f                                      |
|       | MEZZ_CPLD     | 1.f                                      |
|       | RE FPGA       | 2.3                                      |

### show chassis firmware (PTX10008 Routers)

```
user@host> show chassis firmware
```

| Part                 | Type      | Version                                       |
|----------------------|-----------|---|
| RE 0                 | PRI BIOS  | QFXS_SFP_00.31_01.01                          |
|                      | GDN BIOS  | QFXS_SFP_00.31_01.01                          |
|                      | FPGA      | 2.4   |
|                      | RE-FPGA   | 3.2   |
| RE 1                 | PRI BIOS  | QFXS_SFP_00.31_01.01                          |
|                      | GDN BIOS  | QFXS_SFP_00.31_01.01                          |
|                      | FPGA      | 2.3   |
|                      | RE-FPGA   | 3.2   |
| FPC 0<br>- 22:56:52) | U-Boot    | Bank A: U-Boot 2011.12-gfbea47a (Feb 26 2016) |
|                      | CTRL FPGA | 4.1   |
|                      | PORT FPGA | 2.0   |
| FPC 5<br>- 22:56:52) | U-Boot    | Bank A: U-Boot 2011.12-gfbea47a (Feb 26 2016) |
|                      | CTRL FPGA | 3.1   |
|                      | PORT FPGA | 2.0   |
| FPC 6<br>- 22:56:52) | U-Boot    | Bank B: U-Boot 2011.12-gfbea47a (Feb 26 2016) |
|                      | CTRL FPGA | 3.1   |
|                      | PORT FPGA | 2.0   |
| FPM                  | FPGA      | 1.9   |
| FTC 0                | FPGA      | 2.0   |
| FTC 1                | FPGA      | 2.0   |
| SIB 0                | FPGA      | 3.0   |
| SIB 1                | FPGA      | 3.0   |

**show chassis firmware interconnect-device (QFabric System)**

```
user@switch> show chassis firmware interconnect-device interconnect1
```

| Part             | Type          | Version   |
|------------------|---------------|---|
| Routing Engine 0 | U-Boot loader | U-Boot 1.1.6 (May 10 2011 - 04:52:59) 1.1.1<br>FreeBSD/MIPS U-Boot bootstrap loader 0.1 |
| Routing Engine 1 | U-Boot loader | U-Boot 1.1.6 (May 10 2011 - 04:52:59) 1.1.1<br>FreeBSD/MIPS U-Boot bootstrap loader 0.1 |

**show chassis firmware (ACX2000 Universal Metro Router)**

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

| Part | Type | Version                                    |
|------|------|--|
| FPC  | O/S  | Version 12.2I13 by user2 on 2012-05-29 06: |
| FEB  | O/S  | Version 12.2I13 by user2 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 loader  | U-Boot 1.1.6 (Aug 21 2011 - 01:45:26) | 1.0.0<br>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 user1 on 2012-06-19 17: |

**show chassis firmware (ACX5048 Router)**

```
user@host> show chassis firmware
```

| Part | Type       | Version                           |
|------|------------|-----------------------------------|
| FPC  | loader     | FreeBSD/i386 bootstrap loader 1.2 |
|      | BIOS       | V0018.7                           |
|      | TMC FPGA   | 6.d8                              |
|      | PICO CPLD0 | 7.b                               |
|      | PICO CPLD1 | 7.b                               |
|      | PICO CPLD2 | 7.b                               |
|      | PICO CPLD3 | 7.b                               |
|      | PICO CPLD4 | 7.b                               |
|      | PICO CPLD5 | 7.b                               |
|      | PICO CPLD6 | 6.a                               |
|      | MRE        | 17.9                              |
|      | Power CPLD | 3.a                               |

### show chassis firmware (ACX5096 Router)

```
user@host> show chassis firmware
```

| Part | Type        | Version                           |
|------|-------------|-----------------------------------|
| FPC  | Loader      | FreeBSD/i386 bootstrap loader 1.2 |
|      | BIOS        | V0018.7                           |
|      | TMC FPGA    | 3000001.5                         |
|      | PIC0 CPLD0  | 7.b                               |
|      | PIC0 CPLD1  | 7.b                               |
|      | PIC0 CPLD2  | 7.b                               |
|      | PIC0 CPLD3  | 7.b                               |
|      | PIC0 CPLD4  | 7.b                               |
|      | PIC0 CPLD5  | 7.b                               |
|      | PIC0 CPLD6  | c6.a                              |
|      | PIC0 CPLD7  | -NA-                              |
|      | PIC0 CPLD8  | 7.b                               |
|      | PIC0 CPLD9  | 7.b                               |
|      | PIC0 CPLD10 | 7.b                               |
|      | PIC0 CPLD11 | 7.b                               |
|      | PIC0 CPLD12 | 7.b                               |
|      | PIC0 CPLD13 | 7.b                               |
|      | PIC0 CPLD14 | c6.a                              |
|      | MRE         | 7.5                               |
|      | Power CPLD  | 4.1                               |

### show chassis firmware (ACX500 Router)

```
user@host> show chassis firmware
```

| Part                             | Type | Version                                   |
|----------------------------------|------|---|
| FPC                              | O/S  | Version 15.2-20150815_dev_rbu_1_16q1.0 by |
| userb on 2015-08-15 04:18:02 UTC |      |   |
| FEB                              | O/S  | Version 15.2-20150815_dev_rbu_1_16q1.0 by |
| userb on 2015-08-15 04:18:02 UTC |      |   |

## show chassis fan

|                       |   |
|-----------------------|---|
| <b>List of Syntax</b> | <a href="#">Syntax on page 369</a>  |
|                       | <a href="#">Syntax (ACX4000 Series Router) on page 369</a>  |
|                       | <a href="#">Syntax (ACX5048 and ACX5096 Routers) on page 369</a>  |
|                       | <a href="#">Syntax (MX Series Routers) on page 369</a>  |
|                       | <a href="#">Syntax (T Series Routers) on page 369</a>   |
|                       | <a href="#">Syntax (MX104, MX204, MX2010, MX2020, MX2008, and MX10003 Universal Routing Platform) on page 369</a> |
|                       | <a href="#">Syntax (MX10003 Universal Routing Platform) on page 369</a>   |
|                       | <a href="#">Syntax (PTX Series) on page 369</a>   |
|                       | <a href="#">Syntax (QFX Series) on page 370</a>   |
|                       | <a href="#">Syntax (OCX Series) on page 370</a>   |
|                       | <a href="#">Syntax (TX Matrix Router) on page 370</a>   |
|                       | <a href="#">Syntax (TX Matrix Plus Router) on page 370</a>  |
|                       | <a href="#">Syntax (EX9251, EX9253 Switches) on page 370</a>  |

|  |  |
|--|--|
| <b>Syntax</b>  | show chassis fan   |
| <b>Syntax (ACX4000 Series Router)</b>  | show chassis fan   |
| <b>Syntax (ACX5048 and ACX5096 Routers)</b>  | show chassis fan   |
| <b>Syntax (MX Series Routers)</b>  | show chassis fan<br><all-members><br><local><br><member <i>member-id</i> >                 |
| <b>Syntax (T Series Routers)</b>   | show chassis fan   |
| <b>Syntax (MX104, MX204, MX2010, MX2020, MX2008, and MX10003 Universal Routing Platform)</b> | show chassis fan<br><satellite [slot-id <i>slot-id</i> [device-alias <i>alias-name</i> ]]> |
| <b>Syntax (MX10003 Universal Routing Platform)</b>   | show chassis fan   |
| <b>Syntax (PTX Series)</b>   | show chassis fan   |

|   |   |
|---|---|
| <b>Syntax (QFX Series)</b>              | show chassis fan<br><interconnect-device <i>name</i> >  |
| <b>Syntax (OCX Series)</b>              | show chassis fan  |
| <b>Syntax (TX Matrix Router)</b>        | show chassis fan<br><lcc <i>number</i>   scc>   |
| <b>Syntax (TX Matrix Plus Router)</b>   | show chassis fan<br><lcc <i>number</i>   sfc <i>number</i> >  |
| <b>Syntax (EX9251, EX9253 Switches)</b> | show chassis fan  |
| <b>Release Information</b>              | <p>Command introduced in Junos OS Release 10.0 on MX Series 5G Universal Routing Platforms, M120 routers, and M320 routers, T320 routers, T640 routers, T1600 routers, TX Matrix Routers, and TX Matrix Plus routers.</p> <p>Command introduced in Junos OS Release 11.1 for the QFX Series.</p> <p>Command introduced in Junos OS Release 11.4 for EX Series switches.</p> <p>Command introduced in Junos OS Release 12.1 for T4000 routers.</p> <p>Command introduced in Junos OS Release 12.3 for PTX5000 Packet Transport Routers.</p> <p>Command introduced in Junos OS Release 12.3 for MX2010 and MX2020 Universal Routing Platforms, and ACX Series Routers.</p> <p>Command introduced in Junos OS Release 13.2 for MX104 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p> <p><b>satellite</b> option introduced in Junos OS Release 14.2R3.</p> <p>Command introduced in Junos OS Release 17.2 for MX2008 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 17.3 for MX150 Router Appliance.</p> <p>Command introduced in Junos OS Release 17.2 for PTX10008 Routers.</p> <p>Command introduced in Junos OS Release 17.4 for MX204 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 18.1R1 for EX9251 Switches.</p> <p>Command introduced in Junos OS Release 18.2 for EX9253 Switches.</p> <p>Command introduced in Junos OS Release 18.2 for MX10008 Universal Routing Platforms.</p> <p>Command output introduced for Junos OS Evolved Release 19.1R1.</p> |
| <b>Description</b>                      | (T Series routers, TX Matrix routers, TX Matrix Plus routers, M120 routers, M320 routers, MX104 routers, MX2010 routers, MX2020 routers, MX2008 routers, MX Series 5G Universal Routing Platforms, QFX3008-I Interconnect devices, QFX Series, OCX Series, EX Series switches, and PTX Series Packet Transport Routers only) Show information about the fan tray and fans.  |
| <b>Options</b>                          | <b>all-members</b> —(MX Series routers only) (Optional) Display information about the fan tray and fans for all members of the Virtual Chassis configuration.   |

**local**—(MX Series routers only) (Optional) Display information about the fan tray and fans for the local Virtual Chassis member.

**member *member-id***—(MX Series routers only) (Optional) Display information about the fan tray and fans for the specified member of the Virtual Chassis configuration. For an MX Series Virtual Chassis, replace *member-id* variable with a value 0 or 1.

**interconnect-device *name***—(QFX3000-G QFabric systems only) (Optional) Display information about the fan tray and fans for the specified QFX3008-I Interconnect device.

**lcc *number***—(TX Matrix and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display information about the fan tray and fans for the specified T640 router (line-card chassis) that is connected to a TX Matrix router. On a TX Matrix Plus router, display information about the fan tray and fans for the specified router (line-card chassis) that is connected to a TX Matrix Plus router.

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

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**satellite [*slot-id slot-id* | device-alias *alias-name*]**—(Junos Fusion only) (Optional) Display information about the fan tray and fans for the specified satellite device or devices in a Junos Fusion, or for all satellite devices if no satellite devices are specified.

**scc**—(TX Matrix routers only) (Optional) Display information about the fan tray and fans for the TX Matrix router (switch-card chassis).

**sfc *number***—(TX Matrix Plus routers only) (Optional) Display information about the fan tray and fans for the TX Matrix Plus router (switch-fabric chassis). Replace *number* variable with 0.

**Required Privilege Level** view

**List of Sample Output** [show chassis fan on page 373](#)  
[show chassis fan \(QFabric Systems\) on page 373](#)  
[show chassis fan \(EX Series Switches\) on page 375](#)  
[show chassis fan \(T320 Router\) on page 375](#)  
[show chassis fan \(T640 Router\) on page 375](#)  
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[show chassis fan \(TX Matrix Router\) on page 377](#)  
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[show chassis fan \(TX Matrix Plus Router with 3D SIBs\) on page 379](#)  
[show chassis fan \(PTX5000 Packet Transport Router\) on page 381](#)  
[show chassis fan \(PTX10008 Router\) on page 382](#)  
[show chassis fan \(MX150\) on page 382](#)  
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[show chassis fan \(ACX5048 Router\) on page 385](#)  
[show chassis fan \(QFX5100 Switch and OCX Series\) on page 385](#)  
[show chassis fan \(EX9251 switches\) on page 385](#)  
[show chassis fan \(EX9253 switches\) on page 386](#)  
[show chassis fan \(Junos OS Evolved\) on page 386](#)

**Output Fields** Table 14 on page 372 lists the output fields for the **show chassis fan** command. Output fields are listed in the approximate order in which they appear.

*Table 14: show chassis fan Output Fields*

| Field Name    | Field Description  |
|---------------|--|
| <b>Item</b>   | Fan item identifier.   |
| <b>Status</b> | Status of the fan: <ul style="list-style-type: none"> <li>• <b>OK</b>—Fan is running properly and within the normal range.</li> <li>• <b>Check</b>—Fan is in <b>Check</b> state because of some fault or alarm condition.</li> </ul> |
| <b>RPM</b>    | (T Series routers, TX Matrix routers, TX Matrix Plus routers, MX Series 5G Universal Routing Platforms, QFX3108 Interconnect devices, and EX Series switches only) Fan speed in revolutions per minute (RPM).                        |
| <b>% RPM</b>  | (PTX10003, MX2010 routers, MX2020 routers, MX2008 routers, and PTX Series Packet Transport Routers only) Percentage of the fan speed being used.   |



Table 14: show chassis fan Output Fields (continued)

| Field Name  | Field Description   |
|-------------|---|
| Measurement | <p>(T Series routers, TX Matrix routers, TX Matrix Plus routers, MX Series 5G Universal Routing Platforms, QFX3108 Interconnect devices, and EX Series switches only) Fan speed status based on different chassis cooling requirements:</p> <ul style="list-style-type: none"> <li>• Spinning at high speed</li> <li>• Spinning at intermediate speed</li> <li>• Spinning at normal speed</li> <li>• Spinning at low speed (except EX Series switches)</li> </ul> <p>(PTX10003, MX2010 routers, MX2020 routers, MX2008 routers, and PTX Series Packet Transport Routers only) Fan speed in revolutions per minute (RPM) for each fan in the fan tray.</p> |

## Sample Output

### show chassis fan

```
user@host> show chassis fan
```

| Item              | Status | RPM  | Measurement              |
|-------------------|--------|------|--------------------------|
| Top Tray Fan 1    | OK     | 3790 | Spinning at normal speed |
| Top Tray Fan 2    | OK     | 3769 | Spinning at normal speed |
| Top Tray Fan 3    | OK     | 3769 | Spinning at normal speed |
| Top Tray Fan 4    | OK     | 3790 | Spinning at normal speed |
| Top Tray Fan 5    | OK     | 3790 | Spinning at normal speed |
| Top Tray Fan 6    | OK     | 3769 | Spinning at normal speed |
| Top Tray Fan 7    | OK     | 3790 | Spinning at normal speed |
| Top Tray Fan 8    | OK     | 3769 | Spinning at normal speed |
| Top Tray Fan 9    | OK     | 3769 | Spinning at normal speed |
| Top Tray Fan 10   | OK     | 3790 | Spinning at normal speed |
| Top Tray Fan 11   | OK     | 3790 | Spinning at normal speed |
| Top Tray Fan 12   | OK     | 3769 | Spinning at normal speed |
| Bottom Tray Fan 1 | OK     | 2880 | Spinning at normal speed |
| Bottom Tray Fan 2 | OK     | 2912 | Spinning at normal speed |
| Bottom Tray Fan 3 | OK     | 2928 | Spinning at normal speed |
| Bottom Tray Fan 4 | OK     | 2896 | Spinning at normal speed |
| Bottom Tray Fan 5 | OK     | 2896 | Spinning at normal speed |
| Bottom Tray Fan 6 | OK     | 2928 | Spinning at normal speed |

### show chassis fan (QFabric Systems)

```
user@host> show chassis fan interconnect-device interconnect1
```

| Item        | Status | RPM  | Measurement              |
|-------------|--------|------|--------------------------|
| TFT 0 Fan 0 | OK     | 2849 | Spinning at normal speed |
| TFT 0 Fan 1 | OK     | 2821 | Spinning at normal speed |
| TFT 0 Fan 2 | OK     | 2735 | Spinning at normal speed |
| TFT 0 Fan 3 | OK     | 2815 | Spinning at normal speed |
| TFT 0 Fan 4 | OK     | 2828 | Spinning at normal speed |
| TFT 0 Fan 5 | OK     | 2863 | Spinning at normal speed |
| BFT 1 Fan 0 | OK     | 2941 | Spinning at normal speed |

|                     |    |       |                          |
|---------------------|----|-------|--------------------------|
| BFT 1 Fan 1         | OK | 3008  | Spinning at normal speed |
| BFT 1 Fan 2         | OK | 3073  | Spinning at normal speed |
| BFT 1 Fan 3         | OK | 2925  | Spinning at normal speed |
| BFT 1 Fan 4         | OK | 2863  | Spinning at normal speed |
| BFT 1 Fan 5         | OK | 2933  | Spinning at normal speed |
| SFT 0 Fan 0 Rotor 0 | OK | 15472 | Spinning at normal speed |
| SFT 0 Fan 0 Rotor 1 | OK | 14477 | Spinning at normal speed |
| SFT 0 Fan 1 Rotor 0 | OK | 15561 | Spinning at normal speed |
| SFT 0 Fan 1 Rotor 1 | OK | 14210 | Spinning at normal speed |
| SFT 0 Fan 2 Rotor 0 | OK | 16167 | Spinning at normal speed |
| SFT 0 Fan 2 Rotor 1 | OK | 14248 | Spinning at normal speed |
| SFT 0 Fan 3 Rotor 0 | OK | 16463 | Spinning at normal speed |
| SFT 0 Fan 3 Rotor 1 | OK | 14099 | Spinning at normal speed |
| SFT 1 Fan 0 Rotor 0 | OK | 15083 | Spinning at normal speed |
| SFT 1 Fan 0 Rotor 1 | OK | 13533 | Spinning at normal speed |
| SFT 1 Fan 1 Rotor 0 | OK | 16071 | Spinning at normal speed |
| SFT 1 Fan 1 Rotor 1 | OK | 14400 | Spinning at normal speed |
| SFT 1 Fan 2 Rotor 0 | OK | 15517 | Spinning at normal speed |
| SFT 1 Fan 2 Rotor 1 | OK | 14210 | Spinning at normal speed |
| SFT 1 Fan 3 Rotor 0 | OK | 16413 | Spinning at normal speed |
| SFT 1 Fan 3 Rotor 1 | OK | 14400 | Spinning at normal speed |
| SFT 2 Fan 0 Rotor 0 | OK | 15297 | Spinning at normal speed |
| SFT 2 Fan 0 Rotor 1 | OK | 14634 | Spinning at normal speed |
| SFT 2 Fan 1 Rotor 0 | OK | 15561 | Spinning at normal speed |
| SFT 2 Fan 1 Rotor 1 | OK | 14285 | Spinning at normal speed |
| SFT 2 Fan 2 Rotor 0 | OK | 15835 | Spinning at normal speed |
| SFT 2 Fan 2 Rotor 1 | OK | 14400 | Spinning at normal speed |
| SFT 2 Fan 3 Rotor 0 | OK | 15789 | Spinning at normal speed |
| SFT 2 Fan 3 Rotor 1 | OK | 14323 | Spinning at normal speed |
| SFT 3 Fan 0 Rotor 0 | OK | 16314 | Spinning at normal speed |
| SFT 3 Fan 0 Rotor 1 | OK | 14876 | Spinning at normal speed |
| SFT 3 Fan 1 Rotor 0 | OK | 15835 | Spinning at normal speed |
| SFT 3 Fan 1 Rotor 1 | OK | 14323 | Spinning at normal speed |
| SFT 3 Fan 2 Rotor 0 | OK | 16265 | Spinning at normal speed |
| SFT 3 Fan 2 Rotor 1 | OK | 14594 | Spinning at normal speed |
| SFT 3 Fan 3 Rotor 0 | OK | 16071 | Spinning at normal speed |
| SFT 3 Fan 3 Rotor 1 | OK | 14323 | Spinning at normal speed |
| SFT 4 Fan 0 Rotor 0 | OK | 15652 | Spinning at normal speed |
| SFT 4 Fan 0 Rotor 1 | OK | 14438 | Spinning at normal speed |
| SFT 4 Fan 1 Rotor 0 | OK | 16167 | Spinning at normal speed |
| SFT 4 Fan 1 Rotor 1 | OK | 14555 | Spinning at normal speed |
| SFT 4 Fan 2 Rotor 0 | OK | 16023 | Spinning at normal speed |
| SFT 4 Fan 2 Rotor 1 | OK | 14361 | Spinning at normal speed |
| SFT 4 Fan 3 Rotor 0 | OK | 16216 | Spinning at normal speed |
| SFT 4 Fan 3 Rotor 1 | OK | 14438 | Spinning at normal speed |
| SFT 5 Fan 0 Rotor 0 | OK | 15297 | Spinning at normal speed |
| SFT 5 Fan 0 Rotor 1 | OK | 14173 | Spinning at normal speed |
| SFT 5 Fan 1 Rotor 0 | OK | 15472 | Spinning at normal speed |
| SFT 5 Fan 1 Rotor 1 | OK | 13846 | Spinning at normal speed |
| SFT 5 Fan 2 Rotor 0 | OK | 15340 | Spinning at normal speed |
| SFT 5 Fan 2 Rotor 1 | OK | 13917 | Spinning at normal speed |
| SFT 5 Fan 3 Rotor 0 | OK | 15835 | Spinning at normal speed |
| SFT 5 Fan 3 Rotor 1 | OK | 13917 | Spinning at normal speed |
| SFT 6 Fan 0 Rotor 0 | OK | 15743 | Spinning at normal speed |
| SFT 6 Fan 0 Rotor 1 | OK | 14594 | Spinning at normal speed |
| SFT 6 Fan 1 Rotor 0 | OK | 16167 | Spinning at normal speed |
| SFT 6 Fan 1 Rotor 1 | OK | 14634 | Spinning at normal speed |
| SFT 6 Fan 2 Rotor 0 | OK | 16167 | Spinning at normal speed |
| SFT 6 Fan 2 Rotor 1 | OK | 14516 | Spinning at normal speed |
| SFT 6 Fan 3 Rotor 0 | OK | 16666 | Spinning at normal speed |

|                     |    |       |                          |
|---------------------|----|-------|--------------------------|
| SFT 6 Fan 3 Rotor 1 | OK | 14438 | Spinning at normal speed |
| SFT 7 Fan 0 Rotor 0 | OK | 15517 | Spinning at normal speed |
| SFT 7 Fan 0 Rotor 1 | OK | 14438 | Spinning at normal speed |
| SFT 7 Fan 1 Rotor 0 | OK | 15517 | Spinning at normal speed |
| SFT 7 Fan 1 Rotor 1 | OK | 14361 | Spinning at normal speed |
| SFT 7 Fan 2 Rotor 0 | OK | 16167 | Spinning at normal speed |
| SFT 7 Fan 2 Rotor 1 | OK | 14555 | Spinning at normal speed |
| SFT 7 Fan 3 Rotor 0 | OK | 15697 | Spinning at normal speed |
| SFT 7 Fan 3 Rotor 1 | OK | 14361 | Spinning at normal speed |

### show chassis fan (EX Series Switches)

user@host> show chassis fan

| Item   | Status | RPM  | Measurement              |
|--------|--------|------|--------------------------|
| Fan 1  | OK     | 3477 | Spinning at normal speed |
| Fan 2  | OK     | 3477 | Spinning at normal speed |
| Fan 3  | OK     | 3479 | Spinning at normal speed |
| Fan 4  | OK     | 3508 | Spinning at normal speed |
| Fan 5  | OK     | 3517 | Spinning at normal speed |
| Fan 6  | OK     | 3531 | Spinning at normal speed |
| Fan 7  | OK     | 3439 | Spinning at normal speed |
| Fan 8  | OK     | 3424 | Spinning at normal speed |
| Fan 9  | OK     | 3413 | Spinning at normal speed |
| Fan 10 | OK     | 3439 | Spinning at normal speed |
| Fan 11 | OK     | 3446 | Spinning at normal speed |
| Fan 12 | OK     | 3432 | Spinning at normal speed |

### show chassis fan (T320 Router)

user@host> show chassis fan

| Item                    | Status | RPM  | Measurement              |
|-------------------------|--------|------|--------------------------|
| Top Left Front fan      | OK     | 2850 | Spinning at normal speed |
| Top Left Middle fan     | OK     | 2820 | Spinning at normal speed |
| Top Left Rear fan       | OK     | 2970 | Spinning at normal speed |
| Top Right Front fan     | OK     | 2790 | Spinning at normal speed |
| Top Right Middle fan    | OK     | 2640 | Spinning at normal speed |
| Top Right Rear fan      | OK     | 2790 | Spinning at normal speed |
| Bottom Left Front fan   | OK     | 2520 | Spinning at normal speed |
| Bottom Left Middle fan  | OK     | 2610 | Spinning at normal speed |
| Bottom Left Rear fan    | OK     | 2550 | Spinning at normal speed |
| Bottom Right Front fan  | OK     | 2610 | Spinning at normal speed |
| Bottom Right Middle fan | OK     | 2880 | Spinning at normal speed |
| Bottom Right Rear fan   | OK     | 2790 | Spinning at normal speed |
| Rear Tray Top fan       | OK     | 2130 | Spinning at normal speed |
| Rear Tray Second fan    | OK     | 2190 | Spinning at normal speed |
| Rear Tray Middle fan    | OK     | 2250 | Spinning at normal speed |
| Rear Tray Fourth fan    | OK     | 2220 | Spinning at normal speed |
| Rear Tray Bottom fan    | OK     | 2280 | Spinning at normal speed |

### show chassis fan (T640 Router)

user@host> show chassis fan

| Item | Status | RPM | Measurement |
|------|--------|-----|-------------|
|------|--------|-----|-------------|

|                         |    |      |                          |
|-------------------------|----|------|--------------------------|
| Top Left Front fan      | OK | 3420 | Spinning at normal speed |
| Top Left Middle fan     | OK | 3420 | Spinning at normal speed |
| Top Left Rear fan       | OK | 3420 | Spinning at normal speed |
| Top Right Front fan     | OK | 3420 | Spinning at normal speed |
| Top Right Middle fan    | OK | 3420 | Spinning at normal speed |
| Top Right Rear fan      | OK | 3450 | Spinning at normal speed |
| Bottom Left Front fan   | OK | 3390 | Spinning at normal speed |
| Bottom Left Middle fan  | OK | 3420 | Spinning at normal speed |
| Bottom Left Rear fan    | OK | 3390 | Spinning at normal speed |
| Bottom Right Front fan  | OK | 3390 | Spinning at normal speed |
| Bottom Right Middle fan | OK | 3390 | Spinning at normal speed |
| Bottom Right Rear fan   | OK | 3390 | Spinning at normal speed |
| Rear Tray Top fan       | OK | 5220 | Spinning at normal speed |
| Rear Tray Second fan    | OK | 5220 | Spinning at normal speed |
| Rear Tray Third fan     | OK | 5220 | Spinning at normal speed |
| Rear Tray Fourth fan    | OK | 5220 | Spinning at normal speed |
| Rear Tray Fifth fan     | OK | 5220 | Spinning at normal speed |
| Rear Tray Sixth fan     | OK | 5220 | Spinning at normal speed |
| Rear Tray Seventh fan   | OK | 5220 | Spinning at normal speed |
| Rear Tray Bottom fan    | OK | 5220 | Spinning at normal speed |

#### show chassis fan (T1600 Router)

```
user@host> show chassis fan
```

| Item                    | Status | RPM  | Measurement              |
|-------------------------|--------|------|--------------------------|
| Top Left Front fan      | OK     | 3420 | Spinning at normal speed |
| Top Left Middle fan     | OK     | 3420 | Spinning at normal speed |
| Top Left Rear fan       | OK     | 3450 | Spinning at normal speed |
| Top Right Front fan     | OK     | 3420 | Spinning at normal speed |
| Top Right Middle fan    | OK     | 3420 | Spinning at normal speed |
| Top Right Rear fan      | OK     | 3390 | Spinning at normal speed |
| Bottom Left Front fan   | OK     | 3420 | Spinning at normal speed |
| Bottom Left Middle fan  | OK     | 3420 | Spinning at normal speed |
| Bottom Left Rear fan    | OK     | 3390 | Spinning at normal speed |
| Bottom Right Front fan  | OK     | 3390 | Spinning at normal speed |
| Bottom Right Middle fan | OK     | 3420 | Spinning at normal speed |
| Bottom Right Rear fan   | OK     | 3390 | Spinning at normal speed |
| Rear Tray Top fan       | OK     | 5190 | Spinning at normal speed |
| Rear Tray Second fan    | OK     | 5190 | Spinning at normal speed |
| Rear Tray Third fan     | OK     | 5190 | Spinning at normal speed |
| Rear Tray Fourth fan    | OK     | 5190 | Spinning at normal speed |
| Rear Tray Fifth fan     | OK     | 5190 | Spinning at normal speed |
| Rear Tray Sixth fan     | OK     | 5190 | Spinning at normal speed |
| Rear Tray Seventh fan   | OK     | 5190 | Spinning at normal speed |
| Rear Tray Bottom fan    | OK     | 5190 | Spinning at normal speed |

#### show chassis fan (T4000 Core Router)

```
user@host> show chassis fan
```

| Item                 | Status | RPM  | Measurement            |
|----------------------|--------|------|------------------------|
| Top Left Front fan   | OK     | 5190 | Spinning at high speed |
| Top Left Middle fan  | OK     | 5220 | Spinning at high speed |
| Top Left Rear fan    | OK     | 5190 | Spinning at high speed |
| Top Right Front fan  | OK     | 5160 | Spinning at high speed |
| Top Right Middle fan | OK     | 5190 | Spinning at high speed |

|                         |    |       |                        |
|-------------------------|----|-------|------------------------|
| Top Right Rear fan      | OK | 5160  | Spinning at high speed |
| Bottom Left Front fan   | OK | 6030  | Spinning at high speed |
| Bottom Left Middle fan  | OK | 6090  | Spinning at high speed |
| Bottom Left Rear fan    | OK | 6090  | Spinning at high speed |
| Bottom Right Front fan  | OK | 6030  | Spinning at high speed |
| Bottom Right Middle fan | OK | 6060  | Spinning at high speed |
| Bottom Right Rear fan   | OK | 6060  | Spinning at high speed |
| Rear Tray Top fan       | OK | 10000 | Spinning at high speed |
| Rear Tray Second fan    | OK | 10000 | Spinning at high speed |
| Rear Tray Third fan     | OK | 10000 | Spinning at high speed |
| Rear Tray Fourth fan    | OK | 10000 | Spinning at high speed |
| Rear Tray Fifth fan     | OK | 10000 | Spinning at high speed |
| Rear Tray Sixth fan     | OK | 10000 | Spinning at high speed |
| Rear Tray Seventh fan   | OK | 10000 | Spinning at high speed |
| Rear Tray Bottom fan    | OK | 10000 | Spinning at high speed |

**show chassis fan (TX Matrix Router)**

```
user@host> show chassis fan
```

```
scc-re0:
```

| Item                    | Status | RPM  | Measurement              |
|-------------------------|--------|------|--------------------------|
| Top Left Front fan      | OK     | 3420 | Spinning at normal speed |
| Top Left Middle fan     | OK     | 3390 | Spinning at normal speed |
| Top Left Rear fan       | OK     | 3420 | Spinning at normal speed |
| Top Right Front fan     | OK     | 3390 | Spinning at normal speed |
| Top Right Middle fan    | OK     | 3420 | Spinning at normal speed |
| Top Right Rear fan      | OK     | 3390 | Spinning at normal speed |
| Bottom Left Front fan   | OK     | 3420 | Spinning at normal speed |
| Bottom Left Middle fan  | OK     | 3450 | Spinning at normal speed |
| Bottom Left Rear fan    | OK     | 3420 | Spinning at normal speed |
| Bottom Right Front fan  | OK     | 3420 | Spinning at normal speed |
| Bottom Right Middle fan | OK     | 3420 | Spinning at normal speed |
| Bottom Right Rear fan   | OK     | 3420 | Spinning at normal speed |
| Rear Tray Top fan       | OK     | 3420 | Spinning at normal speed |
| Rear Tray Second fan    | OK     | 5190 | Spinning at normal speed |
| Rear Tray Third fan     | OK     | 5190 | Spinning at normal speed |
| Rear Tray Fourth fan    | OK     | 5190 | Spinning at normal speed |
| Rear Tray Fifth fan     | OK     | 3420 | Spinning at normal speed |
| Rear Tray Sixth fan     | OK     | 3420 | Spinning at normal speed |
| Rear Tray Seventh fan   | OK     | 3420 | Spinning at normal speed |
| Rear Tray Bottom fan    | OK     | 3420 | Spinning at normal speed |

```
1cc2-re0:
```

| Item                    | Status | RPM  | Measurement              |
|-------------------------|--------|------|--------------------------|
| Top Left Front fan      | OK     | 3420 | Spinning at normal speed |
| Top Left Middle fan     | OK     | 3420 | Spinning at normal speed |
| Top Left Rear fan       | OK     | 3450 | Spinning at normal speed |
| Top Right Front fan     | OK     | 3420 | Spinning at normal speed |
| Top Right Middle fan    | OK     | 3450 | Spinning at normal speed |
| Top Right Rear fan      | OK     | 3360 | Spinning at normal speed |
| Bottom Left Front fan   | OK     | 3420 | Spinning at normal speed |
| Bottom Left Middle fan  | OK     | 3480 | Spinning at normal speed |
| Bottom Left Rear fan    | OK     | 3420 | Spinning at normal speed |
| Bottom Right Front fan  | OK     | 3420 | Spinning at normal speed |
| Bottom Right Middle fan | OK     | 3390 | Spinning at normal speed |
| Bottom Right Rear fan   | OK     | 3420 | Spinning at normal speed |
| Rear Tray Top fan       | OK     | 3420 | Spinning at normal speed |

|                       |    |      |                          |
|-----------------------|----|------|--------------------------|
| Rear Tray Second fan  | OK | 3420 | Spinning at normal speed |
| Rear Tray Third fan   | OK | 3420 | Spinning at normal speed |
| Rear Tray Fourth fan  | OK | 3420 | Spinning at normal speed |
| Rear Tray Fifth fan   | OK | 3420 | Spinning at normal speed |
| Rear Tray Sixth fan   | OK | 3420 | Spinning at normal speed |
| Rear Tray Seventh fan | OK | 3420 | Spinning at normal speed |
| Rear Tray Bottom fan  | OK | 3420 | Spinning at normal speed |

### show chassis fan (TX Matrix Plus Router)

```
user@host> show chassis fan
```

```
sfc0-re0:
```

| Item             | Status | RPM  | Measurement              |
|------------------|--------|------|--------------------------|
| Fan Tray 0 Fan 1 | OK     | 4350 | Spinning at normal speed |
| Fan Tray 0 Fan 2 | OK     | 4380 | Spinning at normal speed |
| Fan Tray 0 Fan 3 | OK     | 4410 | Spinning at normal speed |
| Fan Tray 0 Fan 4 | OK     | 4380 | Spinning at normal speed |
| Fan Tray 0 Fan 5 | OK     | 4350 | Spinning at normal speed |
| Fan Tray 0 Fan 6 | OK     | 4380 | Spinning at normal speed |
| Fan Tray 1 Fan 1 | OK     | 4410 | Spinning at normal speed |
| Fan Tray 1 Fan 2 | OK     | 4380 | Spinning at normal speed |
| Fan Tray 1 Fan 3 | OK     | 4410 | Spinning at normal speed |
| Fan Tray 1 Fan 4 | OK     | 4380 | Spinning at normal speed |
| Fan Tray 1 Fan 5 | OK     | 4410 | Spinning at normal speed |
| Fan Tray 1 Fan 6 | OK     | 4410 | Spinning at normal speed |
| Fan Tray 2 Fan 1 | OK     | 4380 | Spinning at normal speed |
| Fan Tray 2 Fan 2 | OK     | 4380 | Spinning at normal speed |
| Fan Tray 2 Fan 3 | OK     | 4380 | Spinning at normal speed |
| Fan Tray 2 Fan 4 | OK     | 4410 | Spinning at normal speed |
| Fan Tray 2 Fan 5 | OK     | 4380 | Spinning at normal speed |
| Fan Tray 2 Fan 6 | OK     | 4410 | Spinning at normal speed |
| Fan Tray 2 Fan 7 | OK     | 4410 | Spinning at normal speed |
| Fan Tray 2 Fan 8 | OK     | 4380 | Spinning at normal speed |
| Fan Tray 2 Fan 9 | OK     | 4380 | Spinning at normal speed |
| Fan Tray 3 Fan 1 | OK     | 4350 | Spinning at normal speed |
| Fan Tray 3 Fan 2 | OK     | 4380 | Spinning at normal speed |
| Fan Tray 3 Fan 3 | OK     | 4410 | Spinning at normal speed |
| Fan Tray 3 Fan 4 | OK     | 4440 | Spinning at normal speed |
| Fan Tray 3 Fan 5 | OK     | 4380 | Spinning at normal speed |
| Fan Tray 3 Fan 6 | OK     | 4410 | Spinning at normal speed |
| Fan Tray 3 Fan 7 | OK     | 4410 | Spinning at normal speed |
| Fan Tray 3 Fan 8 | OK     | 4380 | Spinning at normal speed |
| Fan Tray 3 Fan 9 | OK     | 4410 | Spinning at normal speed |
| Fan Tray 4 Fan 1 | OK     | 4410 | Spinning at normal speed |
| Fan Tray 4 Fan 2 | OK     | 4410 | Spinning at normal speed |
| Fan Tray 4 Fan 3 | OK     | 4380 | Spinning at normal speed |
| Fan Tray 4 Fan 4 | OK     | 4380 | Spinning at normal speed |
| Fan Tray 4 Fan 5 | OK     | 4410 | Spinning at normal speed |
| Fan Tray 4 Fan 6 | OK     | 4410 | Spinning at normal speed |
| Fan Tray 4 Fan 7 | OK     | 4410 | Spinning at normal speed |
| Fan Tray 4 Fan 8 | OK     | 4410 | Spinning at normal speed |
| Fan Tray 4 Fan 9 | OK     | 4410 | Spinning at normal speed |
| Fan Tray 5 Fan 1 | OK     | 4350 | Spinning at normal speed |
| Fan Tray 5 Fan 2 | OK     | 4380 | Spinning at normal speed |
| Fan Tray 5 Fan 3 | OK     | 4380 | Spinning at normal speed |
| Fan Tray 5 Fan 4 | OK     | 4350 | Spinning at normal speed |
| Fan Tray 5 Fan 5 | OK     | 4380 | Spinning at normal speed |
| Fan Tray 5 Fan 6 | OK     | 4410 | Spinning at normal speed |

```

Fan Tray 5 Fan 7      OK      4410   Spinning at normal speed
Fan Tray 5 Fan 8      OK      4380   Spinning at normal speed
Fan Tray 5 Fan 9      OK      4410   Spinning at normal speed

```

```
lcc0-re0:
```

```

-----
Item              Status  RPM    Measurement
Top Left Front fan  OK      3420   Spinning at normal speed
Top Left Middle fan OK      3420   Spinning at normal speed
Top Left Rear fan   OK      3420   Spinning at normal speed
Top Right Front fan  OK      3450   Spinning at normal speed
Top Right Middle fan OK      3420   Spinning at normal speed
Top Right Rear fan   OK      3420   Spinning at normal speed
Bottom Left Front fan OK      3420   Spinning at normal speed
Bottom Left Middle fan OK      3420   Spinning at normal speed
Bottom Left Rear fan OK      3390   Spinning at normal speed
Bottom Right Front fan OK      3420   Spinning at normal speed
Bottom Right Middle fan OK      3390   Spinning at normal speed
Bottom Right Rear fan OK      3390   Spinning at normal speed
Rear Tray Top fan    OK      7050   Spinning at normal speed
Rear Tray Second fan OK      7050   Spinning at normal speed
Rear Tray Third fan  OK      7050   Spinning at normal speed
Rear Tray Fourth fan OK      7050   Spinning at normal speed
Rear Tray Fifth fan  OK      7050   Spinning at normal speed
Rear Tray Sixth fan  OK      7050   Spinning at normal speed
Rear Tray Seventh fan OK      7050   Spinning at normal speed
Rear Tray Bottom fan OK      7050   Spinning at normal speed

```

#### show chassis fan (TX Matrix Plus Router with 3D SIBs)

```
user@host> show chassis fan
```

```
sfc0-re0:
```

```

-----
Item              Status  RPM    Measurement
Fan Tray 0 Fan 1   OK      4830   Spinning at normal speed
Fan Tray 0 Fan 2   OK      4860   Spinning at normal speed
Fan Tray 0 Fan 3   OK      4830   Spinning at normal speed
Fan Tray 0 Fan 4   OK      4800   Spinning at normal speed
Fan Tray 0 Fan 5   OK      4830   Spinning at normal speed
Fan Tray 0 Fan 6   OK      4770   Spinning at normal speed
Fan Tray 1 Fan 1   OK      4800   Spinning at normal speed
Fan Tray 1 Fan 2   OK      4770   Spinning at normal speed
Fan Tray 1 Fan 3   OK      4800   Spinning at normal speed
Fan Tray 1 Fan 4   OK      4770   Spinning at normal speed
Fan Tray 1 Fan 5   OK      4770   Spinning at normal speed
Fan Tray 1 Fan 6   OK      4800   Spinning at normal speed
Fan Tray 2 Fan 1   OK      4800   Spinning at normal speed
Fan Tray 2 Fan 2   OK      4800   Spinning at normal speed
Fan Tray 2 Fan 3   OK      4830   Spinning at normal speed
Fan Tray 2 Fan 4   OK      4830   Spinning at normal speed
Fan Tray 2 Fan 5   OK      4830   Spinning at normal speed
Fan Tray 2 Fan 6   OK      4830   Spinning at normal speed
Fan Tray 2 Fan 7   OK      4800   Spinning at normal speed
Fan Tray 2 Fan 8   OK      4830   Spinning at normal speed
Fan Tray 2 Fan 9   OK      4800   Spinning at normal speed
Fan Tray 3 Fan 1   OK      4860   Spinning at normal speed
Fan Tray 3 Fan 2   OK      4860   Spinning at normal speed
Fan Tray 3 Fan 3   OK      4800   Spinning at normal speed
Fan Tray 3 Fan 4   OK      4830   Spinning at normal speed

```

|                  |       |      |                          |
|------------------|-------|------|--------------------------|
| Fan Tray 3 Fan 5 | OK    | 4830 | Spinning at normal speed |
| Fan Tray 3 Fan 6 | OK    | 4830 | Spinning at normal speed |
| Fan Tray 3 Fan 7 | OK    | 4830 | Spinning at normal speed |
| Fan Tray 3 Fan 8 | OK    | 4800 | Spinning at normal speed |
| Fan Tray 3 Fan 9 | OK    | 4800 | Spinning at normal speed |
| Fan Tray 4 Fan 1 | OK    | 4830 | Spinning at normal speed |
| Fan Tray 4 Fan 2 | OK    | 4830 | Spinning at normal speed |
| Fan Tray 4 Fan 3 | OK    | 4830 | Spinning at normal speed |
| Fan Tray 4 Fan 4 | OK    | 4830 | Spinning at normal speed |
| Fan Tray 4 Fan 5 | OK    | 4830 | Spinning at normal speed |
| Fan Tray 4 Fan 6 | OK    | 4860 | Spinning at normal speed |
| Fan Tray 4 Fan 7 | OK    | 4800 | Spinning at normal speed |
| Fan Tray 4 Fan 8 | OK    | 4860 | Spinning at normal speed |
| Fan Tray 4 Fan 9 | OK    | 4770 | Spinning at normal speed |
| Fan Tray 5 Fan 1 | OK    | 4830 | Spinning at normal speed |
| Fan Tray 5 Fan 2 | OK    | 4830 | Spinning at normal speed |
| Fan Tray 5 Fan 3 | OK    | 4830 | Spinning at normal speed |
| Fan Tray 5 Fan 4 | OK    | 4800 | Spinning at normal speed |
| Fan Tray 5 Fan 5 | OK    | 4800 | Spinning at normal speed |
| Fan Tray 5 Fan 6 | OK    | 4800 | Spinning at normal speed |
| Fan Tray 5 Fan 7 | OK    | 4830 | Spinning at normal speed |
| Fan Tray 5 Fan 8 | OK    | 4830 | Spinning at normal speed |
| Fan Tray 5 Fan 9 | Check | 2010 |                          |

1cc0-re0:

| Item                      | Status | RPM  | Measurement              |
|---------------------------|--------|------|--------------------------|
| Top Left Front fan        | OK     | 3420 | Spinning at normal speed |
| Top Left Middle fan       | OK     | 3390 | Spinning at normal speed |
| Top Left Rear fan         | OK     | 3390 | Spinning at normal speed |
| Top Right Front fan       | OK     | 3420 | Spinning at normal speed |
| Top Right Middle fan      | OK     | 3420 | Spinning at normal speed |
| Top Right Rear fan        | OK     | 3450 | Spinning at normal speed |
| Bottom Left Front fan     | OK     | 3420 | Spinning at normal speed |
| Bottom Left Middle fan    | OK     | 3390 | Spinning at normal speed |
| Bottom Left Rear fan      | OK     | 3420 | Spinning at normal speed |
| Bottom Right Front fan    | OK     | 3420 | Spinning at normal speed |
| Bottom Right Middle fan   | OK     | 3390 | Spinning at normal speed |
| Bottom Right Rear fan     | OK     | 3420 | Spinning at normal speed |
| Rear Tray fan 1 (Top)     | OK     | 7740 | Spinning at normal speed |
| Rear Tray fan 2           | OK     | 7740 | Spinning at normal speed |
| Rear Tray fan 3           | OK     | 7740 | Spinning at normal speed |
| Rear Tray fan 4           | OK     | 7740 | Spinning at normal speed |
| Rear Tray fan 5           | OK     | 7740 | Spinning at normal speed |
| Rear Tray fan 6           | OK     | 7740 | Spinning at normal speed |
| Rear Tray fan 7           | OK     | 7740 | Spinning at normal speed |
| Rear Tray fan 8           | OK     | 7740 | Spinning at normal speed |
| Rear Tray fan 9           | OK     | 7740 | Spinning at normal speed |
| Rear Tray fan 10          | OK     | 7740 | Spinning at normal speed |
| Rear Tray fan 11          | OK     | 7740 | Spinning at normal speed |
| Rear Tray fan 12          | OK     | 7740 | Spinning at normal speed |
| Rear Tray fan 13          | OK     | 7740 | Spinning at normal speed |
| Rear Tray fan 14          | OK     | 7740 | Spinning at normal speed |
| Rear Tray fan 15          | OK     | 7740 | Spinning at normal speed |
| Rear Tray fan 16 (Bottom) | OK     | 7740 | Spinning at normal speed |

1cc2-re0:

| Item               | Status | RPM  | Measurement              |
|--------------------|--------|------|--------------------------|
| Top Left Front fan | OK     | 3420 | Spinning at normal speed |



|                           |    |      |                          |
|---------------------------|----|------|--------------------------|
| Top Left Middle fan       | OK | 3390 | Spinning at normal speed |
| Top Left Rear fan         | OK | 3420 | Spinning at normal speed |
| Top Right Front fan       | OK | 3420 | Spinning at normal speed |
| Top Right Middle fan      | OK | 3420 | Spinning at normal speed |
| Top Right Rear fan        | OK | 3450 | Spinning at normal speed |
| Bottom Left Front fan     | OK | 3420 | Spinning at normal speed |
| Bottom Left Middle fan    | OK | 3390 | Spinning at normal speed |
| Bottom Left Rear fan      | OK | 3420 | Spinning at normal speed |
| Bottom Right Front fan    | OK | 3420 | Spinning at normal speed |
| Bottom Right Middle fan   | OK | 3390 | Spinning at normal speed |
| Bottom Right Rear fan     | OK | 3420 | Spinning at normal speed |
| Rear Tray fan 1 (Top)     | OK | 7740 | Spinning at normal speed |
| Rear Tray fan 2           | OK | 7740 | Spinning at normal speed |
| Rear Tray fan 3           | OK | 7740 | Spinning at normal speed |
| Rear Tray fan 4           | OK | 7740 | Spinning at normal speed |
| Rear Tray fan 5           | OK | 7740 | Spinning at normal speed |
| Rear Tray fan 6           | OK | 7740 | Spinning at normal speed |
| Rear Tray fan 7           | OK | 7740 | Spinning at normal speed |
| Rear Tray fan 8           | OK | 7740 | Spinning at normal speed |
| Rear Tray fan 9           | OK | 7740 | Spinning at normal speed |
| Rear Tray fan 10          | OK | 7740 | Spinning at normal speed |
| Rear Tray fan 11          | OK | 7740 | Spinning at normal speed |
| Rear Tray fan 12          | OK | 7740 | Spinning at normal speed |
| Rear Tray fan 13          | OK | 7740 | Spinning at normal speed |
| Rear Tray fan 14          | OK | 7740 | Spinning at normal speed |
| Rear Tray fan 15          | OK | 7740 | Spinning at normal speed |
| Rear Tray fan 16 (Bottom) | OK | 7740 | Spinning at normal speed |

### show chassis fan (PTX5000 Packet Transport Router)

```
user@host> show chassis fan
```

```
user@host> show chassis fan
```

| Item              | Status | % RPM | Measurement |
|-------------------|--------|-------|-------------|
| Fan Tray 0 Fan 1  | OK     | 29%   | 2700 RPM    |
| Fan Tray 0 Fan 2  | OK     | 29%   | 2700 RPM    |
| Fan Tray 0 Fan 3  | OK     | 29%   | 2742 RPM    |
| Fan Tray 0 Fan 4  | OK     | 29%   | 2700 RPM    |
| Fan Tray 0 Fan 5  | OK     | 30%   | 2828 RPM    |
| Fan Tray 0 Fan 6  | OK     | 30%   | 2828 RPM    |
| Fan Tray 0 Fan 7  | OK     | 29%   | 2700 RPM    |
| Fan Tray 0 Fan 8  | OK     | 30%   | 2785 RPM    |
| Fan Tray 0 Fan 9  | OK     | 30%   | 2828 RPM    |
| Fan Tray 0 Fan 10 | OK     | 30%   | 2828 RPM    |
| Fan Tray 0 Fan 11 | OK     | 30%   | 2785 RPM    |
| Fan Tray 0 Fan 12 | OK     | 30%   | 2828 RPM    |
| Fan Tray 0 Fan 13 | OK     | 31%   | 2871 RPM    |
| Fan Tray 0 Fan 14 | OK     | 30%   | 2828 RPM    |
| Fan Tray 1 Fan 1  | OK     | 42%   | 3033 RPM    |
| Fan Tray 1 Fan 2  | OK     | 42%   | 3066 RPM    |
| Fan Tray 1 Fan 3  | OK     | 43%   | 3099 RPM    |
| Fan Tray 1 Fan 4  | OK     | 43%   | 3166 RPM    |
| Fan Tray 1 Fan 5  | OK     | 45%   | 3266 RPM    |
| Fan Tray 1 Fan 6  | OK     | 43%   | 3133 RPM    |
| Fan Tray 2 Fan 1  | OK     | 29%   | 2099 RPM    |
| Fan Tray 2 Fan 2  | OK     | 30%   | 2199 RPM    |
| Fan Tray 2 Fan 3  | OK     | 30%   | 2166 RPM    |
| Fan Tray 2 Fan 4  | OK     | 33%   | 2399 RPM    |
| Fan Tray 2 Fan 5  | OK     | 29%   | 2133 RPM    |
| Fan Tray 2 Fan 6  | OK     | 32%   | 2366 RPM    |

**show chassis fan (PTX10008 Router)**

user@host&gt; show chassis fan

| Item              | Status | RPM  | Measurement              |
|-------------------|--------|------|--------------------------|
| Fan Tray 0 Fan 0  | OK     | 9000 | Spinning at normal speed |
| Fan Tray 0 Fan 1  | OK     | 9000 | Spinning at normal speed |
| Fan Tray 0 Fan 2  | OK     | 9150 | Spinning at normal speed |
| Fan Tray 0 Fan 3  | OK     | 9150 | Spinning at normal speed |
| Fan Tray 0 Fan 4  | OK     | 9000 | Spinning at normal speed |
| Fan Tray 0 Fan 5  | OK     | 9150 | Spinning at normal speed |
| Fan Tray 0 Fan 6  | OK     | 9000 | Spinning at normal speed |
| Fan Tray 0 Fan 7  | OK     | 9150 | Spinning at normal speed |
| Fan Tray 0 Fan 8  | OK     | 8850 | Spinning at normal speed |
| Fan Tray 0 Fan 9  | OK     | 8850 | Spinning at normal speed |
| Fan Tray 0 Fan 10 | OK     | 9000 | Spinning at normal speed |
| Fan Tray 1 Fan 0  | OK     | 9150 | Spinning at normal speed |
| Fan Tray 1 Fan 1  | OK     | 9150 | Spinning at normal speed |
| Fan Tray 1 Fan 2  | OK     | 9000 | Spinning at normal speed |
| Fan Tray 1 Fan 3  | OK     | 9000 | Spinning at normal speed |
| Fan Tray 1 Fan 4  | OK     | 9000 | Spinning at normal speed |
| Fan Tray 1 Fan 5  | OK     | 9000 | Spinning at normal speed |
| Fan Tray 1 Fan 6  | OK     | 9000 | Spinning at normal speed |
| Fan Tray 1 Fan 7  | OK     | 9150 | Spinning at normal speed |
| Fan Tray 1 Fan 8  | OK     | 9000 | Spinning at normal speed |
| Fan Tray 1 Fan 9  | OK     | 9000 | Spinning at normal speed |
| Fan Tray 1 Fan 10 | OK     | 9000 | Spinning at normal speed |

**show chassis fan (MX150)**

user@host &gt; show chassis fan

| Item               | Status | RPM  | Measurement              |
|--------------------|--------|------|--------------------------|
| FPC 0 Tray 0 Fan 0 | OK     | 7419 | Spinning at normal speed |
| FPC 0 Tray 1 Fan 0 | OK     | 7419 | Spinning at normal speed |

**show chassis fan (MX104 Router)**

user@host &gt; show chassis fan

| Item  | Status | RPM  | Measurement              |
|-------|--------|------|--------------------------|
| Fan 1 | OK     | 5640 | Spinning at normal speed |
| Fan 2 | OK     | 5640 | Spinning at normal speed |
| Fan 3 | OK     | 5760 | Spinning at normal speed |
| Fan 4 | OK     | 5640 | Spinning at normal speed |
| Fan 5 | OK     | 5640 | Spinning at normal speed |

**show chassis fan (MX2010 Router)**

user@host &gt; show chassis fan

| Item             | Status | % RPM | Measurement |
|------------------|--------|-------|-------------|
| Fan Tray 0 Fan 1 | OK     | 37%   | 3360 RPM    |
| Fan Tray 0 Fan 2 | OK     | 38%   | 3480 RPM    |
| Fan Tray 0 Fan 3 | OK     | 37%   | 3360 RPM    |
| Fan Tray 0 Fan 4 | OK     | 37%   | 3360 RPM    |
| Fan Tray 0 Fan 5 | OK     | 38%   | 3480 RPM    |
| Fan Tray 0 Fan 6 | OK     | 37%   | 3360 RPM    |
| Fan Tray 1 Fan 1 | OK     | 38%   | 3480 RPM    |

|                  |    |     |          |
|------------------|----|-----|----------|
| Fan Tray 1 Fan 2 | OK | 40% | 3600 RPM |
| Fan Tray 1 Fan 3 | OK | 38% | 3480 RPM |
| Fan Tray 1 Fan 4 | OK | 38% | 3480 RPM |
| Fan Tray 1 Fan 5 | OK | 38% | 3480 RPM |
| Fan Tray 1 Fan 6 | OK | 38% | 3480 RPM |
| Fan Tray 2 Fan 1 | OK | 38% | 3480 RPM |
| Fan Tray 2 Fan 2 | OK | 41% | 3720 RPM |
| Fan Tray 2 Fan 3 | OK | 38% | 3480 RPM |
| Fan Tray 2 Fan 4 | OK | 38% | 3480 RPM |
| Fan Tray 2 Fan 5 | OK | 38% | 3480 RPM |
| Fan Tray 2 Fan 6 | OK | 38% | 3480 RPM |
| Fan Tray 3 Fan 1 | OK | 38% | 3480 RPM |
| Fan Tray 3 Fan 2 | OK | 40% | 3600 RPM |
| Fan Tray 3 Fan 3 | OK | 40% | 3600 RPM |
| Fan Tray 3 Fan 4 | OK | 40% | 3600 RPM |
| Fan Tray 3 Fan 5 | OK | 40% | 3600 RPM |
| Fan Tray 3 Fan 6 | OK | 38% | 3480 RPM |

### show chassis fan (MX2020 Router)

```
user@host > show chassis fan
```

| Item             | Status | % RPM | Measurement |
|------------------|--------|-------|-------------|
| Fan Tray 0 Fan 1 | OK     | 37%   | 3360 RPM    |
| Fan Tray 0 Fan 2 | OK     | 37%   | 3360 RPM    |
| Fan Tray 0 Fan 3 | OK     | 36%   | 3240 RPM    |
| Fan Tray 0 Fan 4 | OK     | 37%   | 3360 RPM    |
| Fan Tray 0 Fan 5 | OK     | 37%   | 3360 RPM    |
| Fan Tray 0 Fan 6 | OK     | 37%   | 3360 RPM    |
| Fan Tray 1 Fan 1 | OK     | 37%   | 3360 RPM    |
| Fan Tray 1 Fan 2 | OK     | 37%   | 3360 RPM    |
| Fan Tray 1 Fan 3 | OK     | 37%   | 3360 RPM    |
| Fan Tray 1 Fan 4 | OK     | 37%   | 3360 RPM    |
| Fan Tray 1 Fan 5 | OK     | 37%   | 3360 RPM    |
| Fan Tray 1 Fan 6 | OK     | 36%   | 3240 RPM    |
| Fan Tray 2 Fan 1 | OK     | 37%   | 3360 RPM    |
| Fan Tray 2 Fan 2 | OK     | 37%   | 3360 RPM    |
| Fan Tray 2 Fan 3 | OK     | 37%   | 3360 RPM    |
| Fan Tray 2 Fan 4 | OK     | 37%   | 3360 RPM    |
| Fan Tray 2 Fan 5 | OK     | 37%   | 3360 RPM    |
| Fan Tray 2 Fan 6 | OK     | 38%   | 3480 RPM    |
| Fan Tray 3 Fan 1 | OK     | 38%   | 3480 RPM    |
| Fan Tray 3 Fan 2 | OK     | 38%   | 3480 RPM    |
| Fan Tray 3 Fan 3 | OK     | 38%   | 3480 RPM    |
| Fan Tray 3 Fan 4 | OK     | 37%   | 3360 RPM    |
| Fan Tray 3 Fan 5 | OK     | 37%   | 3360 RPM    |
| Fan Tray 3 Fan 6 | OK     | 37%   | 3360 RPM    |

### show chassis fan (MX2008 Router)

```
user@host > show chassis fan
```

| Item             | Status | % RPM | Measurement |
|------------------|--------|-------|-------------|
| Fan Tray 0 Fan 1 | OK     | 64%   | 5760 RPM    |
| Fan Tray 0 Fan 2 | OK     | 62%   | 5640 RPM    |
| Fan Tray 0 Fan 3 | OK     | 64%   | 5760 RPM    |
| Fan Tray 0 Fan 4 | OK     | 60%   | 5400 RPM    |
| Fan Tray 0 Fan 5 | OK     | 61%   | 5520 RPM    |
| Fan Tray 0 Fan 6 | OK     | 62%   | 5640 RPM    |

|                  |    |     |          |
|------------------|----|-----|----------|
| Fan Tray 1 Fan 1 | OK | 61% | 5520 RPM |
| Fan Tray 1 Fan 2 | OK | 61% | 5520 RPM |
| Fan Tray 1 Fan 3 | OK | 61% | 5520 RPM |
| Fan Tray 1 Fan 4 | OK | 62% | 5640 RPM |
| Fan Tray 1 Fan 5 | OK | 62% | 5640 RPM |
| Fan Tray 1 Fan 6 | OK | 64% | 5760 RPM |

### show chassis fan (MX10003 Router)

```
user@host> show chassis fan
```

| Item             | Status | % RPM | Measurement |
|------------------|--------|-------|-------------|
| Fan Tray 0 Fan 0 | OK     | 40%   | 7296 RPM    |
| Fan Tray 0 Fan 1 | OK     | 40%   | 6656 RPM    |
| Fan Tray 0 Fan 2 | OK     | 40%   | 7296 RPM    |
| Fan Tray 0 Fan 3 | OK     | 40%   | 6400 RPM    |
| Fan Tray 1 Fan 0 | OK     | 40%   | 7296 RPM    |
| Fan Tray 1 Fan 1 | OK     | 40%   | 6528 RPM    |
| Fan Tray 1 Fan 2 | OK     | 40%   | 7296 RPM    |
| Fan Tray 1 Fan 3 | OK     | 40%   | 6784 RPM    |
| Fan Tray 2 Fan 0 | OK     | 40%   | 7552 RPM    |
| Fan Tray 2 Fan 1 | OK     | 40%   | 6784 RPM    |
| Fan Tray 2 Fan 2 | OK     | 40%   | 7424 RPM    |
| Fan Tray 2 Fan 3 | OK     | 40%   | 6528 RPM    |
| Fan Tray 3 Fan 0 | OK     | 40%   | 7552 RPM    |
| Fan Tray 3 Fan 1 | OK     | 40%   | 6528 RPM    |
| Fan Tray 3 Fan 2 | OK     | 40%   | 7296 RPM    |
| Fan Tray 3 Fan 3 | OK     | 40%   | 6656 RPM    |

### show chassis fan (MX204 Router)

```
user@host> show chassis fan
```

| Item             | Status | % RPM | Measurement |
|------------------|--------|-------|-------------|
| Fan Tray 0 Fan 0 | OK     | 40%   | 9344 RPM    |
| Fan Tray 0 Fan 1 | OK     | 40%   | 8576 RPM    |
| Fan Tray 1 Fan 0 | OK     | 40%   | 9344 RPM    |
| Fan Tray 1 Fan 1 | OK     | 40%   | 8832 RPM    |
| Fan Tray 2 Fan 0 | OK     | 40%   | 9344 RPM    |
| Fan Tray 2 Fan 1 | OK     | 40%   | 8576 RPM    |

### show chassis fan (MX10008 Router)

```
user@host> show chassis fan
```

| Item             | Status | RPM  | Measurement              |
|------------------|--------|------|--------------------------|
| Fan Tray 0 Fan 0 | OK     | 9750 | Spinning at normal speed |
| Fan Tray 0 Fan 1 | OK     | 9750 | Spinning at normal speed |
| Fan Tray 0 Fan 2 | OK     | 9900 | Spinning at normal speed |
| Fan Tray 0 Fan 3 | OK     | 9600 | Spinning at normal speed |
| Fan Tray 0 Fan 4 | Failed |      |                          |
| Fan Tray 0 Fan 5 | Failed |      |                          |
| Fan Tray 0 Fan 6 | OK     | 9750 | Spinning at normal speed |
| Fan Tray 0 Fan 7 | OK     | 9750 | Spinning at normal speed |
| Fan Tray 0 Fan 8 | OK     | 9600 | Spinning at normal speed |
| Fan Tray 0 Fan 9 | OK     | 9600 | Spinning at normal speed |

|                   |    |      |                          |
|-------------------|----|------|--------------------------|
| Fan Tray 0 Fan 10 | OK | 9600 | Spinning at normal speed |
| Fan Tray 1 Fan 0  | OK | 9600 | Spinning at normal speed |
| Fan Tray 1 Fan 1  | OK | 9600 | Spinning at normal speed |
| Fan Tray 1 Fan 2  | OK | 9750 | Spinning at normal speed |
| Fan Tray 1 Fan 3  | OK | 9600 | Spinning at normal speed |
| Fan Tray 1 Fan 4  | OK | 9600 | Spinning at normal speed |
| Fan Tray 1 Fan 5  | OK | 9600 | Spinning at normal speed |
| Fan Tray 1 Fan 6  | OK | 9600 | Spinning at normal speed |
| Fan Tray 1 Fan 7  | OK | 9750 | Spinning at normal speed |
| Fan Tray 1 Fan 8  | OK | 9750 | Spinning at normal speed |
| Fan Tray 1 Fan 9  | OK | 9600 | Spinning at normal speed |
| Fan Tray 1 Fan 10 | OK | 9600 | Spinning at normal speed |

### show chassis fan (ACX4000 Router)

user@host > show chassis fan

| Item  | Status | RPM  | Measurement              |
|-------|--------|------|--------------------------|
| Fan 1 | OK     | 4140 | Spinning at normal speed |
| Fan 2 | OK     | 4200 | Spinning at normal speed |

### show chassis fan (ACX5048 Router)

user@host > show chassis fan

| Item               | Status | RPM   | Measurement              |
|--------------------|--------|-------|--------------------------|
| FPC 0 Tray 0 Fan 0 | OK     | 18305 | Spinning at normal speed |
| FPC 0 Tray 0 Fan 1 | OK     | 15743 | Spinning at normal speed |
| FPC 0 Tray 1 Fan 0 | OK     | 18305 | Spinning at normal speed |
| FPC 0 Tray 1 Fan 1 | OK     | 15606 | Spinning at normal speed |
| FPC 0 Tray 2 Fan 0 | OK     | 19014 | Spinning at normal speed |
| FPC 0 Tray 2 Fan 1 | OK     | 16167 | Spinning at normal speed |
| FPC 0 Tray 3 Fan 0 | OK     | 18947 | Spinning at normal speed |
| FPC 0 Tray 3 Fan 1 | OK     | 16265 | Spinning at normal speed |
| FPC 0 Tray 4 Fan 0 | OK     | 18120 | Spinning at normal speed |
| FPC 0 Tray 4 Fan 1 | OK     | 15743 | Spinning at normal speed |

### show chassis fan (QFX5100 Switch and OCX Series)

user@switch > show chassis fan

| Item               | Status | RPM  | Measurement              |
|--------------------|--------|------|--------------------------|
| FPC 0 Tray 0 Fan 0 | OK     | 6428 | Spinning at normal speed |
| FPC 0 Tray 0 Fan 1 | OK     | 5515 | Spinning at normal speed |
| FPC 0 Tray 1 Fan 0 | OK     | 6360 | Spinning at normal speed |
| FPC 0 Tray 1 Fan 1 | OK     | 5532 | Spinning at normal speed |

### show chassis fan (EX9251 switches)

user@switch > show chassis fan

| Item             | Status | % RPM | Measurement |
|------------------|--------|-------|-------------|
| Fan Tray 0 Fan 0 | OK     | 40%   | 9600 RPM    |
| Fan Tray 0 Fan 1 | OK     | 40%   | 8832 RPM    |
| Fan Tray 1 Fan 0 | OK     | 40%   | 9728 RPM    |
| Fan Tray 1 Fan 1 | OK     | 40%   | 9088 RPM    |
| Fan Tray 2       | Absent |       |             |

**show chassis fan (EX9253 switches)**

user@switch &gt; show chassis fan

| Item             | Status | % RPM | Measurement |
|------------------|--------|-------|-------------|
| Fan Tray 0 Fan 0 | OK     | 40%   | 7552 RPM    |
| Fan Tray 0 Fan 1 | OK     | 40%   | 6272 RPM    |
| Fan Tray 0 Fan 2 | OK     | 40%   | 7552 RPM    |
| Fan Tray 0 Fan 3 | OK     | 40%   | 6272 RPM    |
| Fan Tray 1 Fan 0 | OK     | 40%   | 7552 RPM    |
| Fan Tray 1 Fan 1 | OK     | 40%   | 6272 RPM    |
| Fan Tray 1 Fan 2 | OK     | 40%   | 7552 RPM    |
| Fan Tray 1 Fan 3 | OK     | 40%   | 6272 RPM    |
| Fan Tray 2 Fan 0 | OK     | 40%   | 7552 RPM    |
| Fan Tray 2 Fan 1 | OK     | 40%   | 6400 RPM    |
| Fan Tray 2 Fan 2 | OK     | 40%   | 7552 RPM    |
| Fan Tray 2 Fan 3 | OK     | 40%   | 6272 RPM    |
| Fan Tray 3 Fan 0 | OK     | 40%   | 7552 RPM    |
| Fan Tray 3 Fan 1 | OK     | 40%   | 6400 RPM    |
| Fan Tray 3 Fan 2 | OK     | 40%   | 7552 RPM    |
| Fan Tray 3 Fan 3 | OK     | 40%   | 6272 RPM    |

**show chassis fan (Junos OS Evolved)**

user@device&gt; show chassis fan

| Item             | Status | % RPM | Measurement |
|------------------|--------|-------|-------------|
| Fan Tray 1 Fan 1 | Ok     | 48%   | 6597 RPM    |
| Fan Tray 1 Fan 2 | Ok     | 49%   | 5649 RPM    |
| Fan Tray 2 Fan 1 | Ok     | 49%   | 6687 RPM    |
| Fan Tray 2 Fan 2 | Ok     | 49%   | 5649 RPM    |
| Fan Tray 3 Fan 1 | Ok     | 49%   | 6642 RPM    |
| Fan Tray 3 Fan 2 | Ok     | 49%   | 5649 RPM    |

## show chassis hardware

|   |  |
|---|--|
| <b>List of Syntax</b>   | <a href="#">Syntax on page 387</a><br><a href="#">Syntax (EX Series, MX104, MX204, MX2010, MX2020, MX10003, MX10008, and MX2008 Universal Routing Platforms) on page 387</a><br><a href="#">Syntax (TX Matrix Router) on page 387</a><br><a href="#">Syntax (TX Matrix Plus Router) on page 387</a><br><a href="#">Syntax (MX Series Routers) on page 387</a><br><a href="#">Syntax (QFX Series) on page 387</a> |
| <b>Syntax</b>   | <pre>show chassis hardware &lt;detail   extensive&gt; &lt;clei-models&gt; &lt;models&gt;</pre>   |
| <b>Syntax (EX Series, MX104, MX204, MX2010, MX2020, MX10003, MX10008, and MX2008 Universal Routing Platforms)</b> | <pre>show chassis hardware &lt;clei-models&gt; &lt;detail   extensive&gt; &lt;models&gt; &lt;satellite [slot-id slot-id   device-alias alias-name]&gt;</pre>   |
| <b>Syntax (TX Matrix Router)</b>  | <pre>show chassis hardware &lt;clei-models&gt; &lt;detail   extensive&gt; &lt;models&gt; &lt;lcc number   scc&gt;</pre>  |
| <b>Syntax (TX Matrix Plus Router)</b>   | <pre>show chassis hardware &lt;clei-models&gt; &lt;detail   extensive&gt; &lt;models&gt; &lt;lcc number   sfc number&gt;</pre>   |
| <b>Syntax (MX Series Routers)</b>   | <pre>show chassis hardware &lt;detail   extensive&gt; &lt;clei-models&gt; &lt;models&gt; &lt;all-members&gt; &lt;local&gt; &lt;member member-id&gt;</pre>  |
| <b>Syntax (QFX Series)</b>  | <pre>show chassis hardware &lt;detail   extensive&gt; &lt;clei-models&gt;</pre>  |

```
<interconnect-device name>
<node-device name>
<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 in Junos OS Release 9.6 for the TX Matrix Plus router.  
 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 Metro Routers.  
 Command introduced in Junos OS Release 12.3 for MX2010 and MX2020 Universal Routing Platforms.  
 Information for **disk** and **usb** introduced in Junos OS Release 15.1X53-D60 for QFX10002, QFX10008, and QFX10016 switches.  
 Command introduced in Junos OS Release 15.1X54-D20 for ACX5048 and ACX5096 Routers.  
 Command introduced in Junos OS Release 17.2 for MX2008 Universal Routing Platforms.  
 Command introduced in Junos OS Release 17.2 for PTX10008 Routers.  
 Command introduced in Junos OS Release 17.3 for MX10003 Universal Routing Platforms.  
 Command introduced in Junos OS Release 17.3 for MX150 Router Appliance.  
 Command introduced in Junos OS Release 17.4 for MX204 Routers.  
 Command introduced in Junos OS Release 18.1R1 for EX9251 Switches.  
 Command introduced in Junos OS Release 18.2 for EX9253 Switches.  
 Command introduced in Junos OS Release 18.2R1 for MX10008 Routers



**NOTE:** Routers and routing platforms use the basic syntax, unless otherwise listed. For example, the EX Series has an additional satellite parameter available.

**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 QFX3500, QFX5100, and OCX Series standalone switches, and PTX1000 routers both the FPC and FPC *number* are always 0.



On T4000 Type 5 FPCs, there are no **top temperature sensor** or **bottom temperature sensor** parameters. Instead, **fan intake temperature sensor** and **fan exhaust temperature sensors** parameters are displayed.

Starting from Junos OS Release 11.4, the output of the **show chassis hardware models** operational mode command displays the enhanced midplanes FRU model numbers (CHAS-BP3-MX240-S, CHAS-BP3-MX480-S or CHAS-BP3-MX960-S) based on the router. Prior to release 11.4, the FRU model numbers are left blank when the router has enhanced midplanes. Note that the enhanced midplanes are introduced through the Junos OS Release 13.3, but can be supported on all Junos OS releases.

Starting with Junos OS Release 14.1, the output of the **show chassis hardware detail | extensive | clei-models | models** operational mode command displays the new DC power supply module (PSM) and power distribution unit (PDU) that are added to provide power to the high-density FPC (FPC2-PTX-P1A) and other components in a PTX5000 Packet Transport Router.



**NOTE:** The output samples provided here are intended only as representative examples of the various types of **show chassis hardware** outputs. They are not exhaustive samples of every possible option or platform variant.

- 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.

**satellite [*slot-id slot-id* | device-alias *alias-name*]**—(Junos Fusion only) (Optional) Display hardware information for the specified satellite device in a Junos Fusion, or for all satellite devices in the Junos Fusion if no satellite devices are specified.

**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, as shown in [Table 15 on page 390](#).

**Table 15: 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           |

In Junos OS Release 11.4 and later, the output for the **show chassis hardware models** operational mode command for MX Series routers display the enhanced midplanes FRU model numbers—CHAS-BP3-MX240-S, CHAS-BP3-MX480-S, or CHAS-BP3-MX960-S—based on the router. In releases before Junos OS Release 11.4,

the FRU model numbers are left blank when the router has enhanced midplanes. Note that the enhanced midplanes are introduced through Junos OS Release 13.3, but can be supported on all Junos OS releases.

Starting with Junos OS Release 17.3R1, the output of the **show chassis hardware** command displays the mode in which vMX is running (performance mode or lite mode) in the part number field for the FPC. **RIOT-PERF** indicates performance mode and **RIOT-LITE** indicates lite mode.

**Required Privilege Level**

view

**Related Documentation**

- *show chassis power*

**List of Sample Output**

[show chassis hardware \(MX10008 Router\) on page 395](#)  
[show chassis hardware clei-models \(PTX10016 Routers\) on page 396](#)  
[show chassis hardware detail \(EX9251 Switch\) on page 396](#)  
[show chassis hardware extensive \(T640 Router\) on page 397](#)  
[show chassis hardware interconnect-device \(QFabric Systems\) on page 398](#)  
[show chassis hardware lcc \(TX Matrix Router\) on page 398](#)  
[show chassis hardware models \(MX2010 Router\) on page 399](#)  
[show chassis hardware node-device \(QFabric Systems\) on page 399](#)  
[show chassis hardware scc \(TX Matrix Router\) on page 400](#)  
[show chassis hardware sfc \(TX Matrix Plus Router\) on page 400](#)

**Output Fields**

[Table 16 on page 392](#) lists the output fields for the **show chassis hardware** command. Output fields are listed in the approximate order in which they appear.

Table 16: 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.</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). MX104 routers have a built-in Packet forwarding Engine and a Forwarding Engine Board (FEB). The Packet Forwarding Engine of the MX104 router has three “pseudo” FPCs (FPC0, FPC1, and FPC2).</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, Pseudo CB, 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, MX2020, and MX2008 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> <li>(vMX routers)—Information about the chassis, midplane, Routing Engines, and Control Boards (CBs). Also displays information about Flexible PIC Concentrators (FPCs) and associated Modular Interface Cards (MICs) and Physical Interface Cards (PICs).</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 16: 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>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>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 CT1E1</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> <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> </ul> | All levels       |

Table 16: show chassis hardware Output Fields (continued)

| Field Name | Field Description   | Level of Output |
|------------|---|-----------------|
|            | <ul style="list-style-type: none"> <li>• <b>1x ADSL Annex B</b>—ADSL 2/2+ Annex B PIM (one port, for ISDN)</li> <li>• <b>2x SHDSL (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 M16x10GE</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, or 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

The following output samples are intended to serve as representative examples only and are not exhaustive representations of every single possible command or hardware variation.

### show chassis hardware (MX10008 Router)

```
user@host> show chassis hardware
```

Hardware inventory:

| Item             | Version | Part number | Serial number | Description           |
|------------------|---------|-------------|---------------|-----------------------|
| Chassis          |         |             | DE487         | JNP10008 [MX10008]    |
| Midplane         | REV 27  | 750-054097  | ACPD4307      | Midplane 8            |
| Routing Engine 0 |         | BUILTIN     | BUILTIN       | RE X10 LT             |
| Routing Engine 1 |         | BUILTIN     | BUILTIN       | RE X10                |
| CB 0             | REV 02  | 750-079563  | CAFF4580      | Control Board         |
| CB 1             | REV 04  | 750-079563  | CAGL8034      | Control Board         |
| ..               |         |             |               |                       |
| ...              |         |             |               |                       |
| ..               |         |             |               |                       |
| 4                |         |             |               |                       |
| FPC 3            | REV 04  | 750-084779  | CAKR7019      | JNP10K-LC2101         |
| CPU              | REV 05  | 750-073391  | CAKJ2854      | LC 2101 PMB           |
| PIC 0            |         | BUILTIN     | BUILTIN       | 4xQSFP28 SYNCE        |
| Xcvr 0           | REV 01  | 740-058734  | 1ACQ104300K   | QSFP-100GBASE-SR4     |
| PIC 1            |         | BUILTIN     | BUILTIN       | 4xQSFP28 SYNCE        |
| Xcvr 0           | REV 01  | 740-061405  | 1ACQ12110AN   | QSFP-100GBASE-SR4     |
| PIC 2            |         | BUILTIN     | BUILTIN       | 4xQSFP28 SYNCE        |
| Xcvr 0           | REV 01  | 740-046565  | QG1105B2      | QSFP+-40G-SR4         |
| PIC 3            |         | BUILTIN     | BUILTIN       | 4xQSFP28 SYNCE        |
| Xcvr 0           | REV 01  | 740-045627  | QH08036X      | 40GBASE eSR4          |
| PIC 4            |         | BUILTIN     | BUILTIN       | 4xQSFP28 SYNCE        |
| Xcvr 0           | REV 01  | 740-067443  | XWRORY7       | QSFP+-40G-SR4         |
| Xcvr 1           | REV 01  | 740-067443  | XWRORYH       | QSFP+-40G-SR4         |
| Xcvr 2           | REV 01  | 740-067443  | XWRORYP       | QSFP+-40G-SR4         |
| Xcvr 3           | REV 01  | 740-067443  | XWS028S       | QSFP+-40G-SR4         |
| PIC 5            |         | BUILTIN     | BUILTIN       | 4xQSFP28 SYNCE        |
| Xcvr 3           | REV 01  | 740-058734  | 1ACQ113406C   | QSFP-100GBASE-SR4     |
| FPD Board        | REV 07  | 711-054687  | ACPC7142      | Front Panel Display   |
| PEM 0            | REV 02  | 740-049388  | 1EDL62102N9   | Power Supply AC       |
| PEM 1            | REV 02  | 740-049388  | 1EDL60300KX   | Power Supply AC       |
| PEM 2            | REV 02  | 740-049388  | 1EDL60300DL   | Power Supply AC       |
| PEM 3            | REV 02  | 740-049388  | 1EDL61701BT   | Power Supply AC       |
| PEM 4            | REV 02  | 740-049388  | 1EDL62102P7   | Power Supply AC       |
| PEM 5            | REV 02  | 740-049388  | 1EDL62102PP   | Power Supply AC       |
| FTC 0            | REV 14  | 750-050108  | ACPE4038      | Fan Controller 8      |
| FTC 1            | REV 14  | 750-050108  | ACPE4032      | Fan Controller 8      |
| Fan Tray 0       | REV 09  | 760-054372  | ACPD6799      | Fan Tray 8            |
| Fan Tray 1       | REV 09  | 760-054372  | ACNZ3584      | Fan Tray 8            |
| SFB 0            | REV 24  | 750-050058  | ACPD4587      | Switch Fabric (SIB) 8 |
| SFB 1            | REV 24  | 750-050058  | ACNZ0635      | Switch Fabric (SIB) 8 |
| SFB 2            | REV 24  | 750-050058  | ACPD4908      | Switch Fabric (SIB) 8 |
| SFB 3            | REV 24  | 750-050058  | ACNZ0617      | Switch Fabric (SIB) 8 |
| SFB 4            | REV 24  | 750-050058  | ACNZ0527      | Switch Fabric (SIB) 8 |
| SFB 5            | REV 23  | 750-050058  | ACNX6980      | Switch Fabric (SIB) 8 |

## show chassis hardware clei-models (PTX10016 Routers)

```
user@host> show chassis hardware clei-models
```

```
Hardware inventory:
```

| Item           | Version | Part number | CLEI code  | FRU model number |
|----------------|---------|-------------|------------|------------------|
| Midplane       | REV 24  | 750-077138  | CMMUN00ARA | JNP10016         |
| CB 0           | REV 04  | 711-065897  | PROTOXCLEI | PROTO-ASSEMBLY   |
| CB 1           | REV 05  | 711-065897  | PROTOXCLEI | PROTO-ASSEMBLY   |
| FPC 2          |         |             |            |                  |
| PIC 0          |         | BUILTIN     |            |                  |
| FPC 4          | REV 35  | 750-071976  | CMUIANABAA | JNP10K-LC1101    |
| PIC 0          |         | BUILTIN     |            |                  |
| FPC 5          | REV 13  | 750-068822  | CMUIAM9BAC | QFX10000-36Q     |
| PIC 0          |         | BUILTIN     |            |                  |
| FPC 6          | REV 41  | 750-071976  | CMUIANABAB | JNP10K-LC1101    |
| PIC 0          |         | BUILTIN     |            |                  |
| FPC 7          | REV 35  | 750-071976  | CMUIANABAA | JNP10K-LC1101    |
| PIC 0          |         | BUILTIN     |            |                  |
| FPC 8          | REV 35  | 750-071976  | CMUIANABAA | JNP10K-LC1101    |
| PIC 0          |         | BUILTIN     |            |                  |
| FPC 9          | REV 41  | 750-071976  | CMUIANABAB | JNP10K-LC1101    |
| PIC 0          |         | BUILTIN     |            |                  |
| FPC 10         | REV 35  | 750-071976  | CMUIANABAA | JNP10K-LC1101    |
| PIC 0          |         | BUILTIN     |            |                  |
| FPC 11         | REV 35  | 750-071976  | CMUIANABAA | JNP10K-LC1101    |
| PIC 0          |         | BUILTIN     |            |                  |
| FPC 13         | REV 41  | 750-071976  | CMUIANABAB | JNP10K-LC1101    |
| PIC 0          |         | BUILTIN     |            |                  |
| FPC 15         | REV 37  | 750-071976  | CMUIANABAA | JNP10K-LC1101    |
| PIC 0          |         | BUILTIN     |            |                  |
| Power Supply 0 | REV 01  | 740-073147  | CMUPADPBAA | JNP10K-PWR-DC    |
| Power Supply 1 | REV 01  | 740-073147  | CMUPADPBAA | JNP10K-PWR-DC    |
| Power Supply 2 | REV 01  | 740-073147  | CMUPADPBAA | JNP10K-PWR-DC    |
| Power Supply 3 | REV 01  | 740-073147  | CMUPADPBAA | JNP10K-PWR-DC    |
| Power Supply 4 | REV 01  | 740-073147  | CMUPADPBAA | JNP10K-PWR-DC    |
| Power Supply 5 | REV 01  | 740-073147  | CMUPADPBAA | JNP10K-PWR-DC    |
| Power Supply 6 | REV 01  | 740-073147  | CMUPADPBAA | JNP10K-PWR-DC    |
| Power Supply 7 | REV 01  | 740-073147  | CMUPADPBAA | JNP10K-PWR-DC    |
| Power Supply 8 | REV 01  | 740-073147  | CMUPADPBAA | JNP10K-PWR-DC    |
| Power Supply 9 | REV 01  | 740-073147  | CMUPADPBAA | JNP10K-PWR-DC    |
| Fan Tray 0     |         |             |            | QFX5100-FAN-AFO  |
| Fan Tray 1     |         |             |            | QFX5100-FAN-AFO  |
| SIB 0          | REV 15  | 750-077140  | CMUCAH6CAA | JNP10016-SF      |
| SIB 1          | REV 15  | 750-077140  | CMUCAH6CAA | JNP10016-SF      |
| SIB 2          | REV 15  | 750-077140  | CMUCAH6CAA | JNP10016-SF      |
| SIB 3          | REV 15  | 750-077140  | CMUCAH6CAA | JNP10016-SF      |
| SIB 4          | REV 15  | 750-077140  | CMUCAH6CAA | JNP10016-SF      |
| SIB 5          | REV 15  | 750-077140  | CMUCAH6CAA | JNP10016-SF      |
| FPD Board      | REV 07  | 711-054687  |            |                  |

## show chassis hardware detail (EX9251 Switch)

```
user@switch> show chassis hardware
```

```
Hardware inventory:
```

| Item             | Version | Part number | Serial number | Description |
|------------------|---------|-------------|---------------|-------------|
| Chassis          |         |             | BLANK         | EX9251      |
| Routing Engine 0 |         | BUILTIN     | BUILTIN       | RE-S-2X00x6 |
| CB 0             | REV 05  | 750-069579  | CAGT1382      | EX9251      |



|               |        |            |                |                         |             |
|---------------|--------|------------|----------------|-------------------------|-------------|
| FPC 0         |        |            | BUILTIN        | BUILTIN                 | MPC         |
| PIC 0         |        |            | BUILTIN        | BUILTIN                 | 4XSFP28 PIC |
| Xcvr 0        | REV 01 | 740-044512 | APF14500007NHC | QSFP+-40G-CU50CM        |             |
| Xcvr 2        | REV 01 | 740-046565 | QH21035H       | QSFP+-40G-SR4           |             |
| PIC 1         |        |            | BUILTIN        | BUILTIN                 | 8XSFP PIC   |
| Xcvr 0        | REV 01 | 740-031980 | AA15393URH7    | SFP+-10G-SR             |             |
| Xcvr 1        | REV 01 | 740-031980 | AA162832LVG    | SFP+-10G-SR             |             |
| Xcvr 2        | REV 01 | 740-031980 | MXA0NKJ        | SFP+-10G-SR             |             |
| Xcvr 3        | REV 01 | 740-031980 | MXA0K75        | SFP+-10G-SR             |             |
| Xcvr 4        | REV 01 | 740-021308 | MXA138L        | SFP+-10G-SR             |             |
| Xcvr 5        | REV 01 | 740-021308 | 13T511102684   | SFP+-10G-SR             |             |
| Xcvr 6        | REV 01 | 740-021308 | MXA138E        | SFP+-10G-SR             |             |
| Xcvr 7        | REV 01 | 740-021308 | MXA152N        | SFP+-10G-SR             |             |
| PEM 0         | REV 02 | 740-070749 | 1F186390060    | AC AFO 650W PSU         |             |
| PEM 1         | REV 02 | 740-070749 | 1F186390045    | AC AFO 650W PSU         |             |
| Fan Tray 0    |        |            |                | Fan Tray, Front to Back |             |
| Airflow - AFO |        |            |                |                         |             |
| Fan Tray 1    |        |            |                | Fan Tray, Front to Back |             |
| Airflow - AFO |        |            |                |                         |             |

### 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 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
Midplane      REV 04      710-002726  AX5633
Jedec Code:   0x7fb0          EEPROM Version: 0x01
P/N:          710-002726.      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 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 interconnect-device (QFabric Systems)

```
user@switch> show chassis hardware interconnect-device interconnect1
```

Hardware inventory:

| Item     | Version | Part number | Serial number | Description  |
|----------|---------|-------------|---------------|--------------|
| Chassis  | REV 07  |             |               | QFX_olive    |
| Midplane | REV 07  | 750-021261  | BH0208188289  | QFX Midplane |
| CB 0     | REV 07  | 750-021261  | BH0208188289  | QFXIC08-CB4S |

### 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 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 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    | FPC CPU            |
| PIC 0            |         | BUILTIN    | 48x 10G-SFP+       |
| Xcvr 8           | REV 01  | 740-030658 | AD0946A028B        |
|                  |         |            | SFP+-10G-USR       |

### show chassis hardware scc (TX Matrix Router)

```
user@host> show chassis hardware scc
```

```
scc-re0:
```

```
-----
```

```
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 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 led satellite

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>show chassis led satellite [slot-id <i>slot-id</i>  device-alias <i>alias-name</i>]</code>  |
| <b>Release Information</b>      | Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.<br>Command introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.   |
| <b>Description</b>              | Display the status and colors of the chassis LEDs of the satellite devices in a Junos Fusion. A major alarm (red) indicates a critical error condition that requires immediate action. A minor alarm (yellow) indicates a noncritical condition that requires monitoring or maintenance. A minor alarm that is left unchecked might cause interruption in service or performance degradation.   |
| <b>Options</b>                  | <p><b>none</b>—Display the status of the chassis status LEDs of every satellite device in the Junos Fusion.</p> <p><b>slot-id <i>slot-id</i></b>—(Optional) Display the status of the chassis status LEDs of the satellite device using the specified FPC slot identifier in the Junos Fusion. The <i>slot-id</i> is the FPC slot ID number.</p> <p><b>device-alias <i>alias-name</i></b>—(Optional) Display the status of the chassis status LEDs of the satellite device using the specified alias in the Junos Fusion.</p> |
| <b>Required Privilege Level</b> | view  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Satellite Device Alarm Handling Using an Environment Monitoring Satellite Policy in a Junos Fusion on page 56</a></li><li>• <a href="#">Understanding Junos Fusion Provider Edge Components on page 5</a></li><li>• <a href="#">Understanding Junos Fusion Enterprise Components</a></li></ul>  |
| <b>List of Sample Output</b>    | <a href="#">show chassis led satellite on page 404</a>  |
| <b>Output Fields</b>            | <a href="#">Table 17 on page 403</a> lists the output fields for the <b>show chassis led satellite</b> command. Output fields are listed in the approximate order in which they appear.   |

Table 17: show chassis led Output Fields

| Field Name            | Field Description  |
|-----------------------|--|
| <b>Beacon LED</b>     | <p>(Applies when QFX5100, QFX5110, and QFX5200 switches are in an satellite device role only) Indicates if the beacon feature is on or off. The beacon feature is always off in a Junos Fusion.</p> <p>The <b>Beacon LED</b> output maps to the <b>ID—Identification</b> LED state.</p> <p>For more information, see:</p> <ul style="list-style-type: none"> <li>• <i>Chassis Status LEDs on a QFX5100 Device</i></li> <li>• <i>QFX5110 Chassis Status LEDs</i></li> <li>• <i>QFX5200 Chassis Status LEDs</i></li> </ul> |
| <b>System LED</b>     | <p>Indicates the state of the System (<b>SYS</b>) LED on the satellite device.</p> <p>For more information, see:</p> <ul style="list-style-type: none"> <li>• <i>Chassis Status LEDs on EX4300 Switches</i></li> <li>• <i>Chassis Status LEDs on a QFX5100 Device</i></li> <li>• <i>QFX5110 Chassis Status LEDs</i></li> <li>• <i>QFX5200 Chassis Status LEDs</i></li> </ul>   |
| <b>Master LED</b>     | <p>Indicates the state of the Master (<b>MST</b>) LED on the satellite device.</p> <p>For more information, see:</p> <ul style="list-style-type: none"> <li>• <i>Chassis Status LEDs on EX4300 Switches</i></li> <li>• <i>Chassis Status LEDs on a QFX5100 Device</i></li> <li>• <i>QFX5110 Chassis Status LEDs</i></li> <li>• <i>QFX5200 Chassis Status LEDs</i></li> </ul>   |
| <b>Alarm LED</b>      | <p>Indicates the state of the Alarm (<b>ALM</b>) LED on the satellite device.</p> <p>For more information, see:</p> <ul style="list-style-type: none"> <li>• <i>Chassis Status LEDs on EX4300 Switches</i></li> <li>• <i>Chassis Status LEDs on a QFX5100 Device</i></li> <li>• <i>QFX5110 Chassis Status LEDs</i></li> <li>• <i>QFX5200 Chassis Status LEDs</i></li> </ul>  |
| <b>Mgmt Port0 LED</b> | <p>(Applies when QFX5100, QFX5110, and QFX5200 switches are in an satellite device role only) Indicates the state of the management port 0 (<b>em0</b>) LED status on the satellite device.</p> <p>This port is always off in a Junos Fusion.</p> <p>For more information, see:</p> <ul style="list-style-type: none"> <li>• <i>Management Port LEDs on a QFX5100 Device</i></li> <li>• <i>QFX5110 Management Port LEDs</i></li> <li>• <i>QFX5200 Management Port LEDs</i></li> </ul>                                    |

Table 17: show chassis led Output Fields (continued)

| Field Name               | Field Description  |
|--------------------------|--|
| <b>Mgmt Port1 LED</b>    | <p>(Applies when QFX5100, QFX5110, and QFX5200 switches are in an satellite device role only) Indicates the state of the management port 1(<b>em0</b>) LED status on the satellite device.</p> <p>This port is always off in a Junos Fusion.</p> <p>For more information, see:</p> <ul style="list-style-type: none"> <li>• <i>Management Port LEDs on a QFX5100 Device</i></li> <li>• <i>QFX5110 Management Port LEDs</i></li> <li>• <i>QFX5200 Management Port LEDs</i></li> </ul> |
| <b>Interface</b>         | <p>The interface name on the satellite device.</p> <p>For more information, see:</p> <ul style="list-style-type: none"> <li>• <i>Management Port LEDs on a QFX5100 Device</i></li> <li>• <i>QFX5110 Management Port LEDs</i></li> <li>• <i>QFX5200 Management Port LEDs</i></li> </ul>   |
| <b>Status LED</b>        | <p>The state of the Status LED for the particular interface on the satellite device.</p> <p>For more information, see:</p> <ul style="list-style-type: none"> <li>• <i>Network Port, Built-In QSFP+ Port, Uplink Port, and Uplink Module Port LEDs on EX4300 Switches</i></li> <li>• <i>Access Port and Uplink Port LEDs on a QFX5100 Device</i></li> <li>• <i>QFX5110 Network Port LEDs</i></li> <li>• <i>QFX5200 Access Port and Uplink Port LEDs</i></li> </ul>                   |
| <b>Link/Activity LED</b> | <p>The state of the Link/Activity LED for the particular interface on the satellite device.</p> <p>For more information, see:</p> <ul style="list-style-type: none"> <li>• <i>Network Port, Built-In QSFP+ Port, Uplink Port, and Uplink Module Port LEDs on EX4300 Switches</i></li> <li>• <i>Access Port and Uplink Port LEDs on a QFX5100 Device</i></li> <li>• <i>QFX5110 Network Port LEDs</i></li> <li>• <i>QFX5200 Access Port and Uplink Port LEDs</i></li> </ul>            |

## Sample Output

### show chassis led satellite

```
user@aggregation-device> show chassis led satellite
```

```

LED status for: FPC 101
-----
LEDs status:
  Beacon LED: OFF
  System LED: GREEN
```



```

Master LED: OFF
Alarm LED : YELLOW
Mgmt Port0 LED: OFF
Mgmt Port1 LED: OFF

```

| Interface     | STATUS LED | LINK/ACTIVITY LED |
|---------------|------------|-------------------|
| xe-101/0/0    | green      |                   |
| xe-101/0/1    | green      |                   |
| xe-101/0/10   | off        |                   |
| xe-101/0/48:0 | green      |                   |
| xe-101/0/48:1 | green      |                   |
| xe-101/0/48:2 | green      |                   |
| xe-101/0/48:3 | green      |                   |

LED status for: FPC 102

LEDs status:

```

Beacon LED: OFF
System LED: GREEN
Master LED: OFF
Alarm LED : YELLOW
Mgmt Port0 LED: OFF
Mgmt Port1 LED: OFF

```

| Interface     | STATUS LED | LINK/ACTIVITY LED |
|---------------|------------|-------------------|
| xe-102/0/0    | green      |                   |
| xe-102/0/1    | green      |                   |
| xe-102/0/10   | off        |                   |
| xe-102/0/48:0 | green      |                   |
| xe-102/0/48:1 | green      |                   |
| xe-102/0/48:2 | green      |                   |
| xe-102/0/48:3 | green      |                   |

## show chassis routing-engine

- List of Syntax**
- Syntax on page 406
  - Syntax (ACX Series Universal Metro Routers) on page 406
  - Syntax (EX Series Switches) on page 406
  - Syntax (QFX Series) on page 406
  - Syntax (MX Series Routers) on page 406
  - Syntax (MX2010 Universal Routing Platforms) on page 406
  - Syntax (MX2020 Universal Routing Platforms) on page 407
  - Syntax (MX104 Universal Routing Platforms) on page 407
  - Syntax (MX204 and MX10003 Universal Routing Platforms) on page 407
  - Syntax (PTX Series Packet Transport Routers) on page 407
  - Syntax (T Series Routers) on page 407
  - Syntax (TX Matrix Routers) on page 407
  - Syntax (TX Matrix Plus Routers) on page 407

**Syntax** show chassis routing-engine  
<bios | *slot*>

**Syntax (ACX Series Universal Metro Routers)** show chassis routing-engine

**Syntax (EX Series Switches)** show chassis routing-engine  
<*slot*>  
<satellite [*slot-id slot-id* | device-alias *alias-name*]>

**Syntax (QFX Series)** show chassis routing-engine  
<interconnect-device *name*>  
<node-device *name*>  
<*slot*>  
<*bios*>  
<*errors*>

**Syntax (MX Series Routers)** show chassis routing-engine  
<all-members>  
<bios | *slot*>  
<local>  
<member *member-id*>  
<satellite [*slot-id slot-id* | device-alias *alias-name*]>

**Syntax (MX2010 Universal Routing Platforms)** show chassis routing-engine  
<bios | *slot*>

|  |  |
|--|--|
| Syntax (MX2020 Universal Routing Platforms)            | show chassis routing-engine<br><bios   <i>slot</i> >   |
| Syntax (MX104 Universal Routing Platforms)             | show chassis routing-engine  |
| Syntax (MX204 and MX10003 Universal Routing Platforms) | show chassis routing-engine<br>< <i>slot</i> ><br><bios><br><errors>   |
| Syntax (PTX Series Packet Transport Routers)           | show chassis routing-engine  |
| Syntax (T Series Routers)                              | show chassis routing-engine<br><bios   <i>slot</i> >   |
| Syntax (TX Matrix Routers)                             | show chassis routing-engine<br><bios   <i>slot</i> ><br><lcc <i>number</i>   scc>  |
| Syntax (TX Matrix Plus Routers)                        | show chassis routing-engine<br><bios   <i>slot</i> ><br><lcc <i>number</i>   sfc <i>number</i> >   |
| Release Information                                    | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>sfc</b> option introduced in Junos OS Release in 9.6 for the TX Matrix Plus router.</p> <p>Command introduced in Junos OS Release 11.1 for QFX Series.</p> <p><b>5 sec CPU Utilization, 1 min CPU Utilization, 5 min CPU Utilization, and 15 min CPU Utilization</b> output fields introduced in Junos OS Release 11.3R1.</p> <p>Command introduced in Junos OS Release 12.2 for ACX Series Universal Metro Routers.</p> <p>Command introduced in Junos OS Release 12.3 for MX2010 and MX2020 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 13.2 for MX104 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p> <p><b>satellite</b> option introduced in Junos OS Release 14.2R3.</p> <p>Command introduced in Junos OS Release 17.2 for PTX10008 Routers.</p> <p>Command introduced in Junos OS Release 17.3 for MX10003 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 17.4 for MX204 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 18.1R1 for EX9251 switches.</p> |

**Description** Display the status of the Routing Engine.

**Options** **none**—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.

**errors**—(Optional) Display routing engine errors.

**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.

**satellite [*slot-id slot-id* [*device-alias alias-name*]]**—(Junos Fusion only) (Optional) Display Routing Engine information for the specified satellite device in a Junos Fusion, or for all satellite devices in the Junos Fusion if no satellite devices are specified.

**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**

[show chassis routing-engine \(M5 Router\) on page 412](#)  
[show chassis routing-engine \(M10 Router\) on page 413](#)  
[show chassis routing-engine \(M20 Router\) on page 413](#)  
[show chassis routing-engine \(M40 Router\) on page 414](#)  
[show chassis routing-engine \(M120 Router\) on page 414](#)  
[show chassis routing-engine \(M160 Router\) on page 415](#)  
[show chassis routing-engine \(MX104 Router\) on page 416](#)  
[show chassis routing-engine \(MX240 Router\) on page 417](#)  
[show chassis routing-engine \(MX480 Router\) on page 417](#)  
[show chassis routing-engine \(MX960 Router\) on page 418](#)  
[show chassis routing-engine \(MX2010 Router\) on page 419](#)  
[show chassis routing-engine \(MX2020 Router\) on page 420](#)  
[show chassis routing-engine \(MX10003 Router\) on page 421](#)  
[show chassis routing-engine \(MX204 Router\) on page 422](#)  
[show chassis routing-engine \(T320 Router\) on page 422](#)  
[show chassis routing-engine \(T640 Router\) on page 423](#)  
[show chassis routing-engine \(T1600 Router\) on page 424](#)  
[show chassis routing-engine \(T4000 Router\) on page 425](#)  
[show chassis routing-engine \(TX Matrix Router\) on page 425](#)  
[show chassis routing-engine lcc \(TX Matrix Router\) on page 427](#)  
[show chassis routing-engine bios \(TX Matrix Router\) on page 427](#)  
[show chassis routing-engine \(TX Matrix Plus Router\) on page 427](#)  
[show chassis routing-engine lcc \(TX Matrix Plus Router\) on page 429](#)  
[show chassis routing-engine bios \(TX Matrix Plus Router\) on page 430](#)  
[show chassis routing-engine \(QFX Series\) on page 430](#)  
[show chassis routing-engine \(OCX Series\) on page 430](#)  
[show chassis routing-engine interconnect-device \(QFabric Systems\) on page 431](#)  
[show chassis routing-engine \(PTX Series Packet Transport Router\) on page 431](#)  
[show chassis routing-engine \(EX9200 Switch\) on page 432](#)  
[show chassis routing-engine \(EX9251 Switch\) on page 433](#)  
[show chassis routing-engine \(ACX2000 Universal Metro Router\) on page 433](#)  
[show chassis routing-engine \(ACX1000 Universal Metro Router\) on page 434](#)

[show chassis routing-engine](#) (Displaying the guest reboot reason on PTX5000, MX240, MX480, MX960 < MX2010, and MX2020) on page 434

**Output Fields** Table 18 on page 410 lists the output fields for the **show chassis routing-engine** command. Output fields are listed in the approximate order in which they appear.

Table 18: show chassis routing-engine Output Fields

| Field Name            | Field Description  |
|-----------------------|--|
| Slot                  | (Systems with single and multiple Routing Engines) Slot number.  |
| Current state         | (Systems with multiple Routing Engines) Current state of the Routing Engine: <b>Master</b> , <b>Backup</b> , or <b>Disabled</b> .  |
| Election priority     | (Systems with multiple Routing Engines) Election priority for the Routing Engine: <b>Master</b> or <b>Backup</b> .   |
| Temperature           | Temperature of the air flowing past the Routing Engine.  |
| CPU Temperature       | Temperature of the CPU.  |
| DRAM                  | 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.  |
| Memory utilization    | Percentage of Routing Engine memory being used.<br><br><b>NOTE:</b> For platforms running Junos OS with upgraded FreeBSD, the way memory utilization is calculated has changed. Starting in Junos OS Release 15.1R1, inactive memory is no longer included in the calculation for memory utilization. Inactive memory is now considered as free. That is, the value for used memory decreases and results in more memory to be available for other processes. For platforms that run Junos OS with upgraded FreeBSD, see <i>Release Information for Junos OS with Upgraded FreeBSD</i> . |
| CPU utilization       | 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>  |
| 5 sec CPU Utilization | Information about the Routing Engine's CPU utilization in the past 5 seconds: <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>  |

Table 18: show chassis routing-engine Output Fields (continued)

| Field Name                    | Field Description  |
|-------------------------------|--|
| <b>1 min CPU Utilization</b>  | Information about the Routing Engine's CPU utilization in the past 1 minute: <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>5 min CPU Utilization</b>  | Information about the Routing Engine's CPU utilization in the past 5 minutes: <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>15 min CPU Utilization</b> | Information about the Routing Engine's CPU utilization in the past 15 minutes: <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 18: 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 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> <li><b>Hypervisor reboot</b>—When both Linux host and Junos OS is rebooted using the <b>request vmhost reboot</b> command.</li> <li><b>VJUNOS Reboot</b>—When Junos OS is rebooted using the <b>request system reboot</b> command.</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 (MX104 Router)

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

#### Routing Engine status:

##### Slot 0:

|                    |                                      |
|--------------------|--------------------------------------|
| Current state      | Master                               |
| Election priority  | Master (default)                     |
| Temperature        | 32 degrees C / 89 degrees F          |
| CPU temperature    | 42 degrees C / 107 degrees F         |
| DRAM               | 3840 MB (3840 MB installed)          |
| Memory utilization | 18 percent                           |
| CPU utilization:   |                                      |
| User               | 0 percent                            |
| Background         | 0 percent                            |
| Kernel             | 3 percent                            |
| Interrupt          | 2 percent                            |
| Idle               | 94 percent                           |
| Model              | RE-MX-104                            |
| Serial ID          | CAAR5925                             |
| Start time         | 2013-06-05 13:17:08 IST              |
| Uptime             | 1 hour, 15 minutes, 8 seconds        |
| Last reboot reason | 0x200:normal shutdown                |
| Load averages:     | 1 minute    5 minute    15 minute    |
|                    | 0.87            0.90            0.41 |

#### Routing Engine status:

##### Slot 1:

|                    |                                      |
|--------------------|--------------------------------------|
| Current state      | Backup                               |
| Election priority  | Backup (default)                     |
| Temperature        | 32 degrees C / 89 degrees F          |
| CPU temperature    | 38 degrees C / 100 degrees F         |
| DRAM               | 3840 MB (3840 MB installed)          |
| Memory utilization | 13 percent                           |
| CPU utilization:   |                                      |
| User               | 0 percent                            |
| Background         | 0 percent                            |
| Kernel             | 1 percent                            |
| Interrupt          | 2 percent                            |
| Idle               | 97 percent                           |
| Model              | RE-MX-104                            |
| Serial ID          | CAAM6369                             |
| Start time         | 2013-06-05 13:07:37 IST              |
| Uptime             | 1 hour, 24 minutes, 34 seconds       |
| Last reboot reason | 0x200:normal shutdown                |
| Load averages:     | 1 minute    5 minute    15 minute    |
|                    | 0.19            0.15            0.06 |

**show chassis routing-engine (MX240 Router)**

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

**Routing Engine status:****Slot 0:**

|                         |  |
|-------------------------|--|
| Current state           | Master                                   |
| Election priority       | Master (default)                         |
| Temperature             | 36 degrees C / 96 degrees F              |
| CPU temperature         | 35 degrees C / 95 degrees F              |
| DRAM                    | 3314 MB (8192 MB installed)              |
| Memory utilization      | 37 percent                               |
| 5 sec CPU utilization:  |  |
| User                    | 0 percent                                |
| Background              | 0 percent                                |
| Kernel                  | 1 percent                                |
| Interrupt               | 0 percent                                |
| Idle                    | 99 percent                               |
| 1 min CPU utilization:  |  |
| User                    | 0 percent                                |
| Background              | 0 percent                                |
| Kernel                  | 1 percent                                |
| Interrupt               | 0 percent                                |
| Idle                    | 99 percent                               |
| 5 min CPU utilization:  |  |
| User                    | 0 percent                                |
| Background              | 0 percent                                |
| Kernel                  | 1 percent                                |
| Interrupt               | 0 percent                                |
| Idle                    | 99 percent                               |
| 15 min CPU utilization: |  |
| User                    | 0 percent                                |
| Background              | 0 percent                                |
| Kernel                  | 1 percent                                |
| Interrupt               | 0 percent                                |
| Idle                    | 99 percent                               |
| Model                   | RE-S-1800x4                              |
| Serial ID               | 9009074155                               |
| Start time              | 2014-10-13 00:35:41 PDT                  |
| Uptime                  | 98 days, 2 hours, 6 minutes, 35 seconds  |
| Last reboot reason      | Router rebooted after a normal shutdown. |
| Load averages:          | 1 minute    5 minute    15 minute        |
|                         | 0.12        0.12        0.13             |

**Routing Engine status:****Slot 1:**

|               |         |
|---------------|---------|
| Current state | Present |
|---------------|---------|

**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        | 33 degrees C / 91 degrees F   |
| CPU temperature    | 32 degrees C / 89 degrees F   |
| DRAM               | 16323 MB (16384 MB installed) |
| Memory utilization | 7 percent                     |

```

5 sec CPU utilization:
  User          1 percent
  Background    0 percent
  Kernel        1 percent
  Interrupt     0 percent
  Idle          98 percent
1 min CPU utilization:
  User          2 percent
  Background    0 percent
  Kernel        1 percent
  Interrupt     0 percent
  Idle          97 percent
5 min CPU utilization:
  User          1 percent
  Background    0 percent
  Kernel        1 percent
  Interrupt     0 percent
  Idle          97 percent
15 min CPU utilization:
  User          1 percent
  Background    0 percent
  Kernel        1 percent
  Interrupt     0 percent
  Idle          97 percent
Model          RE-S-1800x4
Serial ID      9009122628
Start time     2019-05-29 21:58:46 PDT
Uptime         11 days, 5 hours, 8 minutes, 55 seconds
Last reboot reason Router rebooted after a normal shutdown.
Load averages: 1 minute   5 minute  15 minute
                  0.28      0.22     0.22

```

### 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        34 degrees C / 93 degrees F
  CPU temperature    33 degrees C / 91 degrees F
  DRAM               16325 MB (16384 MB installed)
  Memory utilization 7 percent
  5 sec CPU utilization:
    User          1 percent
    Background    0 percent
    Kernel        3 percent
    Interrupt     1 percent
    Idle          95 percent
  1 min CPU utilization:
    User          0 percent
    Background    0 percent
    Kernel        3 percent
    Interrupt     0 percent
    Idle          97 percent
  5 min CPU utilization:
    User          0 percent
    Background    0 percent

```

```

Kernel                3 percent
Interrupt             0 percent
Idle                  97 percent
15 min CPU utilization:
User                  0 percent
Background            0 percent
Kernel                2 percent
Interrupt             0 percent
Idle                  97 percent
Model                 RE-S-1800x4
Serial ID              9013043129
Start time             2019-04-29 13:07:15 CEST
Uptime                 15 days, 22 hours, 42 minutes, 57 seconds
Last reboot reason     Router rebooted after a normal shutdown.
Load averages:         1 minute   5 minute  15 minute
                       0.17       0.20    0.22

Routing Engine status:
Slot 1:
  Current state         Backup
  Election priority     Backup (default)
  Temperature           33 degrees C / 91 degrees F
  CPU temperature       32 degrees C / 89 degrees F
  DRAM                  16330 MB (16384 MB installed)
  Memory utilization    9 percent
  5 sec CPU utilization:
    User                0 percent
    Background          0 percent
    Kernel              0 percent
    Interrupt           0 percent
    Idle                100 percent
  Model                 RE-S-1800x4
  Serial ID              9013043081
  Start time             2019-04-29 13:05:17 CEST
  Uptime                 15 days, 22 hours, 44 minutes, 52 seconds
  Last reboot reason     0x1:power cycle/failure
  Load averages:         1 minute   5 minute  15 minute
                       0.17       0.17    0.12

```

### 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           41 degrees C / 105 degrees F
  CPU temperature       38 degrees C / 100 degrees F
  DRAM                  3313 MB (16384 MB installed)
  Memory utilization    37 percent
  5 sec CPU utilization:
    User                0 percent
    Background          0 percent
    Kernel              2 percent
    Interrupt           2 percent
    Idle                96 percent
  1 min CPU utilization:
    User                0 percent
    Background          0 percent
    Kernel              2 percent

```

```

Interrupt                2 percent
Idle                    97 percent
5 min CPU utilization:
  User                  0 percent
  Background            0 percent
  Kernel                2 percent
  Interrupt             2 percent
  Idle                  97 percent
15 min CPU utilization:
  User                  0 percent
  Background            0 percent
  Kernel                2 percent
  Interrupt             2 percent
  Idle                  97 percent
Model                   RE-S-1800x4
Serial ID                9009146890
Start time              2015-01-18 21:35:12 PST
Uptime                  4 hours, 21 minutes, 34 seconds
Last reboot reason      Router rebooted after a normal shutdown.
Load averages:          1 minute   5 minute   15 minute
                        0.11       0.14       0.14

```

### 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            2 degrees C / 35 degrees F
  CPU temperature        32 degrees C / 89 degrees F
  DRAM                   32735 MB (32768 MB installed)
  Memory utilization      10 percent
  5 sec CPU utilization:
    User                  0 percent
    Background            0 percent
    Kernel                1 percent
    Interrupt             1 percent
    Idle                  98 percent
  1 min CPU utilization:
    User                  0 percent
    Background            0 percent
    Kernel                1 percent
    Interrupt             1 percent
    Idle                  99 percent
  5 min CPU utilization:
    User                  0 percent
    Background            0 percent
    Kernel                1 percent
    Interrupt             1 percent
    Idle                  99 percent
  15 min CPU utilization:
    User                  0 percent
    Background            0 percent
    Kernel                1 percent
    Interrupt             1 percent
    Idle                  99 percent
Model                   RE-S-2X00x8
Serial ID                CADN0309

```



```

Start time          2015-01-08 16:31:15 PST
Uptime              4 days, 22 hours, 59 minutes, 3 seconds
Last reboot reason   Router rebooted after a normal shutdown.
Load averages:      1 minute   5 minute   15 minute
                     0.39      0.41      0.34

```

### show chassis routing-engine (MX10003 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
CPU temperature         40 degrees C / 104 degrees F
DRAM                   49112 MB (49152 MB installed)
Memory utilization      4 percent
5 sec CPU utilization:
  User                  0 percent
  Background            0 percent
  Kernel                2 percent
  Interrupt             0 percent
  Idle                  98 percent
1 min CPU utilization:
  User                  0 percent
  Background            0 percent
  Kernel                1 percent
  Interrupt             0 percent
  Idle                  98 percent
5 min CPU utilization:
  User                  0 percent
  Background            0 percent
  Kernel                1 percent
  Interrupt             0 percent
  Idle                  98 percent
15 min CPU utilization:
  User                  0 percent
  Background            0 percent
  Kernel                1 percent
  Interrupt             0 percent
  Idle                  96 percent
Model                  RE-S-2X00x6
Start time             2017-08-08 23:13:16 PDT
Uptime                 53 minutes, 38 seconds
Last reboot reason     0x1:power cycle/failure
Load averages:         1 minute   5 minute   15 minute
                       0.23      0.28      0.25

```

#### Routing Engine status:

##### Slot 1:

```

Current state          Backup
Election priority       Backup (default)
Temperature             38 degrees C / 100 degrees F
CPU temperature         39 degrees C / 102 degrees F
DRAM                   49112 MB (49152 MB installed)
Memory utilization      4 percent
5 sec CPU utilization:
  User                  0 percent
  Background            0 percent

```

```

Kernel          1 percent
Interrupt       0 percent
Idle           99 percent
Model          RE-S-2X00x6
Start time      2017-08-08 23:13:18 PDT
Uptime         53 minutes, 25 seconds
Last reboot reason 0x1:power cycle/failure
Load averages:  1 minute   5 minute  15 minute
                  0.21      0.19      0.17

```

### show chassis routing-engine (MX204 Router)

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

```

Routing Engine status:
  Temperature          52 degrees C / 125 degrees F
  CPU temperature      52 degrees C / 125 degrees F
  DRAM                16341 MB (16384 MB installed)
  Memory utilization   11 percent
  5 sec CPU utilization:
    User              0 percent
    Background        0 percent
    Kernel            0 percent
    Interrupt         0 percent
    Idle             100 percent
  1 min CPU utilization:
    User              0 percent
    Background        0 percent
    Kernel            0 percent
    Interrupt         0 percent
    Idle             100 percent
  5 min CPU utilization:
    User              0 percent
    Background        0 percent
    Kernel            0 percent
    Interrupt         0 percent
    Idle             100 percent
  15 min CPU utilization:
    User              0 percent
    Background        0 percent
    Kernel            0 percent
    Interrupt         0 percent
    Idle             100 percent
  Model              RE-S-2X00x6
  Start time         2017-11-04 00:30:31 PDT
  Uptime             4 days, 7 hours, 17 minutes, 3 seconds
  Last reboot reason 0x1:power cycle/failure
  Load averages:    1 minute   5 minute  15 minute
                    0.17      0.12      0.13

```

### 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 (TI600 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 (OCX 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 OCX-1100-48SX-AFI
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 interconnect-device (QFabric Systems)

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

```
Routing Engine status:
```

```
Slot 0:
```

```

Current state           Master
Election priority       Master (default)
Temperature             48 degrees C / 118 degrees F
DRAM                   3312 MB
Memory utilization      63 percent
CPU utilization:
  User                  14 percent
  Background            0 percent
  Kernel                5 percent
  Interrupt             0 percent
  Idle                  81 percent
Model                  RE-QFXC08-CB4S
Serial ID               BUILTIN
Start time              2011-07-06 13:26:15 UTC
Uptime                  11 hours, 24 minutes, 57 seconds
Last reboot reason      0x4:reset-button reset
Load averages:         1 minute   5 minute   15 minute
                        2.62       2.31       2.28

```

```
Routing Engine status:
```

```
Slot 1:
```

```

Current state           Backup
Election priority       Backup (default)
Temperature             39 degrees C / 102 degrees F
DRAM                   3312 MB
Memory utilization      59 percent
CPU utilization:
  User                  9 percent
  Background            0 percent
  Kernel                1 percent
  Interrupt             0 percent
  Idle                  91 percent
Model                  RE-QFXC08-CB4S
Serial ID               BUILTIN
Start time              2011-07-06 13:24:58 UTC
Uptime                  11 hours, 26 minutes, 18 seconds
Last reboot reason      0x4:reset-button reset

```

### 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 (EX9200 Switch)

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

```

Routing Engine status:
Slot 0:
  Current state      Master
  Election priority   Master (default)
  Temperature        35 degrees C / 95 degrees F
  CPU temperature    33 degrees C / 91 degrees F
  DRAM               8157 MB
  Installed Memory    8192 MB
  Memory utilization 18 percent
  CPU utilization:
    User             1 percent
    Background        0 percent
    Kernel            4 percent
    Interrupt         1 percent
    Idle             94 percent
  Model              RE-S-EX9200-1800X4
  Serial ID           9009119555
  Start time          2014-03-12 14:58:05 UTC
  Uptime              1 hour, 41 minutes, 51 seconds

```

```

Last reboot reason      Router rebooted after a normal shutdown.
Load averages:         1 minute   5 minute   15 minute
                        0.02        0.02        0.00

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

[...Output truncated...]

```

### show chassis routing-engine (EX9251 Switch)

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

```

Routing Engine status:
  Temperature           50 degrees C / 122 degrees F
  CPU temperature       50 degrees C / 122 degrees F
  DRAM                  16340 MB (16384 MB installed)
  Memory utilization    6 percent
  5 sec CPU utilization:
    User                2 percent
    Background          0 percent
    Kernel              19 percent
    Interrupt           0 percent
    Idle                79 percent
  1 min CPU utilization:
    User                2 percent
    Background          0 percent
    Kernel              19 percent
    Interrupt           0 percent
    Idle                79 percent
  5 min CPU utilization:
    User                2 percent
    Background          0 percent
    Kernel              19 percent
    Interrupt           0 percent
    Idle                79 percent
  15 min CPU utilization:
    User                2 percent
    Background          0 percent
    Kernel              19 percent
    Interrupt           0 percent
    Idle                79 percent
  Model                 RE-S-2X00x6
  Start time            2018-03-08 05:11:33 PST
  Uptime                10 days, 18 hours, 59 minutes, 15 seconds
  Last reboot reason    0x4000:VJUNOS reboot
  Load averages:       1 minute   5 minute   15 minute
                        1.06        1.09        1.08

```

### show chassis routing-engine (ACX2000 Universal Metro 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 Metro 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 routing-engine (Displaying the guest reboot reason on PTX5000,MX240, MX480, MX960< MX2010, and MX2020)

```
user@host> show chassis routing-engine re0 | match "Last reboot reason"
```

```
Last reboot reason 0x4000:VJUNOS reboot
```

## show chassis satellite

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>show chassis satellite [device-alias <i>device-alias</i>   fpc-slot <i>fpc-slot</i>   cluster <i>cluster-name</i>] [brief   detail   extensive   terse] &lt;since <i>time</i>&gt;</pre>   |
| <b>Release Information</b>      | <p>Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.</p> <p>Command introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.</p> <p>Command introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.</p>  |
| <b>Description</b>              | Display the status of the satellite device connections in a Junos Fusion.  |
| <b>Options</b>                  | <p><b>none</b>—(Same as <b>brief</b>) Display satellite device connection information</p> <p><b>device-alias <i>device-alias</i></b>—(Optional) Display satellite device connection information for the satellite device using the specified device alias only.</p> <p><b>fpc-slot <i>fpc-slot</i></b>—(Optional) Display satellite device connection information for the satellite device using the specified FPC slot number only.</p> <p><b>cluster <i>cluster-name</i></b>—(Optional) Display satellite device connection information for the satellite devices in the specified satellite device cluster only.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>since <i>time</i></b>—(Optional) Display the satellite devices that have been added to the Junos Fusion on or after a certain date or time, in YYYY-MM-DD.HH:MM:SS format.</p> <p>To display all satellite devices added since a specified date, enter the specific date. For instance, to display all satellite devices added on or after December 22nd, 2015, enter <b>2015-12-22</b> as the <i>time</i>.</p> <p>To display all satellite devices added since a specified time, enter the specific date and time. For instance, to display all satellite devices added on or after 11:01AM on December 22nd, 2015, enter <b>2015-12-22.11:01:00</b> as the <i>time</i>.</p> |
| <b>Required Privilege Level</b> | view   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring or Expanding a Junos Fusion Enterprise</a></li> <li>• <a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li> </ul>  |
| <b>List of Sample Output</b>    | <p><a href="#">show chassis satellite on page 441</a></p> <p><a href="#">show chassis satellite device-alias on page 442</a></p> <p><a href="#">show chassis satellite fpc-slot 130 on page 442</a></p> <p><a href="#">show chassis satellite terse on page 442</a></p>  |

[show chassis satellite detail on page 443](#)

**Output Fields** [Table 19 on page 436](#) lists the output fields for the **show chassis satellite** command. Output fields are listed in the approximate order in which they appear.

*Table 19: show chassis satellite Output Fields*

| Field Name           | Field Description   | Level of Output            |
|----------------------|---|----------------------------|
| Fields for Interface |   |                            |
| Alias                | The satellite device's alias.   | brief                      |
|                      | The satellite device's alias is configured using the <b>set chassis satellite-management fpc slot-id alias alias</b> statement. | extensive<br>none          |
| Slot                 | The slot number of the satellite device.  | brief                      |
|                      | The slot number can be configured using the <b>set chassis satellite-management fpc slot-id</b> statement..                     | terse<br>extensive<br>none |



Table 19: show chassis satellite Output Fields (continued)

| Field Name           | Field Description   | Level of Output                               |
|----------------------|---|---|
| <b>Device State</b>  | <p>The state of the satellite device within the Junos Fusion.</p> <p>The most common device states:</p> <ul style="list-style-type: none"> <li>• <b>Online</b>—the satellite device is online and active. This is the satellite device state during normal operating procedure.</li> <li>• <b>Offline</b>—the satellite device is offline and not detected. This state is typically seen when the satellite device has been disconnected from the aggregation device, or when all cascade or uplink ports connecting the satellite device to the aggregation device are down.</li> <li>• <b>Present</b>—the satellite device is recognized by the aggregation device, but is not online. This state is typically seen before a satellite device goes online, or while satellite device configuration is in progress or finalizing.</li> <li>• <b>Rebooting</b>—the satellite device is rebooting.</li> <li>• <b>Disable</b>—the satellite device has been disabled.</li> <li>• <b>Misconfig</b>—the satellite device is not properly configured. This state is typically seen when the system ID, cascade port, or FPC slot ID defined for the satellite device has a misconfiguration.</li> <li>• <b>Miswire</b>—the satellite device is miswired. This state is typically seen when a satellite device is wired to two aggregation devices but is not configured for multihoming. Use <b>show chassis satellite detail</b> to gather more information on the issue when the device state is <b>Miswire</b>.</li> </ul> <p>Other less common device states include:</p> <ul style="list-style-type: none"> <li>• <b>ModeChanging</b>—the device is converting from a standalone device to a satellite device, or from a satellite device to a standalone device.</li> <li>• <b>ModeChangeFail</b>—the mode change operation failed.</li> <li>• <b>MinorUpgradeOn</b>—A minor satellite software upgrade is in progress.</li> <li>• <b>MajorUpgradeOn</b>—A major satellite software upgrade is in progress.</li> <li>• <b>Upgrade-pending</b>—the satellite device is waiting for a satellite software upgrade.</li> <li>• <b>ProvSessionDn</b>—the provisioning session is down.</li> <li>• <b>ReconcileState</b>—the satellite provisioning daemon has restarted and is reconciling the satellite device state.</li> </ul> | <p>brief<br/>terse<br/>extensive<br/>none</p> |
| <b>Cascade Ports</b> | <p>The cascade port or ports.</p> <p>A cascade port is a port on the aggregation device that connects to a satellite device in a Junos Fusion.</p>  | <p>brief<br/>extensive<br/>none</p>           |

Table 19: show chassis satellite Output Fields (continued)

| Field Name                  | Field Description   | Level of Output                           |
|-----------------------------|---|---|
| <b>Port State</b>           | <p>The state of the cascade port on the aggregation device.</p> <p>Port states include:</p> <ul style="list-style-type: none"> <li>• <b>online</b>—the cascade port is online and active. This is the port state during normal operating procedure.</li> <li>• <b>txUpRxDn</b>—Tx or Rx forwarding is disabled on the cascade port. This state is often seen when a second aggregation device is added to a Junos Fusion topology, and the devices in the Junos Fusion are synchronizing to the new topology.</li> <li>• <b>miswire</b>—the cascade port is miswired. This state is typically seen when a satellite device is interconnected to two aggregation devices but multihoming is not configured. Use <b>show chassis satellite detail</b> to gather more information on the issue when the device state is <b>Miswire</b>.</li> <li>• <b>present</b>—The cascade port recognized the satellite device and is up.</li> <li>• <b>misconfig</b>—the cascade port is assigned, but this interface is not working correctly due to a misconfiguration.</li> <li>• <b>down</b>—the cascade port is down.</li> <li>• <b>offline</b>—the satellite device was previously recognized from this interface, but is no longer present.</li> <li>• <b>absent</b>—the cascade port is configured but no satellite device is detected on the interface.</li> </ul> | <p>brief</p> <p>extensive</p> <p>none</p> |
| <b>Extended Ports Total</b> | <p>The total number of extended ports on the satellite device.</p> <p>An extended port is a network-facing port on the satellite device that sends and receives network traffic for the Junos Fusion.</p>   | <p>brief</p> <p>none</p> <p>terse</p>     |
| <b>Extended Ports Up</b>    | The number of active extended ports.  | <p>brief</p> <p>none</p> <p>terse</p>     |
| <b>Model</b>                | The hardware model of the satellite device.   | terse                                     |
| <b>Version</b>              | The version of satellite device software running on the satellite device.   | terse                                     |
| <b>Satellite Alias</b>      | <p>The satellite device's alias.</p> <p>The satellite device's alias is configured using the <b>set chassis satellite-management fpc slot-id alias alias</b> statement.</p>   | detail                                    |
| <b>FPC slot</b>             | <p>The FPC slot number of the satellite device.</p> <p>The slot number can be configured using the <b>set chassis satellite-management fpc slot-id</b> statement.</p>   | detail                                    |

Table 19: show chassis satellite Output Fields (continued)

| Field Name                       | Field Description  | Level of Output |
|----------------------------------|--|-----------------|
| <b>Operational State</b>         | <p>The operational state of the satellite device.</p> <p>The state UFDDown indicates that uplink failure detection disabled the satellite device's extended ports due to an uplink port failure.</p>   | detail          |
| <b>Product Model</b>             | The hardware model of the satellite device.  | detail          |
| <b>Product Family</b>            | The product family of the satellite device.  | detail          |
| <b>Serial number</b>             | The serial number of the satellite device.   | detail          |
| <b>System ID</b>                 | The system ID of the satellite device. The system ID is also the satellite device's MAC address.   | detail          |
| <b>Software package version</b>  | The satellite software version running on the satellite device.  | detail          |
| <b>Host software version</b>     | The host operating system software version running on the satellite device.  | detail          |
| <b>Management Address</b>        | <p>The management IP address of the satellite device.</p> <p>This management IP address belongs to an internal routing instance. This management address is assigned by the control plane internally based on FPC slot ID and is used for the control plane traffic between the aggregation device and satellite device.</p> <p>All management in a Junos Fusion should be done through the aggregation device. The management IP address of the satellite device is useful for debugging purposes by expert users only.</p> | detail          |
| <b>UFD config state</b>          | Uplink failure detection configuration state.  | detail          |
| <b>Minimum link</b>              | Uplink failure detection minimum active uplink port setting.   | detail          |
| <b>Holdddown timer (seconds)</b> | Uplink failure detection holdddown timer setting, in seconds.  | detail          |
| <b>UFD operational state</b>     | Uplink failure detection operational state.  | detail          |

Table 19: show chassis satellite Output Fields (continued)

| Field Name   | Field Description   | Level of Output |
|--|---|-----------------|
| <b>Candidate uplink interfaces (pic/port)</b>            | Uplink failure detection candidate uplink interfaces.   | detail          |
| <b>Extended Ports</b>                                    | The number of extended ports for the satellite device. The number on the left is the total number of extended ports, and the number on the right is the total number of extended ports currently in the up state. | extensive       |
| <b>When</b>  | The date and time of the event.   | extensive       |
| <b>Event</b>   | The event.  | extensive       |
| <b>Action</b>  | The actions that resulted from the event.   | extensive       |
| <b>Fields for Cascade interfaces</b>                     |   |                 |
| <b>Interface Name</b>                                    | The name of the cascade interface on the aggregation device.  | detail          |
| <b>State</b>   | The state of the cascade interface.   | detail          |
| <b>Uplink Interface</b>                                  | The name of the uplink interface on the satellite device.   | detail          |
| <b>Adjacency state</b>                                   | The adjacency state of the cascade to uplink interface link.  | detail          |
| <b>Last transition</b>                                   | The amount of time that has passed since the last transition of the cascade to uplink interface link.   | detail          |
| <b>Adjacency down count (Interface Name)</b>             | The number of times the cascade to uplink interface link has gone into the down state.  | detail          |
| <b>RX Packet</b>   | The number of packets received on the cascade interface.  | detail          |
| <b>Last received packet</b>                              | The amount of time that has passed since the last packet was received on the cascade interface.   | detail          |
| <b>Peer adjacency information</b>                        | The amount of time that has passed since the last peer adjacency transition.  | detail          |
| <b>Adjacency down count (Peer adjacency information)</b> | The number of times the cascade to uplink interface link has gone into the down state.  | detail          |

Table 19: show chassis satellite Output Fields (continued)

| Field Name                            | Field Description   | Level of Output |
|---------------------------------------|---|-----------------|
| <b>Last down cause</b>                | The cause of the last adjacency failure.                                      | detail          |
| <b>SDPD restart detected</b>          | The number of times that the satellite device protocol process has restarted. | detail          |
| <b>Fields for Process information</b> |   |                 |
| <b>Process Name</b>                   | The name of the process.  | detail          |
| <b>PID</b>                            | The process identification number of the process.                             | detail          |
| <b>State</b>                          | The current state of the process.   | detail          |
| <b>Number of restart detected</b>     | The number of times the process has restarted.                                | detail          |
| <b>Uptime</b>                         | The amount of time that the process has been running.                         | detail          |

## Sample Output

### show chassis satellite

```
user@aggregation-device> show chassis satellite
```

| Alias          | Slot | Device State | Cascade Ports        | Port State       | Extended Ports Total/Up |
|----------------|------|--------------|----------------------|------------------|-------------------------|
| qfx5100-24q-01 | 100  | Online       | xe-0/0/1<br>xe-0/3/0 | online<br>online | 9/2                     |
| qfx5100-24q-02 | 101  | Online       | xe-0/0/2<br>xe-0/3/1 | online<br>online | 20/12                   |
| qfx5100-24q-03 | 102  | Online       | xe-0/0/3<br>xe-0/3/2 | online<br>online | 16/6                    |
| qfx5100-24q-04 | 103  | Online       | xe-0/0/4<br>xe-0/3/3 | online<br>online | 16/4                    |
| qfx5100-24q-05 | 104  | Online       | xe-0/0/5<br>xe-0/3/4 | online<br>online | 13/3                    |
| qfx5100-24q-06 | 105  | Online       | xe-0/0/6<br>xe-0/3/5 | online<br>online | 24/15                   |
| qfx5100-24q-07 | 106  | Online       | xe-0/0/7<br>xe-0/3/6 | online<br>online | 24/15                   |
| qfx5100-24q-08 | 107  | Online       | xe-0/0/8<br>xe-0/3/7 | online<br>online | 21/12                   |
| ex4300-01      | 109  | Online       | xe-1/0/1             | online           | 49/2                    |
| ex4300-02      | 110  | Online       | xe-1/0/2             | online           | 49/2                    |
| ex4300-03      | 111  | Online       | xe-1/0/3             | online           | 49/2                    |
| ex4300-04      | 112  | Online       | xe-1/0/4             | online           | 49/11                   |
| ex4300-05      | 113  | Online       | xe-1/0/5             | online           | 49/11                   |
| ex4300-06      | 114  | Online       | xe-1/0/6             | online           | 49/11                   |
| ex4300-07      | 115  | Online       | xe-1/0/7             | online           | 49/11                   |
| ex4300-08      | 116  | Online       | xe-1/1/0             | online           | 49/11                   |
| ex4300-09      | 117  | Online       | xe-1/1/1             | online           | 49/11                   |

|           |     |        |          |        |       |
|-----------|-----|--------|----------|--------|-------|
| ex4300-10 | 118 | Online | xe-1/1/2 | online | 49/11 |
| ex4300-11 | 119 | Online | xe-1/1/3 | online | 49/11 |
| ex4300-12 | 120 | Online | xe-1/1/4 | online | 49/11 |
| ex4300-13 | 121 | Online | xe-1/1/5 | online | 49/11 |
| ex4300-14 | 122 | Online | xe-1/1/6 | online | 49/11 |
| ex4300-15 | 123 | Online | xe-1/1/7 | online | 49/11 |
| ex4300-16 | 124 | Online | xe-1/2/1 | online | 49/11 |
| ex4300-17 | 125 | Online | xe-1/2/2 | online | 49/11 |
| ex4300-18 | 126 | Online | xe-1/2/3 | online | 49/2  |
| ex4300-19 | 127 | Online | xe-1/2/4 | online | 49/1  |
| ex4300-20 | 128 | Online | xe-1/2/5 | online | 49/1  |
| ex4300-21 | 129 | Online | xe-1/2/6 | online | 49/1  |
| ex4300-22 | 130 | Online | xe-1/2/7 | online | 49/1  |

## Sample Output

### show chassis satellite device-alias

```
user@aggregation-device> show chassis satellite device-alias ex4300-22
```

| Alias     | Slot | Device State | Cascade Ports | Port State | Extended Ports Total/Up |
|-----------|------|--------------|---------------|------------|-------------------------|
| ex4300-22 | 130  | Online       | xe-0/2/7      | online     | 49/1                    |

## Sample Output

### show chassis satellite fpc-slot 130

```
user@aggregation-device> show chassis satellite fpc-slot 130
```

| Alias     | Slot | Device State | Cascade Ports        | Port State       | Extended Ports Total/Up |
|-----------|------|--------------|----------------------|------------------|-------------------------|
| ex4300-22 | 101  | Online       | xe-0/0/2<br>xe-0/3/1 | online<br>online | 20/12                   |

## Sample Output

### show chassis satellite terse

```
user@aggregation-device> show chassis satellite terse
```

| Slot | Device State | Model          | Extended Ports Total/Up Version |         |
|------|--------------|----------------|---------------------------------|---------|
| 101  | Online       | QFX5100-48S-6Q | 7/7                             | 3.0R1.1 |
| 102  | Online       | QFX5100-48S-6Q | 7/7                             | 3.0R1.1 |
| 103  | Online       | QFX5100-48S-6Q | 6/5                             | 3.0R1.1 |
| 104  | Online       | QFX5100-48S-6Q | 14/14                           | 3.0R1.1 |
| 105  | Online       | QFX5100-48S-6Q | 18/18                           | 3.0R1.1 |
| 106  | Online       | QFX5100-48S-6Q | 17/16                           | 3.0R1.1 |
| 107  | Online       | EX4300-48T     | 52/6                            | 3.0R1.1 |
| 108  | Online       | EX4300-48T     | 52/15                           | 3.0R1.1 |
| 109  | Online       | EX4300-48T     | 51/14                           | 3.0R1.1 |
| 110  | Online       | EX4300-48T     | 51/14                           | 3.0R1.1 |
| 111  | Online       | EX4300-48T     | 51/13                           | 3.0R1.1 |
| 112  | Online       | EX4300-48T     | 51/12                           | 3.0R1.1 |
| 113  | Online       | EX4300-48T     | 51/13                           | 3.0R1.1 |
| 114  | Online       | QFX5100-24Q-2P | 17/13                           | 3.0R1.1 |

**show chassis satellite detail**

```

user@aggregation-device> show chassis satellite detail

Satellite Alias: qfx5100-48s-02
FPC Slot: 101
Operational State: Online
Product Model: QFX5100-48S-6Q
Product Family: i386
Serial number: ABC123DEF456
System id: 00:11:22:aa:bb:cc
Software package version: 3.0R1.1
Host software version: 1.0.0
Management Address: 172.16.0.101/32
Cascade interfaces:
  Interface Name: xe-0/0/2 State: online
    Uplink Interface: xe-001/0/48:0
    Adjacency state: Two-Way
    Last transition: 00:10:22
    Adjacency down count: 0
    Rx Packet: 65 Last received packet: 00:00:02
    Peer adjacency information: 00:10:22
      Adjacency down count: 3
      Last down cause: Interface Down
      SDPD restart detected: 3
  Interface Name: xe-0/2/1 State: online
    Uplink Interface: xe-001/0/48:1
    Adjacency state: Two-Way
    Last transition: 00:10:22
    Adjacency down count: 0
    Rx Packet: 64 Last received packet: 00:00:02
    Peer adjacency information: 00:10:22
      Adjacency down count: 3
      Last down cause: Interface Down
      SDPD restart detected: 3
  Interface Name: xe-2/0/0 State: online
    Uplink Interface: xe-001/0/48:2
    Adjacency state: Two-Way
    Last transition: 00:10:22
    Adjacency down count: 0
    Rx Packet: 65 Last received packet: 00:00:02
    Peer adjacency information: 00:10:22
      Adjacency down count: 3
      Last down cause: Interface Down
      SDPD restart detected: 3
  Interface Name: xe-2/1/6 State: online
    Uplink Interface: xe-001/0/48:3
    Adjacency state: Two-Way
    Last transition: 00:10:22
    Adjacency down count: 0
    Rx Packet: 65 Last received packet: 00:00:02
    Peer adjacency information: 00:10:22
      Adjacency down count: 3
      Last down cause: Hold timer expire
      SDPD restart detected: 3
Process information:
  Process Name: Provisioning PID: 6716 State: Running
    Number of restart detected: 0
    Uptime: 00:10:22
  Process Name: PFE PID: 3194 State: Running

```

```
Number of restart detected: 0
Uptime: 00:10:22
UFD config state: Enable (persist), Minimum link: 1,
Holdddown timer (seconds): 6
UFD operational state: Enable
Candidate uplink interfaces (pic/port):
  1/0
  1/1
  1/2
  1/3
  2/0
  2/1
  2/2
  2/3

Satellite Alias: qfx5100-48s-03
FPC Slot: 102
Operational State: Online
Product Model: QFX5100-48S-6Q
Product Family: i386
Serial number: ABCDEFG12345
System id: 00:11:22:aa:ba:cc
Software package version: 3.0R1.1
Host software version: 1.0.0
Management Address: 172.16.0.102/32
Cascade interfaces:
  Interface Name: xe-0/0/3 State: online
    Uplink Interface: xe-002/0/48:0
    Adjacency state: Two-Way
    Last transition: 00:10:22
    Adjacency down count: 0
    Rx Packet: 65 Last received packet: 00:00:02
    Peer adjacency information: 00:10:22
      Adjacency down count: 3
      Last down cause: Interface Down
      SDPD restart detected: 3
  Interface Name: xe-0/2/2 State: online
    Uplink Interface: xe-002/0/48:1
    Adjacency state: Two-Way
    Last transition: 00:10:22
    Adjacency down count: 0
    Rx Packet: 65 Last received packet: 00:00:02
    Peer adjacency information: 00:10:22
      Adjacency down count: 3
      Last down cause: Interface Down
      SDPD restart detected: 3
  Interface Name: xe-2/0/1 State: online
    Uplink Interface: xe-002/0/48:2
    Adjacency state: Two-Way
    Last transition: 00:10:22
    Adjacency down count: 0
    Rx Packet: 65 Last received packet: 00:00:02
    Peer adjacency information: 00:10:22
      Adjacency down count: 3
      Last down cause: Interface Down
      SDPD restart detected: 3
  Interface Name: xe-2/1/7 State: online
    Uplink Interface: xe-002/0/48:3
    Adjacency state: Two-Way
    Last transition: 00:10:22
```



```
Adjacency down count: 0
Rx Packet: 65 Last received packet: 00:00:02
Peer adjacency information: 00:10:22
  Adjacency down count: 3
  Last down cause: Interface Down
  SDPD restart detected: 3
Process information:
  Process Name: Provisioning PID: 6667 State: Running
  Number of restart detected: 0
  Uptime: 00:10:22
  Process Name: PFE PID: 3155 State: Running
  Number of restart detected: 0
  Uptime: 00:10:22
<additional output removed for brevity>
```

## show chassis satellite extended-port

---

**Syntax**    `show chassis satellite extended-port interface-name`  
              `<fpc-slot fpc-slot>`  
              `<interface-name interface-name>`  
              `[brief | detail | extensive | terse]`  
              `<since time>`

**Release Information**    Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.  
                              Command introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.  
                              Command introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.

**Description**    Display the status of the extended ports on the satellite devices in a Junos Fusion.

The extended ports are the network-facing ports on satellite devices that send and receive network traffic for a Junos Fusion.

**Options**    **none**—(Same as **brief** and **terse**) Display extended port status information.

**brief | detail | extensive | terse**—(Optional) Display the specified level of output.

**fpc *fpc-slot***—Display extended port status information for the specified FPC slot only.  
In a Junos Fusion, one FPC slot ID is assigned to each satellite device, so you can use this option to display extended port status information for all extended ports on one satellite device.

**interface-name *interface-name***—Display extended port status information for the extended port interface only.

**history**—Display extended port history.

**statistics**—Display extended port statistics.

**since *time***—(Optional) Display extended port status information for the satellite devices that have been added to the Junos Fusion on or after a certain date or time, which is entered in the *YYYY-MM-DD.HH:MM:SS* format.

To display extended port status information for all satellite devices added since a specified date, enter the specific date as the *time* as the *time*. For instance, **2015-12-22**.

To display extended port status information for all satellite devices added since a specified time, enter the specific date and time as the *time*. For instance, **2015-12-22.11:01:00**.

**Required Privilege Level**    view

- Related Documentation**
- [Configuring or Expanding a Junos Fusion Enterprise](#)
  - [Configuring Junos Fusion Provider Edge on page 41](#)

**List of Sample Output** [show chassis satellite extended-port on page 448](#)

**Output Fields** [Table 20 on page 447](#) lists the output fields for the **show chassis satellite extended-port** command. Output fields are listed in the approximate order in which they appear.

*Table 20: show chassis satellite extended-port Output Fields*

| Field Name              | Field Description                                | Level of Output                               |
|-------------------------|--|---|
| Fields for Interface    |  |   |
| <b>Name</b>             | The interface name of the extended port.         | brief<br>terse<br>detail<br>extensive<br>none |
| <b>State</b>            | The state of the extended port.                  | brief<br>terse<br>detail<br>extensive<br>none |
| <b>Rx Request State</b> | The receive request state of the extended port.  | brief<br>terse<br>detail<br>extensive<br>none |
| <b>Tx Request State</b> | The transmit request state of the extended port. | brief<br>terse<br>detail<br>extensive<br>none |
| <b>Admin State</b>      | The administrative state of the extended port.   | brief<br>terse<br>detail<br>extensive<br>none |
| <b>Op State</b>         | The operational state of the extended port.      | brief<br>terse<br>detail<br>extensive<br>none |
| <b>IFD Idx</b>          | The internal interface index.                    | brief<br>terse<br>detail<br>extensive<br>none |

Table 20: show chassis satellite extended-port Output Fields (continued)

| Field Name | Field Description  | Level of Output                               |
|------------|--|---|
| PCID       | The port's E-channel identifier (ECID), abbreviated as PCID. | brief<br>terse<br>detail<br>extensive<br>none |
| When       | The date and time of the event.                              | detail<br>extensive                           |
| Event      | The event.   | detail<br>extensive                           |
| Action     | The actions that resulted from the event.                    | detail<br>extensive                           |

## Sample Output

### show chassis satellite extended-port

```
user@aggregation-device> show chassis satellite extended-port
```

```
Legend for interface types:
```

```
* -- Uplink interface
```

| Name        | State       | Rx Request | Rx State | Tx Request | Tx State | Admin/Op State | IFD Idx | PCID |
|-------------|-------------|------------|----------|------------|----------|----------------|---------|------|
| et-100/0/2  | AddComplete | None       |          | Ready      |          | Up/Dn          | 838     | 110  |
| et-104/0/2  | AddComplete | None       |          | Ready      |          | Up/Dn          | 813     | 110  |
| et-107/0/23 | AddComplete | None       |          | Ready      |          | Up/Up          | 544     | 194  |
| ge-109/0/0  | AddComplete | None       |          | Ready      |          | Up/Up          | 402     | 115  |
| ge-109/0/1  | AddComplete | None       |          | Ready      |          | Up/Dn          | 403     | 114  |
| ge-109/0/10 | AddComplete | None       |          | Ready      |          | Up/Dn          | 412     | 113  |
| ge-109/0/11 | AddComplete | None       |          | Ready      |          | Up/Dn          | 413     | 112  |
| ge-109/0/12 | AddComplete | None       |          | Ready      |          | Up/Dn          | 414     | 123  |
| ge-109/0/13 | AddComplete | None       |          | Ready      |          | Up/Dn          | 415     | 122  |
| ge-109/0/14 | AddComplete | None       |          | Ready      |          | Up/Dn          | 416     | 125  |
| ge-109/0/15 | AddComplete | None       |          | Ready      |          | Up/Dn          | 417     | 124  |
| ge-109/0/16 | AddComplete | None       |          | Ready      |          | Up/Dn          | 418     | 131  |
| ge-109/0/17 | AddComplete | None       |          | Ready      |          | Up/Dn          | 419     | 130  |
| ge-109/0/18 | AddComplete | None       |          | Ready      |          | Up/Dn          | 420     | 133  |
| ge-109/0/19 | AddComplete | None       |          | Ready      |          | Up/Dn          | 421     | 132  |
| ge-109/0/2  | AddComplete | None       |          | Ready      |          | Up/Dn          | 404     | 117  |
| ge-109/0/20 | AddComplete | None       |          | Ready      |          | Up/Dn          | 422     | 127  |
| ge-109/0/21 | AddComplete | None       |          | Ready      |          | Up/Dn          | 423     | 126  |
| ge-109/0/22 | AddComplete | None       |          | Ready      |          | Up/Dn          | 424     | 129  |
| ge-109/0/23 | AddComplete | None       |          | Ready      |          | Up/Dn          | 425     | 128  |
| ge-109/0/24 | AddComplete | None       |          | Ready      |          | Up/Dn          | 426     | 103  |
| ge-109/0/25 | AddComplete | None       |          | Ready      |          | Up/Dn          | 427     | 102  |
| ge-109/0/26 | AddComplete | None       |          | Ready      |          | Up/Dn          | 428     | 105  |
| ge-109/0/27 | AddComplete | None       |          | Ready      |          | Up/Dn          | 429     | 104  |
| ge-109/0/28 | AddComplete | None       |          | Ready      |          | Up/Dn          | 430     | 107  |
| ge-109/0/29 | AddComplete | None       |          | Ready      |          | Up/Dn          | 431     | 106  |
| ge-109/0/3  | AddComplete | None       |          | Ready      |          | Up/Dn          | 405     | 116  |
| ge-109/0/30 | AddComplete | None       |          | Ready      |          | Up/Dn          | 432     | 109  |
| ge-109/0/31 | AddComplete | None       |          | Ready      |          | Up/Dn          | 433     | 108  |

|             |             |      |       |       |     |     |
|-------------|-------------|------|-------|-------|-----|-----|
| ge-109/0/32 | AddComplete | None | Ready | Up/Dn | 434 | 135 |
| ge-109/0/33 | AddComplete | None | Ready | Up/Dn | 435 | 134 |
| ge-109/0/34 | AddComplete | None | Ready | Up/Dn | 436 | 137 |
| ge-109/0/35 | AddComplete | None | Ready | Up/Dn | 437 | 136 |
| ge-109/0/36 | AddComplete | None | Ready | Up/Dn | 438 | 144 |
| ge-109/0/37 | AddComplete | None | Ready | Up/Dn | 439 | 143 |
| ge-109/0/38 | AddComplete | None | Ready | Up/Dn | 440 | 146 |
| ge-109/0/39 | AddComplete | None | Ready | Up/Dn | 441 | 145 |
| ge-109/0/4  | AddComplete | None | Ready | Up/Dn | 406 | 119 |
| ge-109/0/40 | AddComplete | None | Ready | Up/Dn | 442 | 140 |
| ge-109/0/41 | AddComplete | None | Ready | Up/Dn | 443 | 139 |
| ge-109/0/42 | AddComplete | None | Ready | Up/Dn | 444 | 142 |
| ge-109/0/43 | AddComplete | None | Ready | Up/Dn | 445 | 141 |
| ge-109/0/44 | AddComplete | None | Ready | Up/Dn | 446 | 148 |
| ge-109/0/45 | AddComplete | None | Ready | Up/Dn | 447 | 147 |
| ge-109/0/46 | AddComplete | None | Ready | Up/Dn | 448 | 150 |
| ge-109/0/47 | AddComplete | None | Ready | Up/Dn | 449 | 149 |
| ge-109/0/5  | AddComplete | None | Ready | Up/Dn | 407 | 118 |
| ge-109/0/6  | AddComplete | None | Ready | Up/Dn | 408 | 121 |
| ge-109/0/7  | AddComplete | None | Ready | Up/Dn | 409 | 120 |
| ge-109/0/8  | AddComplete | None | Ready | Up/Dn | 410 | 111 |
| ge-109/0/9  | AddComplete | None | Ready | Up/Dn | 411 | 110 |
| ge-110/0/0  | AddComplete | None | Ready | Up/Up | 728 | 115 |
| ge-110/0/1  | AddComplete | None | Ready | Up/Dn | 729 | 114 |

## show chassis satellite interface

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>show chassis satellite interface &lt;interface-name&gt; [ brief   detail   extensive ] &lt;since time&gt;</pre>  |
| <b>Release Information</b>      | Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.<br>Command introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.<br>Command introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.  |
| <b>Description</b>              | <p>Display the status of the cascade ports as well as the internal satellite interfaces in a Junos Fusion.</p> <p>You might see <b>sd</b> interfaces in the output of this command. These are internal interfaces for the Junos Fusion.</p>   |
| <b>Options</b>                  | <p><b>interface-name</b>—Specify the name of the interface.</p> <p><b>none</b>—(Same as <b>brief</b>) Display aggregation device interface information.</p> <p><b>brief   detail   extensive</b>—(Optional) Display the specified level of output.</p> <p><b>since time</b>—(Optional) Display interface status information for the satellite devices that have been added to the Junos Fusion on or after a certain date or time, which is entered in the <i>YYYY-MM-DD.HH:MM:SS</i> format.</p> <p>To display extended port status information for all satellite devices added since a specified date, enter the specific date as the time as the <i>time</i>. For instance, <b>2015-12-22</b>.</p> <p>To display extended port status information for all satellite devices added since a specified time, enter the specific date and time as the <i>time</i>. For instance, <b>2015-12-22.11:01:00</b>.</p> |
| <b>Required Privilege Level</b> | view  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring or Expanding a Junos Fusion Enterprise</a></li><li>• <a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li></ul>  |
| <b>List of Sample Output</b>    | <a href="#">show chassis satellite interface on page 451</a><br><a href="#">show chassis satellite interface (Junos Fusion Data Center with EVPN-VXLAN) on page 454</a>   |
| <b>Output Fields</b>            | <a href="#">Table 21 on page 451</a> lists the output fields for the <b>show chassis satellite interface</b> command. Output fields are listed in the approximate order in which they appear.   |

Table 21: show chassis satellite interface Output Fields

| Field Name                   | Field Description   | Level of Output                      |
|------------------------------|---|--------------------------------------|
| <b>Fields for Interface</b>  |   |                                      |
| <b>Interface</b>             | The interface name.   | brief<br>detail<br>extensive<br>none |
| <b>State</b>                 | The state of the interface.   | brief<br>detail<br>extensive<br>none |
| <b>Type</b>                  | The type of interface.  | brief<br>detail<br>extensive<br>none |
| <b>DF-Role</b>               | <p>(Junos Fusion Data Center with EVPN-VXLAN architecture) The designated forwarder (DF) role:</p> <ul style="list-style-type: none"> <li>• <b>NA</b>—Not applicable.</li> <li>• <b>NON-DF</b>—This aggregation device is not the designated forwarder for the satellite device</li> <li>• <b>DF</b>—This aggregation device is the designated forwarder for the satellite device.</li> </ul> | brief<br>detail<br>extensive<br>none |
| <b>Provisioned Addresses</b> | <p>The provisioned IP addresses for the Junos Fusion.</p> <p>This information is primarily useful for debugging purposes by expert users.</p>   | detail<br>extensive                  |
| <b>Operational Addresses</b> | <p>The operational IP addresses for the Junos Fusion.</p> <p>This information is primarily useful for debugging purposes by expert users.</p>   | detail<br>extensive                  |
| <b>When</b>                  | The date and time of the event.   | detail<br>extensive                  |
| <b>Event</b>                 | The event.  | detail<br>extensive                  |
| <b>Action</b>                | The actions that resulted from the event.   | detail<br>extensive                  |

## Sample Output

### show chassis satellite interface

```
user@aggregation-device> show chassis satellite interface
```

| Interface  | State | Type      |
|------------|-------|-----------|
| lo0        | Up    | Loopback  |
| sd-101/0/0 | Up    | Satellite |
| sd-102/0/0 | Up    | Satellite |
| sd-103/0/0 | Up    | Satellite |
| sd-104/0/0 | Up    | Satellite |
| sd-105/0/0 | Up    | Satellite |
| sd-106/0/0 | Up    | Satellite |
| sd-107/0/0 | Up    | Satellite |
| sd-108/0/0 | Up    | Satellite |
| sd-109/0/0 | Up    | Satellite |
| sd-110/0/0 | Up    | Satellite |
| sd-111/0/0 | Up    | Satellite |
| sd-112/0/0 | Up    | Satellite |
| sd-113/0/0 | Up    | Satellite |
| sd-114/0/0 | Up    | Satellite |
| xe-0/0/1   | Up    | Cascade   |
| xe-0/0/2   | Up    | Cascade   |
| xe-0/0/3   | Up    | Cascade   |
| xe-0/0/4   | Up    | Cascade   |
| xe-0/0/5   | Up    | Cascade   |
| xe-0/0/6   | Up    | Cascade   |
| xe-0/0/7   | Up    | Cascade   |
| xe-0/0/8   | Up    | Cascade   |
| xe-0/0/9   | Up    | Cascade   |
| xe-0/2/0   | Up    | Cascade   |
| xe-0/2/1   | Up    | Cascade   |
| xe-0/2/2   | Up    | Cascade   |
| xe-0/2/3   | Up    | Cascade   |
| xe-0/2/4   | Up    | Cascade   |



|          |    |         |
|----------|----|---------|
| xe-0/2/5 | Up | Cascade |
| xe-0/2/6 | Up | Cascade |
| xe-0/2/7 | Up | Cascade |
| xe-1/0/1 | Up | Cascade |
| xe-1/0/2 | Up | Cascade |
| xe-1/0/3 | Up | Cascade |
| xe-1/2/1 | Up | Cascade |
| xe-1/2/2 | Up | Cascade |
| xe-1/2/3 | Up | Cascade |
| xe-2/0/0 | Up | Cascade |
| xe-2/0/1 | Up | Cascade |
| xe-2/0/2 | Up | Cascade |
| xe-2/0/3 | Up | Cascade |
| xe-2/0/4 | Up | Cascade |
| xe-2/0/5 | Up | Cascade |
| xe-2/0/6 | Up | Cascade |
| xe-2/0/7 | Up | Cascade |
| xe-2/1/0 | Up | Cascade |
| xe-2/1/1 | Up | Cascade |
| xe-2/1/2 | Up | Cascade |
| xe-2/1/3 | Up | Cascade |
| xe-2/1/4 | Up | Cascade |
| xe-2/1/5 | Up | Cascade |
| xe-2/1/6 | Up | Cascade |
| xe-2/1/7 | Up | Cascade |
| xe-2/2/0 | Up | Cascade |
| xe-2/2/1 | Up | Cascade |
| xe-2/2/2 | Up | Cascade |
| xe-2/2/3 | Up | Cascade |
| xe-2/2/4 | Up | Cascade |

|          |    |         |
|----------|----|---------|
| xe-2/2/5 | Up | Cascade |
| xe-2/2/6 | Up | Cascade |
| xe-2/2/7 | Up | Cascade |
| xe-2/3/0 | Up | Cascade |
| xe-2/3/3 | Dn | Cascade |
| xe-2/3/4 | Up | Cascade |
| xe-2/3/5 | Up | Cascade |
| xe-2/3/6 | Up | Cascade |
| xe-2/3/7 | Up | Cascade |

## Sample Output

### show chassis satellite interface (Junos Fusion Data Center with EVPN-VXLAN)

```
user@aggregation-device> show chassis satellite interface
```

| Interface  | State | Type      | DF-Role |
|------------|-------|-----------|---------|
| lo0        | Up    | Loopback  | NA      |
| sd-101/0/0 | Up    | Satellite | Non-DF  |
| sd-102/0/0 | Up    | Satellite | Non-DF  |
| sd-103/0/0 | Up    | Satellite | DF      |
| xe-0/0/1   | Up    | Cascade   | NA      |
| xe-0/0/2   | Up    | Cascade   | NA      |
| xe-0/0/3   | Up    | Cascade   | NA      |
| xe-0/0/4   | Up    | Cascade   | NA      |
| xe-0/0/5   | Up    | Cascade   | NA      |

## show chassis satellite neighbor

**Syntax** `show chassis satellite neighbor`  
`[interface-name]`  
`[ brief | detail | extensive | terse]`  
`<since time>`

**Release Information** Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.  
 Command introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.  
 Command introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.

**Description** Display the status of the satellite device to aggregation device links in a Junos Fusion.

**Options** *interface-name*—Specify the name of the cascade port on the aggregation device.

*none*—(Same as *terse*) Display satellite device connection information.

*brief | detail | extensive | terse*—(Optional) Display the specified level of output.

*since time*—(Optional) Display satellite device connection information for the satellite devices that have been added to the Junos Fusion on or after a certain date or time, which is entered in the *YYYY-MM-DD.HH:MM:SS* format.

To display satellite device connection information for all satellite devices added since a specified date, enter the specific date as the *time* as the *time*. For instance, **2015-12-22**.

To display satellite device connection information for all satellite devices added since a specified time, enter the specific date and time as the *time*. For instance, **2015-12-22.11:01:00**.

**Required Privilege Level** view

**Related Documentation**

- [Configuring or Expanding a Junos Fusion Enterprise](#)
- [Configuring Junos Fusion Provider Edge on page 41](#)

**List of Sample Output** [show chassis satellite neighbor on page 458](#)

**Output Fields** [Table 22 on page 455](#) lists the output fields for the **show chassis satellite neighbor** command. Output fields are listed in the approximate order in which they appear.

*Table 22: show chassis satellite neighbor Output Fields*

| Field Name           | Field Description | Level of Output |
|----------------------|-------------------|-----------------|
| Fields for Interface |                   |                 |

Table 22: show chassis satellite neighbor Output Fields (continued)

| Field Name                                | Field Description   | Level of Output  |
|---|---|--|
| <b>Interface</b>                          | <p>A cascade port interface on the aggregation device in the Junos Fusion.</p> <p>A cascade port interface on an aggregation device connects to a satellite device in a Junos Fusion.</p>                           | <p>brief<br/>terse<br/>detail<br/>extensive<br/>none</p> |
| <b>State</b>                              | The state of the interface.   | <p>brief<br/>terse<br/>detail<br/>extensive<br/>none</p> |
| <b>Port Info</b>                          | <p>The uplink port interface on the satellite device.</p> <p>An uplink port interface on a satellite device connects the satellite device to an aggregation device in a Junos Fusion.</p>                           | <p>brief<br/>terse<br/>detail<br/>extensive<br/>none</p> |
| <b>System Name</b>                        | <p>The system name, or alias, of the satellite device.</p> <p>The satellite device's alias is configured using the <b>set chassis satellite-management fpc slot-id alias</b> statement.</p>                         | <p>brief<br/>terse<br/>detail<br/>extensive<br/>none</p> |
| <b>Model</b>                              | The hardware model of the satellite device.   | <p>brief<br/>terse<br/>detail<br/>extensive<br/>none</p> |
| <b>SW Version</b>                         | The version of satellite software running on the satellite device.  | <p>brief<br/>terse<br/>detail<br/>extensive<br/>none</p> |
| <b>Adjacency up-down transition count</b> | The number of times that the adjacency has transitioned between up and down.  | <p>brief<br/>detail<br/>extensive</p>                    |
| <b>Last transition</b>                    | The last transition of the adjacency state.   | <p>brief<br/>detail<br/>extensive</p>                    |
| <b>Device Serial Number</b>               | The serial number of the satellite device.  | <p>brief<br/>detail<br/>extensive</p>                    |
| <b>Chassis ID</b>                         | The chassis ID of the satellite device. The chassis ID of the satellite device is the satellite's device's MAC address. The chassis ID is also specified as the system ID in some Junos Fusion configuration tasks. | <p>brief<br/>detail<br/>extensive</p>                    |

Table 22: show chassis satellite neighbor Output Fields (continued)

| Field Name   | Field Description  | Level of Output              |
|--|--|------------------------------|
| <b>Device Family Name</b>                          | The device family name.  | brief<br>detail<br>extensive |
| <b>Version Sequence Number</b>                     | The version sequence number.   | brief<br>detail<br>extensive |
| <b>System Description</b>                          | A plain-text description of the hardware and software currently running on the satellite device. | brief<br>detail<br>extensive |
| <b>Build date</b>                                  | The date and time that the satellite software was built.   | brief<br>detail<br>extensive |
| <b>Hello interval</b>                              | The current hello interval configuration.  | brief<br>detail<br>extensive |
| <b>Satellite hello interval</b>                    | The current satellite device hello interval configuration.                                       | brief<br>detail<br>extensive |
| <b>Local-end (Local assigned primary address)</b>  | The local-end cascade port IP address.   | brief<br>detail<br>extensive |
| <b>Remote-end (Local assigned primary address)</b> | The remote-end uplink port IP address.   | brief<br>detail<br>extensive |
| <b>Cause (Adjacency Down History)</b>              | The cause of the last adjacency down event.  | brief<br>detail<br>extensive |
| <b>Timestamp (Adjacency Down History)</b>          | The date and time of the last adjacency down event.  | brief<br>detail<br>extensive |
| <b>Information (Adjacency Down History)</b>        | Information related to the last adjacency down event.  | brief<br>detail<br>extensive |
| <b>When</b>  | The date and time of the event.  | detail<br>extensive          |
| <b>Event</b>                                       | The event.   | detail<br>extensive          |

Table 22: show chassis satellite neighbor Output Fields (continued)

| Field Name | Field Description                         | Level of Output     |
|------------|---|---------------------|
| Action     | The actions that resulted from the event. | detail<br>extensive |

## Sample Output

### show chassis satellite neighbor

```
user@aggregation-device> show chassis satellite neighbor
```

| Interface     | State   | Port Info   | System Name    | Model          | SW Version       |
|---------------|---------|-------------|----------------|----------------|------------------|
| xe-2/3/7      | Init    |             |                |                |                  |
| xe-2/3/6      | Init    |             |                |                |                  |
| xe-2/3/5      | Init    |             |                |                |                  |
| xe-2/3/4      | Init    |             |                |                |                  |
| xe-2/3/3      | Dn      |             |                |                |                  |
| xe-2/3/0      | Two-Way | xe-0/2/2    | ex4300-29      | EX4300-48T     | 0.1I20150224_182 |
| 7_dc-builder  |         |             |                |                |                  |
| xe-2/2/7      | Two-Way | xe-0/2/2    | ex4300-28      | EX4300-48T     | 0.1I20150224_182 |
| 7_dc-builder  |         |             |                |                |                  |
| xe-2/2/6      | Two-Way | xe-0/2/2    | ex4300-27      | EX4300-48T     | 0.1I20150224_182 |
| 7_dc-builder  |         |             |                |                |                  |
| xe-2/2/5      | Two-Way | xe-0/2/2    | ex4300-26      | EX4300-48T     | 0.1I20150224_182 |
| 7_dc-builder  |         |             |                |                |                  |
| xe-2/2/4      | Init    |             |                |                |                  |
| xe-2/2/3      | Init    |             |                |                |                  |
| xe-2/2/2      | Two-Way | xe-0/0/48:3 | qfx5100-48s-06 | QFX5100-48S-6Q | 0.1I20150224_18  |
| 27_dc-builder |         |             |                |                |                  |
| xe-2/2/1      | Two-Way | xe-0/0/48:3 | qfx5100-48s-05 | QFX5100-48S-6Q | 0.1I20150224_18  |
| 27_dc-builder |         |             |                |                |                  |
| xe-2/2/0      | Init    |             |                |                |                  |
| xe-2/1/7      | Init    |             |                |                |                  |
| xe-2/1/6      | Init    |             |                |                |                  |
| xe-2/1/5      | Two-Way | xe-0/0/4:2  | qfx5100-24q-09 | QFX5100-24Q-2P | 0.1I20150224_18  |
| 27_dc-builder |         |             |                |                |                  |
| xe-2/1/4      | Two-Way | xe-0/2/1    | ex4300-31      | EX4300-48T     | 0.1I20150224_182 |
| 7_dc-builder  |         |             |                |                |                  |
| xe-2/1/3      | Two-Way | xe-0/2/1    | ex4300-30      | EX4300-48T     | 0.1I20150224_182 |
| 7_dc-builder  |         |             |                |                |                  |
| xe-2/1/2      | Two-Way | xe-0/2/1    | ex4300-29      | EX4300-48T     | 0.1I20150224_182 |
| 7_dc-builder  |         |             |                |                |                  |
| xe-2/1/1      | Two-Way | xe-0/2/1    | ex4300-28      | EX4300-48T     | 0.1I20150224_182 |
| 7_dc-builder  |         |             |                |                |                  |
| xe-2/1/0      | Init    |             |                |                |                  |
| xe-2/0/7      | Two-Way | xe-0/2/1    | ex4300-26      | EX4300-48T     | 0.1I20150224_182 |
| 7_dc-builder  |         |             |                |                |                  |
| xe-2/0/6      | Init    |             |                |                |                  |
| xe-2/0/5      | Init    |             |                |                |                  |
| xe-2/0/4      | Init    |             |                |                |                  |
| xe-2/0/3      | Init    |             |                |                |                  |
| xe-2/0/2      | Two-Way | xe-0/0/48:2 | qfx5100-48s-04 | QFX5100-48S-6Q | 0.1I20150224_18  |
| 27_dc-builder |         |             |                |                |                  |
| xe-2/0/1      | Two-Way | xe-0/0/48:2 | qfx5100-48s-03 | QFX5100-48S-6Q | 0.1I20150224_18  |
| 27_dc-builder |         |             |                |                |                  |
| xe-2/0/0      | Init    |             |                |                |                  |
| xe-1/2/3      | Two-Way | xe-0/0/0:0  | qfx5100-24q-09 | QFX5100-24Q-2P | 0.1I20150224_18  |

```

27_dc-builder
xe-1/2/2    Two-Way    xe-0/2/0      ex4300-31 EX4300-48T    0.1I20150224_182
7_dc-builder
xe-1/2/1    Two-Way    xe-0/2/0      ex4300-30 EX4300-48T    0.1I20150224_182
7_dc-builder
xe-1/0/3    Two-Way    xe-0/2/0      ex4300-29 EX4300-48T    0.1I20150224_182
7_dc-builder
xe-1/0/2    Two-Way    xe-0/2/0      ex4300-28 EX4300-48T    0.1I20150224_182
7_dc-builder
xe-1/0/1    Two-Way    xe-0/2/0      ex4300-27 EX4300-48T    0.1I20150224_182
7_dc-builder
xe-0/2/7    Two-Way    xe-0/0/0:1    qfx5100-24q-09 QFX5100-24Q-2P 0.1I20150224_18
27_dc-builder
xe-0/2/6    Init
xe-0/2/5    Init
xe-0/2/4    Two-Way    xe-0/0/48:1   qfx5100-48s-05 QFX5100-48S-6Q 0.1I20150224_18
27_dc-builder
xe-0/2/3    Two-Way    xe-0/0/48:1   qfx5100-48s-04 QFX5100-48S-6Q 0.1I20150224_18
27_dc-builder
xe-0/2/2    Two-Way    xe-0/0/48:1   qfx5100-48s-03 QFX5100-48S-6Q 0.1I20150224_18
27_dc-builder
xe-0/2/1    Init
xe-0/2/0    Init
xe-0/0/9    Two-Way    xe-0/2/0      ex4300-26 EX4300-48T    0.1I20150224_182
7_dc-builder
xe-0/0/8    Two-Way    xe-0/2/0      ex4300-25 EX4300-48T    0.1I20150224_182
7_dc-builder
xe-0/0/7    Two-Way    xe-0/0/48:0   qfx5100-48s-07 QFX5100-48S-6Q 0.1I20150224_18
27_dc-builder
xe-0/0/6    Two-Way    xe-0/0/48:0   qfx5100-48s-06 QFX5100-48S-6Q 0.1I20150224_18
27_dc-builder
xe-0/0/5    Two-Way    xe-0/0/48:0   qfx5100-48s-05 QFX5100-48S-6Q 0.1I20150224_18
27_dc-builder
xe-0/0/4    Two-Way    xe-0/0/48:0   qfx5100-48s-04 QFX5100-48S-6Q 0.1I20150224_18
27_dc-builder
xe-0/0/3    Two-Way    xe-0/0/48:0   qfx5100-48s-03 QFX5100-48S-6Q 0.1I20150224_18
27_dc-builder
xe-0/0/2    Two-Way    xe-0/0/48:0   qfx5100-48s-02 QFX5100-48S-6Q 0.1I20150224_18
27_dc-builder
xe-0/0/1    Init

```

## show chassis satellite software

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>show chassis satellite software</code><br><code>[ brief   detail ]</code>  |
| <b>Release Information</b>      | Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.<br>Command introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.<br>Command introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center. |
| <b>Description</b>              | Display information related to the satellite software in the Junos Fusion.   |
| <b>Options</b>                  | <b>none</b> —(Same as <b>brief</b> ) Display satellite device software information.<br><b>brief   detail</b> —(Optional) Display the specified level of output.  |
| <b>Required Privilege Level</b> | view   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Configuring or Expanding a Junos Fusion Enterprise</i></li> <li><a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li> </ul>   |
| <b>List of Sample Output</b>    | <a href="#">show chassis satellite software on page 461</a><br><a href="#">show chassis satellite software detail on page 461</a>  |
| <b>Output Fields</b>            | <a href="#">Table 23 on page 460</a> lists the output fields for the <b>show chassis satellite neighbor</b> command. Output fields are listed in the approximate order in which they appear.   |

Table 23: show chassis satellite software Output Fields

| Field Name                      | Field Description   | Level of Output |
|---------------------------------|---|-----------------|
| Fields for Interface            |   |                 |
| <b>Version</b>                  | The versions of satellite software that are installed and associated with a software upgrade group. | brief<br>none   |
| <b>Platforms</b>                | The hardware platform information.  | brief<br>none   |
| <b>Group</b>                    | The name of the assigned satellite software group or groups, if assigned.                           | brief<br>none   |
| <b>Software Package Version</b> | The satellite software package version.   | detail          |
| <b>Platform</b>                 | The platform type.  | detail          |
| <b>Host Version</b>             | The host version of software for the platform.  | detail          |



Table 23: show chassis satellite software Output Fields (continued)

| Field Name            | Field Description  | Level of Output |
|-----------------------|--|-----------------|
| <b>Current Groups</b> | The name or names of the satellite software upgrade groups that are using the software package.<br><br>This output only appears if the software package is associated with a satellite software upgrade group.                     | detail          |
| <b>Former Groups</b>  | The name or names of satellite software upgrade groups that were previously using the software package.<br><br>This output only appears if the software package was previously associated with a satellite software upgrade group. | detail          |

## Sample Output

### show chassis satellite software

```
user@aggregation-device> show chassis satellite software
```

|         |           |        |
|---------|-----------|--------|
| Version | Platforms | Group  |
| 3.0R1.1 | i386 ppc  | group0 |

## Sample Output

### show chassis satellite software detail

```
user@aggregation-device> show chassis satellite software detail
```

```
Software package version: 3.0R1.6
Platforms supported by package: i386 ppc arm arm563xx
Platform      Host Version  Models Supported
i386          3.0.3        QFX5100-24Q-2P
               QFX5100-48C-6Q
               QFX5100-48S-6Q
               QFX5100-48T-6Q
               QFX5100-96S-8Q
               QFX5100-48SH-6Q
               QFX5100-48TH-6Q
ppc           1.1.2        EX4300-24P
               EX4300-24T
               EX4300-48P
               EX4300-48T
               EX4300-48T-BF
               EX4300-48T-DC
               EX4300-48T-DC-BF
arm           1.0.0        EX2300-24P
               EX2300-24T-DC
               EX2300-C-12T
               EX4300-C-12P
arm563xx      1.0.0        EX3400-24P
               EX3400-24T
               EX3400-48T
               EX3400-48P
Current Groups: group1
```

```
group2  
group3  
group4  
group5
```

## show chassis satellite statistics

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>show chassis satellite statistics &lt;device-alias device-alias&gt; &lt;fpc-slot fpc-slot&gt; &lt;cluster cluster-name&gt;</pre>   |
| <b>Release Information</b>      | <p>Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.</p> <p>Command introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.</p> <p>Command introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.</p>   |
| <b>Description</b>              | Display statistics for satellite devices in a Junos Fusion.   |
| <b>Options</b>                  | <p><b>device-alias</b>—Display output for the specified satellite device, which is identified by the device alias, only.</p> <p><b>fpc-slot</b> —Display output for the specified satellite device, which is identified by the FPC slot ID, only.</p> <p><b>cluster-name</b>—Display output for the satellite devices in the specified satellite device cluster only.</p> |
| <b>Required Privilege Level</b> | view  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring or Expanding a Junos Fusion Enterprise</a></li> <li>• <a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li> </ul>   |
| <b>List of Sample Output</b>    | <p><a href="#">show chassis satellite statistics on page 464</a></p> <p><a href="#">show chassis satellite statistics device-alias qfx5100-48s-02 on page 467</a></p> <p><a href="#">show chassis satellite statistics fpc-slot 101 on page 467</a></p>   |
| <b>Output Fields</b>            | <p><a href="#">Table 24 on page 463</a> lists the output fields for the <b>show chassis satellite statistics</b> command. Output fields are listed in the approximate order in which they appear.</p>   |

*Table 24: show chassis satellite statistics Output Fields*

| Field Name                | Field Description   |
|---------------------------|---|
| Fields for Interface      |   |
| Serial Number             | The serial number of the satellite device.  |
| Slot-ID                   | The FPC slot ID of the satellite device.  |
| CSP down transition count | The number of times that the Control and Status Protocol (CSP) session has gone down. |

Table 24: show chassis satellite statistics Output Fields (continued)

| Field Name  | Field Description   |
|---|---|
| Last transition (CSP down transition count)                               | The last time that the Control and Status Protocol (CSP) session transitioned.  |
| Reachability down transition count  | The number of times the satellite device has been in the reachability down state.   |
| Reachability change transition count (Reachability down transition count) | The number of times that the satellite device's reachability state has transitioned.  |
| S/W image update count  | The number of times that the satellite software has been updated on the satellite device.   |
| Extended Port add/delete/up/down request/response                         | The number of times an extended port—a network-facing port on the satellite device—has been added, deleted, placed in the up position, received a down request, or received a response. |
| Extended Port Params change request                                       | The number of times that an extended port—a network-facing port on the satellite device—has had a change request.   |
| Extended Port up/down operational state transition                        | The number of times that an extended port—a network-facing port on the satellite device—has had an operational state transition to up or down.  |
| Rx sync complete  | The number of times the receive synchronization state has been completed.   |
| Uplink ready rx count   | The number of times the uplink port—the port on the satellite device that connects to the aggregation device—has been placed in the ready-to-receive state.                             |
| Uplink ready tx count   | The number of times the uplink port—the port on the satellite device that connects to the aggregation device—has been placed in the ready-to-transmit state.                            |

## Sample Output

### show chassis satellite statistics

```
user@aggregation-device> show chassis satellite statistics
```

```
Serial Number: TA3714160468 Slot-ID: 101
  CSP down transition count: 0 Last transition: 05:23:56
  Reachability down transition count: 0
  Reachability change transition count: 4 Last transition: 05:23:16
  S/W image update count: 0
  Extended Port add/delete/up/down request/response: 7/0/7/2 7/0/7/2
  Extended Port Params change request: 0
  Extended Port up/down operational state transition: 7/0
  Rx sync complete: 1
  Uplink ready rx count: 4
  Uplink ready tx count: 4
Serial Number: TA3714160046 Slot-ID: 102
  CSP down transition count: 0 Last transition: 05:23:55
  Reachability down transition count: 0
  Reachability change transition count: 4 Last transition: 05:23:19
  S/W image update count: 0
```

```

Extended Port add/delete/up/down request/response: 7/0/7/2 7/0/7/2
Extended Port Params change request: 0
Extended Port up/down operational state transition: 7/0
Rx sync complete: 1
Uplink ready rx count: 4
Uplink ready tx count: 4
Serial Number: TA3714140404 Slot-ID: 103
CSP down transition count: 0 Last transition: 05:23:57
Reachability down transition count: 0
Reachability change transition count: 4 Last transition: 05:23:14
S/W image update count: 0
Extended Port add/delete/up/down request/response: 6/0/5/3 6/0/5/3
Extended Port Params change request: 0
Extended Port up/down operational state transition: 5/0
Rx sync complete: 1
Uplink ready rx count: 4
Uplink ready tx count: 4
Serial Number: TA3714141327 Slot-ID: 104
CSP down transition count: 0 Last transition: 05:23:57
Reachability down transition count: 0
Reachability change transition count: 4 Last transition: 05:23:15
S/W image update count: 0
Extended Port add/delete/up/down request/response: 14/0/14/2 14/0/14/2
Extended Port Params change request: 0
Extended Port up/down operational state transition: 14/0
Rx sync complete: 1
Uplink ready rx count: 4
Uplink ready tx count: 4
Serial Number: TA3714140200 Slot-ID: 105
CSP down transition count: 0 Last transition: 05:23:59
Reachability down transition count: 0
Reachability change transition count: 4 Last transition: 05:23:15
S/W image update count: 0
Extended Port add/delete/up/down request/response: 18/0/18/2 18/0/18/2
Extended Port Params change request: 6
Extended Port up/down operational state transition: 18/0
Rx sync complete: 1
Uplink ready rx count: 4
Uplink ready tx count: 4
Serial Number: TA3714140904 Slot-ID: 106
CSP down transition count: 0 Last transition: 05:23:57
Reachability down transition count: 0
Reachability change transition count: 4 Last transition: 05:23:16
S/W image update count: 0
Extended Port add/delete/up/down request/response: 17/0/16/3 17/0/16/3
Extended Port Params change request: 2
Extended Port up/down operational state transition: 16/0
Rx sync complete: 1
Uplink ready rx count: 4
Uplink ready tx count: 4
Serial Number: PE3714040197 Slot-ID: 107
CSP down transition count: 0 Last transition: 05:24:32
Reachability down transition count: 0
Reachability change transition count: 4 Last transition: 05:23:18
S/W image update count: 0
Extended Port add/delete/up/down request/response: 52/0/7/50 52/0/7/50
Extended Port Params change request: 0
Extended Port up/down operational state transition: 7/1
Rx sync complete: 1
Uplink ready rx count: 4

```

```
Uplink ready tx count: 4
Serial Number: PE3714080398 Slot-ID: 108
  CSP down transition count: 0 Last transition: 05:24:32
  Reachability down transition count: 0
  Reachability change transition count: 4 Last transition: 05:23:18
  S/W image update count: 0
  Extended Port add/delete/up/down request/response: 52/0/15/40 52/0/15/40
  Extended Port Params change request: 0
  Extended Port up/down operational state transition: 15/0
  Rx sync complete: 1
  Uplink ready rx count: 4
  Uplink ready tx count: 4
Serial Number: PE3714080103 Slot-ID: 109
  CSP down transition count: 0 Last transition: 05:23:22
  Reachability down transition count: 0
  Reachability change transition count: 3 Last transition: 05:23:19
  S/W image update count: 0
  Extended Port add/delete/up/down request/response: 51/0/14/37 51/0/14/37
  Extended Port Params change request: 51
  Extended Port up/down operational state transition: 14/0
  Rx sync complete: 1
  Uplink ready rx count: 3
  Uplink ready tx count: 3
Serial Number: PE3714090246 Slot-ID: 110
  CSP down transition count: 0 Last transition: 05:23:22
  Reachability down transition count: 0
  Reachability change transition count: 3 Last transition: 05:23:19
  S/W image update count: 0
  Extended Port add/delete/up/down request/response: 51/0/14/37 51/0/14/37
  Extended Port Params change request: 42
  Extended Port up/down operational state transition: 14/0
  Rx sync complete: 1
  Uplink ready rx count: 3
  Uplink ready tx count: 3
Serial Number: PE3714080417 Slot-ID: 111
  CSP down transition count: 0 Last transition: 05:23:22
  Reachability down transition count: 0
  Reachability change transition count: 3 Last transition: 05:23:19
  S/W image update count: 0
  Extended Port add/delete/up/down request/response: 51/0/13/38 51/0/13/38
  Extended Port Params change request: 51
  Extended Port up/down operational state transition: 13/0
  Rx sync complete: 1
  Uplink ready rx count: 3
  Uplink ready tx count: 3
Serial Number: PE3714080018 Slot-ID: 112
  CSP down transition count: 0 Last transition: 05:23:22
  Reachability down transition count: 0
  Reachability change transition count: 2 Last transition: 05:23:18
  S/W image update count: 0
  Extended Port add/delete/up/down request/response: 51/0/12/39 51/0/12/39
  Extended Port Params change request: 51
  Extended Port up/down operational state transition: 12/0
  Rx sync complete: 1
  Uplink ready rx count: 2
  Uplink ready tx count: 2
Serial Number: PE3714080030 Slot-ID: 113
  CSP down transition count: 0 Last transition: 05:23:22
  Reachability down transition count: 0
  Reachability change transition count: 3 Last transition: 05:23:18
```

```

S/W image update count: 0
Extended Port add/delete/up/down request/response: 51/0/13/38 51/0/13/38
Extended Port Params change request: 51
Extended Port up/down operational state transition: 13/0
Rx sync complete: 1
Uplink ready rx count: 3
Uplink ready tx count: 3
Serial Number: TB3714070145 Slot-ID: 114
CSP down transition count: 0 Last transition: 05:23:58
Reachability down transition count: 0
Reachability change transition count: 4 Last transition: 05:23:15
S/W image update count: 0
Extended Port add/delete/up/down request/response: 17/0/13/7 17/0/13/7
Extended Port Params change request: 0
Extended Port up/down operational state transition: 13/0
Rx sync complete: 1
Uplink ready rx count: 4
Uplink ready tx count: 4

```

## Sample Output

**show chassis satellite statistics device-alias qfx5100-48s-02**

```

user@aggregation-device> show chassis satellite statistics device-alias qfx5100-48s-02
Serial Number: TA3714160468 Slot-ID: 101
CSP down transition count: 0 Last transition: 05:52:44
Reachability down transition count: 0
Reachability change transition count: 4 Last transition: 05:52:04
S/W image update count: 0
Extended Port add/delete/up/down request/response: 7/0/7/2 7/0/7/2
Extended Port Params change request: 0
Extended Port up/down operational state transition: 7/0
Rx sync complete: 1
Uplink ready rx count: 4
Uplink ready tx count: 4

```

## Sample Output

**show chassis satellite statistics fpc-slot 101**

```

user@aggregation-device> show chassis satellite statistics fpc-slot 101
Serial Number: TA3714160468 Slot-ID: 101
CSP down transition count: 0 Last transition: 05:52:44
Reachability down transition count: 0
Reachability change transition count: 4 Last transition: 05:52:04
S/W image update count: 0
Extended Port add/delete/up/down request/response: 7/0/7/2 7/0/7/2
Extended Port Params change request: 0
Extended Port up/down operational state transition: 7/0
Rx sync complete: 1
Uplink ready rx count: 4
Uplink ready tx count: 4

```

## show chassis satellite unprovision

---

**Syntax** show chassis satellite unprovision  
[brief | detail | extensive]  
[cluster *cluster-name*]  
<since *time*>

**Release Information** Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.  
Command introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.  
Command introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.

**Description** Display information about unprovisioned satellite devices in a Junos Fusion.

An unprovisioned satellite device in a Junos Fusion is a satellite device that is recognized by the aggregation device, but is not participating in a Junos Fusion.

No output appears when this command is entered when a Junos Fusion contains no unprovisioned satellite devices.

This command is helpful in identifying satellite devices that are not participating in a Junos Fusion due to configuration issues. Notably, a satellite device that has not been associated with an FPC ID in a Junos Fusion becomes an unprovisioned satellite device. See [“Configuring Junos Fusion Provider Edge” on page 41](#) or *Configuring or Expanding a Junos Fusion Enterprise* for information on associating an FPC ID with a Junos Fusion.

**Options** **none**—(Same as **brief**) Display unprovisioned satellite device information.

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

**cluster *cluster-name***—(Optional) Display unprovisioned satellite device information for the specified satellite device cluster only.

**since *time***—(Optional) Display unprovisioned satellite device information for the satellite devices that have been unprovisioned from a Junos Fusion on or after a certain date or time, which is entered in the YYYY-MM-DD.HH:MM:SS format.

To display unprovisioned satellite device information for all satellite devices unprovisioned since a specified date, enter the specific date as the *time* as the *time*. For instance, **2015-12-22**.

To display unprovisioned satellite device information for all satellite devices added since a specified time, enter the specific date and time as the *time*. For instance, **2015-12-22.11:01:00**.

**Required Privilege Level** view



- Related Documentation**
- [Configuring or Expanding a Junos Fusion Enterprise](#)
  - [Configuring Junos Fusion Provider Edge on page 41](#)

**List of Sample Output** [show chassis satellite unprovision on page 470](#)  
[show chassis satellite unprovision detail on page 471](#)

**Output Fields** [Table 25 on page 469](#) lists the output fields for the **show chassis satellite unprovision** command. Output fields are listed in the approximate order in which they appear.

*Table 25: show chassis satellite unprovision Output Fields*

| Field Name                           | Field Description   | Level of Output            |
|--------------------------------------|---|----------------------------|
| <b>System-Id</b>                     | The MAC address of the satellite device.  | brief<br>extensive<br>none |
| <b>Serial-Number</b>                 | The serial number of the satellite device.  | brief<br>extensive<br>none |
| <b>Device State</b>                  | The device state of the unprovisioned satellite device.                                 | brief<br>extensive<br>none |
| <b>Cascade Ports</b>                 | The cascade ports on the aggregation device that are connected to the satellite device. | brief<br>extensive<br>none |
| <b>Port State</b>                    | The port state of the cascade port.   | brief<br>extensive<br>none |
| <b>Operational State</b>             | The operational state of the satellite device.  | detail                     |
| <b>Product Model</b>                 | The product model of the satellite device.  | detail                     |
| <b>Product Family</b>                | The product family of the satellite device.   | detail                     |
| <b>Serial number</b>                 | The serial number of the satellite device.  | detail                     |
| <b>System id</b>                     | The MAC address of the satellite device.  | detail                     |
| <b>Software package version</b>      | The satellite software package version running on the satellite device.                 | detail                     |
| <b>Host software version</b>         | The host software version.  | detail                     |
| <b>Fields for Cascade interfaces</b> |   |                            |
| <b>Interface Name</b>                | The interface name of the cascade port on the aggregation device.                       | detail                     |

Table 25: show chassis satellite unprovision Output Fields (continued)

| Field Name                            | Field Description   | Level of Output |
|---------------------------------------|---|-----------------|
| <b>State</b>                          | The state of the cascade port.  | detail          |
| <b>Uplink Interface</b>               | The uplink interface name. The uplink interface is the interface on the satellite device that connects to the aggregation device. | detail          |
| <b>Adjacency State</b>                | The adjacency state of the uplink interface to cascade port link.   | detail          |
| <b>Last transition</b>                | The amount of time that has passed since the last link transition.  | detail          |
| <b>Adjacency down count</b>           | The number of times that the uplink interface to cascade port link has gone into the adjacency down count.                        | detail          |
| <b>Rx Packet</b>                      | The number of received packets.   | detail          |
| <b>Last received packet</b>           | The amount of time that has passed since the last received packet.  | detail          |
| <b>Peer adjacency information</b>     | The amount of time that the adjacency has been active.  | detail          |
| <b>Last down cause</b>                | The cause of the last time the adjacency went down.   | detail          |
| <b>SDPD restart detected</b>          | The number of times that the SDPD has restarted.  | detail          |
| <b>Fields for process information</b> |   |                 |
| <b>Process Name</b>                   | The name of the process.  | detail          |
| <b>PID</b>                            | The PID of the process.   | detail          |
| <b>State</b>                          | The current state of the process.   | detail          |
| <b>Number of restart detected</b>     | The number of times that the process has restarted.   | detail          |
| <b>Uptime</b>                         | The amount of time that the process has been active.  | detail          |
| <b>When</b>                           | The date and time of the event.   | extensive       |
| <b>Event</b>                          | The event.  | extensive       |
| <b>Action</b>                         | The actions that resulted from the event.   | extensive       |

## Sample Output

### show chassis satellite unprovision

```
user@aggregation-device> show chassis satellite unprovision
```

| System-Id         | Serial-Number | Device State | Cascade Ports | Port State |
|-------------------|---------------|--------------|---------------|------------|
| AA:BB:CC:aa:bb:cc | TABCDE111111  | Present      | xe-0/0/1      | present    |
|                   |               |              | xe-0/1/2      | present    |
| AA:BB:CC:aa:bb:zz | PABCDE111111  | Present      | xe-0/0/2      | present    |
|                   |               |              | xe-0/3/2      | present    |

## Sample Output

### show chassis satellite unprovision detail

```
user@aggregation-device> show chassis satellite unprovision detail
```

```
Operational State: Present
Product Model: QFX5100-48S-6Q
Product Family: i386
Serial number: TABCDE111111
System id: AA:BB:CC:aa:bb:cc
Software package version: 3.0R1
Host software version: 0.2.3
Cascade interfaces:
  Interface Name: xe-0/0/1 State: present
    Uplink Interface: xe-0/0/25
    Adjacency state: Two-Way
    Last transition: 3d 22:06:55
    Adjacency down count: 0
    Rx Packet: 33875 Last received packet: 00:00:09
    Peer adjacency information: 3d 22:06:55
      Adjacency down count: 3
      Last down cause: TTL is 0
      SDPD restart detected: 3
  Interface Name: xe-0/1/2 State: present
    Uplink Interface: xe-0/0/24
    Adjacency state: Two-Way
    Last transition: 3d 22:06:58
    Adjacency down count: 0
    Rx Packet: 33875 Last received packet: 00:00:09
    Peer adjacency information: 3d 22:06:58
      Adjacency down count: 5
      Last down cause: TTL is 0
      SDPD restart detected: 3
Process information:
  Process Name: Provisioning PID: 2488 State: Running
    Number of restart detected: 0
    Uptime: 3d 22:06:58
  Process Name: PFE PID: 2631 State: Running
    Number of restart detected: 0
    Uptime: 3d 22:06:58
Operational State: Present
Product Model: EX4300-48T
Product Family: ppc
Serial number: PABCDE111111
System id: AA:BB:CC:aa:bb:zz
Software package version: 3.0R1
Host software version: 0.2.4
Cascade interfaces:
  Interface Name: xe-0/0/2 State: present
    Uplink Interface: xe-0/2/1
    Adjacency state: Two-Way
    Last transition: 3d 22:06:56
```

```
Adjacency down count: 0
Rx Packet: 33876 Last received packet: 00:00:05
Peer adjacency information: 3d 22:06:56
  Adjacency down count: 1
  Last down cause: TTL is 0
  SDPD restart detected: 2
Interface Name: xe-0/3/2 State: present
Uplink Interface: xe-0/2/0
Adjacency state: Two-Way
Last transition: 3d 22:06:57
Adjacency down count: 0
Rx Packet: 33876 Last received packet: 00:00:05
Peer adjacency information: 3d 22:06:57
  Adjacency down count: 3
  Last down cause: TTL is 0
  SDPD restart detected: 2
Process information:
  Process Name: Provisioning PID: 1603 State: Running
  Number of restart detected: 0
  Uptime: 3d 22:06:57
  Process Name: PFE PID: 1615 State: Running
  Number of restart detected: 0
  Uptime: 3d 22:06:57
```

## show chassis satellite upgrade-group

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>show chassis satellite upgrade-group &lt;upgrade-group-name&gt; [ brief   detail   extensive   terse]</pre>  |
| <b>Release Information</b>      | <p>Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.</p> <p>Command introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.</p> <p>Command introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.</p>   |
| <b>Description</b>              | <p>Display information about the satellite software upgrade groups for the Junos Fusion.</p> <p>A satellite software upgrade group is a group of satellite devices that are updated at the same time to the same version of the satellite software. One Junos Fusion can contain multiple software upgrade groups, and multiple software upgrade groups should be configured in most Junos Fusions to avoid network downtimes during satellite software installations.</p> <p>A satellite software upgrade group that contains all satellite devices in a satellite device cluster is automatically created when a satellite device cluster is configured. The software upgrade group name for these automatically created software upgrade groups is the cluster name.</p> |
| <b>Options</b>                  | <p><b>none</b>—(Same as <b>brief</b> and <b>terse</b>) Display satellite software upgrade group information for all satellite software upgrade groups.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>upgrade-group-name</b>—Display satellite software upgrade group information for the specified satellite software upgrade group only.</p> <p>The satellite software upgrade group name is set using the <b>set chassis satellite-management upgrade-groups upgrade-group-name</b> statement for standalone satellite devices and is the cluster name for satellite device clusters.</p>  |
| <b>Required Privilege Level</b> | view  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring or Expanding a Junos Fusion Enterprise</a></li> <li>• <a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li> </ul>   |
| <b>List of Sample Output</b>    | <p><a href="#">show chassis satellite upgrade-group on page 475</a></p> <p><a href="#">show chassis satellite upgrade-group detail on page 475</a></p>  |
| <b>Output Fields</b>            | <p><a href="#">Table 26 on page 474</a> lists the output fields for the <b>show chassis satellite upgrade-group</b> command. Output fields are listed in the approximate order in which they appear.</p>  |

Table 26: show chassis satellite upgrade-group Output Fields

| Field Name                               | Field Description  | Level of Output  |
|--|--|--|
| Fields for Interface                     |  |  |
| <b>Group</b>                             | <p>The satellite software upgrade group name.</p> <p>The satellite software upgrade group name is the name of the satellite device cluster when used with a satellite device cluster. A satellite software upgrade group with the name of the satellite device cluster is created automatically when a satellite device cluster is configured.</p> <p>The satellite software upgrade group name is set using the <b>set chassis satellite-management upgrade-groups upgrade-group-name</b> statement for standalone satellite devices.</p> | <p>brief</p> <p>terse</p> <p>extensive</p> <p>none</p>               |
| <b>Sw-Version</b>                        | The version of satellite software associated with the satellite software upgrade group.  | <p>brief</p> <p>terse</p> <p>extensive</p> <p>none</p>               |
| <b>Group State</b>                       | The state of the satellite software upgrade group.   | <p>brief</p> <p>terse</p> <p>extensive</p> <p>none</p>               |
| <b>Slot</b>                              | The FPC slot identification number of the satellite device that is a member of the satellite software upgrade group.   | <p>brief</p> <p>terse</p> <p>detail</p> <p>extensive</p> <p>none</p> |
| <b>Device State</b>                      | <p>The state of the satellite software for the specified member of the satellite software upgrade group.</p> <p>The <b>version-in-sync</b> output appears when the satellite device is running the satellite software version that is associated with the satellite software upgrade group.</p>  | <p>brief</p> <p>terse</p> <p>detail</p> <p>extensive</p> <p>none</p> |
| <b>Software upgrade group</b>            | The name of the satellite software upgrade group.  | detail   |
| <b>Software package version</b>          | The satellite software package associated with the satellite software upgrade group.   | detail   |
| <b>Previous software package version</b> | <p>The satellite software package that was previously associated with the satellite software upgrade group.</p> <p>This output only appears if the satellite software upgrade group was previously associated with another version of satellite software.</p>  | detail   |

## Sample Output

### show chassis satellite upgrade-group

```
user@aggregation-device> show chassis satellite upgrade-group
```

| Group                   | Sw-Version | Group State | Slot | Device State    |
|-------------------------|------------|-------------|------|-----------------|
| __ungrouped__<br>ex4300 | 3.0R1.0    | in-sync     | 107  | version-in-sync |
|                         |            |             | 108  | version-in-sync |
|                         |            |             | 109  | version-in-sync |
|                         |            |             | 110  | version-in-sync |
|                         |            |             | 111  | version-in-sync |
|                         |            |             | 112  | version-in-sync |
| qfx                     | 3.0R1.0    | in-sync     | 113  | version-in-sync |
|                         |            |             | 102  | version-in-sync |
|                         |            |             | 103  | version-in-sync |
|                         |            |             | 104  | version-in-sync |
|                         |            |             | 105  | version-in-sync |
|                         |            |             | 106  | version-in-sync |
|                         |            |             | 114  | version-in-sync |

## Sample Output

### show chassis satellite upgrade-group detail

```
user@aggregation-device> show chassis satellite upgrade-group detail
```

```
Software upgrade group: ex4300
Software package version: 3.0R1.0
Previous software package version: 3.0R1.1
Slot  Device State
107   version-in-sync
108   version-in-sync
109   version-in-sync
110   version-in-sync
111   version-in-sync
112   version-in-sync
113   version-in-sync

Software upgrade group: qfx
Software package version: 3.0R1.0
Slot  Device State
102   version-in-sync
103   version-in-sync
104   version-in-sync
105   version-in-sync
```

|     |                 |
|-----|-----------------|
| 106 | version-in-sync |
| 114 | version-in-sync |



## show chassis temperature-thresholds

**List of Syntax**    [Syntax on page 477](#)  
                          [Syntax \(TX Matrix Routers\) on page 477](#)  
                          [Syntax \(TX Matrix Plus Routers\) on page 477](#)  
                          [Syntax \(MX Series Routers\) on page 477](#)  
                          [Syntax \(MX104, MX204, MX2010, MX2020, MX10003, MX10008, and MX2008 Universal Routing Platforms\) on page 477](#)  
                          [Syntax \(QFX Series\) on page 477](#)  
                          [Syntax \(PTX Series\) on page 477](#)  
                          [Syntax \(EX9251, EX9253 Switches\) on page 477](#)

**Syntax**    show chassis temperature-thresholds

**Syntax (TX Matrix Routers)**    show chassis temperature-thresholds  
    <lcc *number* | scc>

**Syntax (TX Matrix Plus Routers)**    show chassis temperature-thresholds  
    <lcc *number* | sfc *number*>

**Syntax (MX Series Routers)**    show chassis temperature-thresholds  
    <all-members>  
    <local>  
    <member *member-id*>  
    <satellite [slot-id *slot-ID* | device-alias *alias-name*]>

**Syntax (MX104, MX204, MX2010, MX2020, MX10003, MX10008, and MX2008 Universal Routing Platforms)**    show chassis temperature-thresholds

**Syntax (QFX Series)**    show chassis temperature-thresholds  
    <interconnect-device *name*>  
    <node-device *name*>

**Syntax (PTX Series)**    show chassis temperature-thresholds

**Syntax (EX9251, EX9253 Switches)**    show chassis temperature-thresholds

|                            |  |
|----------------------------|--|
| <b>Release Information</b> | <p>Command introduced in Junos OS Release 8.0.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>sfc</b> command introduced in Junos OS Release 9.6 for the TX Matrix Plus router.</p> <p>Command introduced in Junos OS Release 11.1 for QFX Series.</p> <p>Command introduced in Junos OS Release 12.1 for T4000 Core Routers.</p> <p>Command introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers.</p> <p>Command introduced in Junos OS Release 12.3 for MX2010 and MX2020 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 13.2 for MX104 Universal Routing Platforms.</p> <p><b>satellite</b> option introduced in Junos OS Release 14.2R3.</p> <p>Command introduced in Junos OS Release 17.2 for MX2008 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 17.2 for PTX10008 Routers.</p> <p>Command introduced in Junos OS Release 17.3 for MX10003 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 17.3 for MX150 Router Appliance.</p> <p>Command introduced in Junos OS Release 17.4 for MX204 Universal Routing Platforms.</p> <p>Command introduced in Junos OS Release 18.1R1 for EX9251 switches.</p> <p>Command introduced in Junos OS Release 18.2 for EX9253 Switches.</p> <p>Command introduced in Junos OS Release 18.2R1 for MX10008 Routers.</p> |
| <b>Description</b>         | Display chassis temperature threshold settings, in degrees Celsius.  |
| <b>Options</b>             | <p><b>none</b>—Display the temperature threshold details.</p> <p><b>all-members</b>—(MX Series routers only) (Optional) Display the chassis temperature threshold settings of all member routers in the Virtual Chassis configuration.</p> <p><b>interconnect-device <i>name</i></b>—(QFabric systems only) (Optional) Display the chassis temperature threshold settings of the Interconnect device.</p> <p><b>lcc <i>number</i></b>—(TX Matrix and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display the temperature threshold details of a specified T640 router (line-card chassis) that is connected to a TX Matrix router. On a TX Matrix Plus router, display the temperature threshold details of a specified router (line-card chassis) that is connected to a TX Matrix Plus router.</p> <p>Replace <i>number</i> with the following values depending on the LCC configuration:</p> <ul style="list-style-type: none"><li>• 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.</li><li>• 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.</li><li>• 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.</li><li>• 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.</li></ul> |

**local**—(MX Series routers only) (Optional) Display the chassis temperature threshold settings of the local Virtual Chassis member.

**member *member-id***—(MX Series routers only) (Optional) Display the chassis temperature threshold settings of 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 the chassis temperature threshold settings of the Node device.

**satellite [*slot-id slot-ID* | device-alias *alias-name*]**—(Junos Fusion only) (Optional) Display the chassis temperature threshold settings for the specified satellite device or devices in a Junos Fusion, or for all satellite devices if no satellite devices are specified.

**scc**—(TX Matrix routers only) (Optional) Display the temperature threshold details of the TX Matrix router (switch-card chassis).

**sfc *number***—(TX Matrix Plus routers only) (Optional) On TX Matrix Plus routers, display the temperature threshold details of the TX Matrix Plus router, which is the switch-fabric chassis. Replace *number* with 0.

**Required Privilege Level** view

**List of Sample Output**

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- [show chassis temperature-thresholds \(MX150\) on page 481](#)
- [show chassis temperature-thresholds \(MX104 Router\) on page 481](#)
- [show chassis temperature-thresholds \(MX240, MX480, MX960 Routers with Application Services Modular Line Card\) on page 482](#)
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- [show chassis temperature-thresholds \(QFX3500 Switch and QFX3600\) on page 514](#)
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- [show chassis temperature-thresholds \(PTX5000 Packet Transport Router\) on page 514](#)

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**Output Fields** Table 27 on page 480 lists the output fields for the **show chassis temperature-thresholds** command. Output fields are listed in the approximate order in which they appear.

*Table 27: show chassis temperature-thresholds Output Fields*

| Field name    | Field Description  |
|---------------|--|
| Item          | Chassis component. If per FRU per slot thresholds are configured, the components about which information is displayed include the chassis, the Routing Engines, FPCs, and FEBs. If per FRU per slot thresholds are not configured, the components about which information is displayed include the chassis and the Routing Engines.  |
| Fan speed     | <p><b>NOTE:</b> On the QFX3500 switch and QFX3600 switch, there are four fan speeds: <b>low</b>, <b>medium-low</b>, <b>medium-high</b>, and <b>high</b>. The fan speed changes at the threshold when going from a low speed to a higher speed. When the fan speed changes from a higher speed to a lower speed, the temperature changes two degrees below the threshold.</p> <p>Temperature threshold settings, in degrees Celsius, for the fans to operate at normal and high speeds.</p> <ul style="list-style-type: none"> <li>Normal—The fans operate at normal speed if the component is at or below this temperature and all the fans are present and functioning normally.</li> </ul> <p><b>NOTE:</b> On a TX Matrix Plus router with 3D SIBs, the threshold temperature at the XF junction is set to 70°C for <b>Normal</b> fan speed, which is less than or equal to 4800 RPM.</p> <ul style="list-style-type: none"> <li>High—The fans operate at high speed if the component has exceeded this temperature or a fan has failed or is missing.</li> </ul> <p><b>NOTE:</b> On a TX Matrix Plus router with 3D SIBs, the threshold temperature at the XF junction is set to 75°C for <b>High</b> fan speed, which is greater than or equal to 5000 RPM.</p> <p><b>NOTE:</b> For MX480 Routers, there are three fan speeds: Low, Medium, and High.</p> <p>An alarm is not triggered until the temperature exceeds the threshold settings for a yellow alarm or a red alarm.</p> |
| Yellow alarm  | <p>Temperature threshold settings, in degrees Celsius, that trigger a yellow alarm.</p> <ul style="list-style-type: none"> <li>Normal—The temperature that must be exceeded on the component to trigger a yellow alarm when the fans are running at full speed.</li> <li>Bad fan—The temperature that must be exceeded on the component to trigger a yellow alarm when one or more fans have failed or are missing.</li> </ul>   |
| Red alarm     | <p>Temperature threshold settings, in degrees Celsius, that trigger a red alarm.</p> <ul style="list-style-type: none"> <li>Normal—The temperature that must be exceeded on the component to trigger a red alarm when the fans are running at full speed.</li> <li>Bad fan—The temperature that must be exceeded on the component to trigger a red alarm when one or more fans have failed or are missing.</li> </ul>  |
| Fire Shutdown | (T4000 routers, TX Matrix Plus router with 3D SIBs, and PTX Series Packet Transport Routers only)—Temperature threshold settings, in degrees Celsius, for the network device to shut down.   |

## Sample Output

### show chassis temperature-thresholds

```
user@host> show chassis temperature-thresholds
```

| Item             | Fan speed<br>(degrees C) |      | Yellow alarm<br>(degrees C) |         | Red alarm<br>(degrees C) |         |
|------------------|--------------------------|------|-----------------------------|---------|--------------------------|---------|
|                  | Normal                   | High | Normal                      | Bad fan | Normal                   | Bad fan |
| Chassis default  | 48                       | 54   | 65                          | 55      | 75                       | 65      |
| Routing Engine 0 | 70                       | 80   | 95                          | 95      | 110                      | 110     |
| Routing Engine 1 | 70                       | 80   | 95                          | 95      | 110                      | 110     |
| FPC 0            | 55                       | 60   | 75                          | 65      | 90                       | 80      |
| FPC 1            | 55                       | 60   | 75                          | 65      | 90                       | 80      |
| FPC 2            | 55                       | 60   | 75                          | 65      | 90                       | 80      |
| FPC 3            | 55                       | 60   | 75                          | 65      | 90                       | 80      |
| FPC 4            | 55                       | 60   | 75                          | 65      | 90                       | 80      |
| FPC 5            | 55                       | 60   | 75                          | 65      | 90                       | 80      |
| FPC 6            | 55                       | 60   | 75                          | 65      | 90                       | 80      |
| FPC 7            | 55                       | 60   | 75                          | 65      | 90                       | 80      |
| FPC 8            | 55                       | 60   | 75                          | 65      | 90                       | 80      |
| FPC 9            | 55                       | 60   | 75                          | 65      | 90                       | 80      |
| FPC 10           | 55                       | 60   | 75                          | 65      | 90                       | 80      |
| FPC 11           | 55                       | 60   | 75                          | 65      | 90                       | 80      |

### show chassis temperature-thresholds (MX150)

```
user@host> show chassis temperature-thresholds
```

| Item           | Fan speed<br>(degrees C) |      | Yellow alarm<br>(degrees C) |      | Red alarm<br>(degrees C) |         | Fire Shutdown<br>(degrees C) |         |
|----------------|--------------------------|------|-----------------------------|------|--------------------------|---------|------------------------------|---------|
|                | Normal                   | High | Normal                      | High | Normal                   | Bad fan | Normal                       | Bad fan |
| FPC 0 Sensor 1 | 43                       | 65   | 68                          | 68   | 70                       | 70      |                              |         |
| FPC 0 Sensor 2 | 43                       | 65   | 68                          | 68   | 70                       | 70      |                              |         |
| FPC 0 Coretemp | 78                       | 94   | 100                         | 100  | 105                      | 105     |                              |         |

### show chassis temperature-thresholds (MX104 Router)

```
user@host> show chassis temperature-thresholds
```

| Item             | Fan speed<br>(degrees C) |      | Yellow alarm<br>(degrees C) |      | Red alarm<br>(degrees C) |         | Fire Shutdown<br>(degrees C) |         |
|------------------|--------------------------|------|-----------------------------|------|--------------------------|---------|------------------------------|---------|
|                  | Normal                   | High | Normal                      | High | Normal                   | Bad fan | Normal                       | Bad fan |
| Chassis default  | 48                       | 54   | 65                          | 55   | 75                       | 65      |                              |         |
| Routing Engine 0 | 55                       | 80   | 95                          | 95   | 105                      | 100     |                              |         |

### show chassis temperature-thresholds (MX240, MX480, MX960 Routers with Application Services Modular Line Card)

```
user@host> show chassis temperature-thresholds
```

| Fan speed<br>(degrees C) | Yellow alarm<br>(degrees C) |      | Red alarm<br>(degrees C) |         | Fire Shutdown<br>(degrees C) |         |
|--------------------------|-----------------------------|------|--------------------------|---------|------------------------------|---------|
|                          | Normal                      | High | Normal                   | Bad fan | Normal                       | Bad fan |
| Item                     |                             |      |                          |         |                              |         |
| Normal                   |                             |      |                          |         |                              |         |
| Chassis default          | 48                          | 54   | 65                       | 55      | 75                           | 65      |
| 100                      |                             |      |                          |         |                              |         |
| Routing Engine 0         | 70                          | 80   | 95                       | 95      | 110                          | 110     |
| 112                      |                             |      |                          |         |                              |         |
| Routing Engine 1         | 70                          | 80   | 95                       | 95      | 110                          | 110     |
| 112                      |                             |      |                          |         |                              |         |
| FPC 0                    | 55                          | 60   | 75                       | 65      | 90                           | 80      |
| 95                       |                             |      |                          |         |                              |         |
| FPC 1                    | 55                          | 60   | 75                       | 65      | 90                           | 80      |
| 95                       |                             |      |                          |         |                              |         |
| FPC 2                    | 55                          | 60   | 75                       | 65      | 90                           | 80      |
| 95                       |                             |      |                          |         |                              |         |
| FPC 4                    | 55                          | 60   | 75                       | 65      | 90                           | 80      |
| 95                       |                             |      |                          |         |                              |         |
| FPC 5                    | 55                          | 60   | 75                       | 65      | 90                           | 80      |
| 95                       |                             |      |                          |         |                              |         |

### show chassis temperature-thresholds (MX480 Router with MPC4E)

```
user@ host> show chassis temperature-thresholds
```

| Fan speed<br>(degrees C) | Yellow alarm<br>(degrees C) |      | Red alarm<br>(degrees C) |         | Fire Shutdown<br>(degrees C) |         |
|--------------------------|-----------------------------|------|--------------------------|---------|------------------------------|---------|
|                          | Normal                      | High | Normal                   | Bad fan | Normal                       | Bad fan |
| Item                     |                             |      |                          |         |                              |         |
| Normal                   |                             |      |                          |         |                              |         |
| Chassis default          | 48                          | 54   | 65                       | 55      | 75                           | 65      |
| 100                      |                             |      |                          |         |                              |         |
| Routing Engine 0         | 70                          | 80   | 95                       | 95      | 110                          | 110     |
| 112                      |                             |      |                          |         |                              |         |
| Routing Engine 1         | 70                          | 80   | 95                       | 95      | 110                          | 110     |
| 112                      |                             |      |                          |         |                              |         |
| FPC 2                    | 55                          | 60   | 75                       | 65      | 95                           | 80      |
| 100                      |                             |      |                          |         |                              |         |
| FPC 3                    | 55                          | 60   | 75                       | 65      | 95                           | 80      |
| 100                      |                             |      |                          |         |                              |         |
| FPC 4                    | 55                          | 60   | 75                       | 65      | 90                           | 80      |
| 95                       |                             |      |                          |         |                              |         |

### show chassis temperature-thresholds (MX2010 Router with MPC7E, MPC8E, and MPC9E)

```
user@ host> show chassis temperature-thresholds
```

| Fire Shutdown<br>(degrees C) | Fan speed<br>(degrees C) |      | Yellow alarm<br>(degrees C) |         | Red alarm<br>(degrees C) |         |
|------------------------------|--------------------------|------|-----------------------------|---------|--------------------------|---------|
|                              | Normal                   | High | Normal                      | Bad fan | Normal                   | Bad fan |
| Item                         |                          |      |                             |         |                          |         |
| Bad fan                      |                          |      |                             |         |                          |         |
| Normal                       |                          |      |                             |         |                          |         |

|                          |    |    |     |     |     |
|--------------------------|----|----|-----|-----|-----|
| FPC 3 Intake             | 53 | 59 | 72  | 67  | 80  |
| 75 85                    |    |    |     |     |     |
| FPC 3 Exhaust A          | 77 | 85 | 98  | 93  | 103 |
| 98 108                   |    |    |     |     |     |
| FPC 3 Exhaust B          | 54 | 62 | 80  | 75  | 103 |
| 98 108                   |    |    |     |     |     |
| FPC 3 EA0 Chip           | 64 | 72 | 90  | 90  | 100 |
| 100 105                  |    |    |     |     |     |
| FPC 3 EA0_XR0 Chip       | 79 | 87 | 102 | 102 | 106 |
| 106 108                  |    |    |     |     |     |
| FPC 3 EA0_XR1 Chip       | 79 | 87 | 102 | 102 | 106 |
| 106 108                  |    |    |     |     |     |
| FPC 3 EA1 Chip           | 64 | 72 | 90  | 90  | 100 |
| 100 105                  |    |    |     |     |     |
| FPC 3 EA1_XR0 Chip       | 79 | 87 | 102 | 102 | 106 |
| 106 108                  |    |    |     |     |     |
| FPC 3 EA1_XR1 Chip       | 79 | 87 | 102 | 102 | 106 |
| 106 108                  |    |    |     |     |     |
| FPC 3 PEX Chip           | 74 | 82 | 100 | 100 | 105 |
| 105 110                  |    |    |     |     |     |
| FPC 3 EA2 Chip           | 64 | 72 | 90  | 90  | 100 |
| 100 105                  |    |    |     |     |     |
| FPC 3 EA2_XR0 Chip       | 79 | 87 | 102 | 102 | 106 |
| 106 108                  |    |    |     |     |     |
| FPC 3 EA2_XR1 Chip       | 79 | 87 | 102 | 102 | 106 |
| 106 108                  |    |    |     |     |     |
| FPC 3 EA3 Chip           | 64 | 72 | 90  | 90  | 100 |
| 100 105                  |    |    |     |     |     |
| FPC 3 EA3_XR0 Chip       | 79 | 87 | 102 | 102 | 106 |
| 106 108                  |    |    |     |     |     |
| FPC 3 EA3_XR1 Chip       | 79 | 87 | 102 | 102 | 106 |
| 106 108                  |    |    |     |     |     |
| FPC 3 EA0_HMC0 Logic die | 81 | 89 | 103 | 103 | 107 |
| 107 111                  |    |    |     |     |     |
| FPC 3 EA0_HMC0 DRAM botm | 76 | 84 | 98  | 98  | 102 |
| 102 106                  |    |    |     |     |     |
| FPC 3 EA0_HMC1 Logic die | 81 | 89 | 103 | 103 | 107 |
| 107 111                  |    |    |     |     |     |
| FPC 3 EA0_HMC1 DRAM botm | 76 | 84 | 98  | 98  | 102 |
| 102 106                  |    |    |     |     |     |
| FPC 3 EA0_HMC2 Logic die | 81 | 89 | 103 | 103 | 107 |
| 107 111                  |    |    |     |     |     |
| FPC 3 EA0_HMC2 DRAM botm | 76 | 84 | 98  | 98  | 102 |
| 102 106                  |    |    |     |     |     |
| FPC 3 EA1_HMC0 Logic die | 81 | 89 | 103 | 103 | 107 |
| 107 111                  |    |    |     |     |     |
| FPC 3 EA1_HMC0 DRAM botm | 76 | 84 | 98  | 98  | 102 |
| 102 106                  |    |    |     |     |     |
| FPC 3 EA1_HMC1 Logic die | 81 | 89 | 103 | 103 | 107 |
| 107 111                  |    |    |     |     |     |
| FPC 3 EA1_HMC1 DRAM botm | 76 | 84 | 98  | 98  | 102 |
| 102 106                  |    |    |     |     |     |
| FPC 3 EA1_HMC2 Logic die | 81 | 89 | 103 | 103 | 107 |
| 107 111                  |    |    |     |     |     |
| FPC 3 EA1_HMC2 DRAM botm | 76 | 84 | 98  | 98  | 102 |
| 102 106                  |    |    |     |     |     |
| FPC 3 EA2_HMC0 Logic die | 81 | 89 | 103 | 103 | 107 |
| 107 111                  |    |    |     |     |     |
| FPC 3 EA2_HMC0 DRAM botm | 76 | 84 | 98  | 98  | 102 |
| 102 106                  |    |    |     |     |     |

|                                     |    |    |     |     |     |
|-------------------------------------|----|----|-----|-----|-----|
| FPC 3 EA2_HMC1 Logic die<br>107 111 | 81 | 89 | 103 | 103 | 107 |
| FPC 3 EA2_HMC1 DRAM botm<br>102 106 | 76 | 84 | 98  | 98  | 102 |
| FPC 3 EA2_HMC2 Logic die<br>107 111 | 81 | 89 | 103 | 103 | 107 |
| FPC 3 EA2_HMC2 DRAM botm<br>102 106 | 76 | 84 | 98  | 98  | 102 |
| FPC 3 EA3_HMC0 Logic die<br>107 111 | 81 | 89 | 103 | 103 | 107 |
| FPC 3 EA3_HMC0 DRAM botm<br>102 106 | 76 | 84 | 98  | 98  | 102 |
| FPC 3 EA3_HMC1 Logic die<br>107 111 | 81 | 89 | 103 | 103 | 107 |
| FPC 3 EA3_HMC1 DRAM botm<br>102 106 | 76 | 84 | 98  | 98  | 102 |
| FPC 3 EA3_HMC2 Logic die<br>107 111 | 81 | 89 | 103 | 103 | 107 |
| FPC 3 EA3_HMC2 DRAM botm<br>102 106 | 76 | 84 | 98  | 98  | 102 |
| FPC 4 Intake<br>76 90               | 46 | 55 | 65  | 60  | 81  |
| FPC 4 Exhaust A<br>95 110           | 61 | 70 | 80  | 75  | 100 |
| FPC 4 Exhaust B<br>90 105           | 61 | 70 | 80  | 75  | 95  |
| FPC 4 EA0 Chip<br>112 123           | 86 | 95 | 105 | 100 | 117 |
| FPC 4 EA0_XR0 Chip<br>105 116       | 86 | 95 | 105 | 100 | 110 |
| FPC 4 EA0_XR1 Chip<br>110 121       | 86 | 95 | 105 | 100 | 115 |
| FPC 4 EA1 Chip<br>112 123           | 86 | 95 | 105 | 100 | 117 |
| FPC 4 EA1_XR0 Chip<br>105 116       | 86 | 95 | 105 | 100 | 110 |
| FPC 4 EA1_XR1 Chip<br>110 121       | 86 | 95 | 105 | 100 | 115 |
| FPC 4 PCIE_SW Chip<br>110 121       | 81 | 90 | 105 | 100 | 115 |
| FPC 4 EA0_HMC0 DRAM botm<br>110 121 | 86 | 95 | 105 | 100 | 115 |
| FPC 4 EA0_HMC1 DRAM botm<br>110 121 | 86 | 95 | 105 | 100 | 115 |
| FPC 4 EA1_HMC0 DRAM botm<br>110 121 | 86 | 95 | 105 | 100 | 115 |
| FPC 4 EA1_HMC1 DRAM botm<br>110 121 | 86 | 95 | 105 | 100 | 115 |
| FPC 7 Intake<br>75 85               | 53 | 59 | 72  | 67  | 80  |
| FPC 7 Exhaust A<br>98 108           | 77 | 85 | 98  | 93  | 103 |
| FPC 7 Exhaust B<br>98 108           | 54 | 62 | 80  | 75  | 103 |
| FPC 7 EA0 Chip<br>100 105           | 64 | 72 | 90  | 90  | 100 |
| FPC 7 EA0_XR0 Chip<br>106 108       | 79 | 87 | 102 | 102 | 106 |
| FPC 7 EA0_XR1 Chip<br>106 108       | 79 | 87 | 102 | 102 | 106 |



|                          |    |    |     |     |     |
|--------------------------|----|----|-----|-----|-----|
| FPC 7 EA1 Chip           | 64 | 72 | 90  | 90  | 100 |
| 100 105                  |    |    |     |     |     |
| FPC 7 EA1_XR0 Chip       | 79 | 87 | 102 | 102 | 106 |
| 106 108                  |    |    |     |     |     |
| FPC 7 EA1_XR1 Chip       | 79 | 87 | 102 | 102 | 106 |
| 106 108                  |    |    |     |     |     |
| FPC 7 PEX Chip           | 74 | 82 | 100 | 100 | 105 |
| 105 110                  |    |    |     |     |     |
| FPC 7 EA2 Chip           | 64 | 72 | 90  | 90  | 100 |
| 100 105                  |    |    |     |     |     |
| FPC 7 EA2_XR0 Chip       | 79 | 87 | 102 | 102 | 106 |
| 106 108                  |    |    |     |     |     |
| FPC 7 EA2_XR1 Chip       | 79 | 87 | 102 | 102 | 106 |
| 106 108                  |    |    |     |     |     |
| FPC 7 EA3 Chip           | 64 | 72 | 90  | 90  | 100 |
| 100 105                  |    |    |     |     |     |
| FPC 7 EA3_XR0 Chip       | 79 | 87 | 102 | 102 | 106 |
| 106 108                  |    |    |     |     |     |
| FPC 7 EA3_XR1 Chip       | 79 | 87 | 102 | 102 | 106 |
| 106 108                  |    |    |     |     |     |
| FPC 7 EA0_HMC0 Logic die | 81 | 89 | 103 | 103 | 107 |
| 107 111                  |    |    |     |     |     |
| FPC 7 EA0_HMC0 DRAM botm | 76 | 84 | 98  | 98  | 102 |
| 102 106                  |    |    |     |     |     |
| FPC 7 EA0_HMC1 Logic die | 81 | 89 | 103 | 103 | 107 |
| 107 111                  |    |    |     |     |     |
| FPC 7 EA0_HMC1 DRAM botm | 76 | 84 | 98  | 98  | 102 |
| 102 106                  |    |    |     |     |     |
| FPC 7 EA0_HMC2 Logic die | 81 | 89 | 103 | 103 | 107 |
| 107 111                  |    |    |     |     |     |
| FPC 7 EA0_HMC2 DRAM botm | 76 | 84 | 98  | 98  | 102 |
| 102 106                  |    |    |     |     |     |
| FPC 7 EA1_HMC0 Logic die | 81 | 89 | 103 | 103 | 107 |
| 107 111                  |    |    |     |     |     |
| FPC 7 EA1_HMC0 DRAM botm | 76 | 84 | 98  | 98  | 102 |
| 102 106                  |    |    |     |     |     |
| FPC 7 EA1_HMC1 Logic die | 81 | 89 | 103 | 103 | 107 |
| 107 111                  |    |    |     |     |     |
| FPC 7 EA1_HMC1 DRAM botm | 76 | 84 | 98  | 98  | 102 |
| 102 106                  |    |    |     |     |     |
| FPC 7 EA1_HMC2 Logic die | 81 | 89 | 103 | 103 | 107 |
| 107 111                  |    |    |     |     |     |
| FPC 7 EA1_HMC2 DRAM botm | 76 | 84 | 98  | 98  | 102 |
| 102 106                  |    |    |     |     |     |
| FPC 7 EA2_HMC0 Logic die | 81 | 89 | 103 | 103 | 107 |
| 107 111                  |    |    |     |     |     |
| FPC 7 EA2_HMC0 DRAM botm | 76 | 84 | 98  | 98  | 102 |
| 102 106                  |    |    |     |     |     |
| FPC 7 EA2_HMC1 Logic die | 81 | 89 | 103 | 103 | 107 |
| 107 111                  |    |    |     |     |     |
| FPC 7 EA2_HMC1 DRAM botm | 76 | 84 | 98  | 98  | 102 |
| 102 106                  |    |    |     |     |     |
| FPC 7 EA2_HMC2 Logic die | 81 | 89 | 103 | 103 | 107 |
| 107 111                  |    |    |     |     |     |
| FPC 7 EA2_HMC2 DRAM botm | 76 | 84 | 98  | 98  | 102 |
| 102 106                  |    |    |     |     |     |
| FPC 7 EA3_HMC0 Logic die | 81 | 89 | 103 | 103 | 107 |
| 107 111                  |    |    |     |     |     |
| FPC 7 EA3_HMC0 DRAM botm | 76 | 84 | 98  | 98  | 102 |
| 102 106                  |    |    |     |     |     |

|                          |    |    |     |     |     |
|--------------------------|----|----|-----|-----|-----|
| FPC 7 EA3_HMC1 Logic die | 81 | 89 | 103 | 103 | 107 |
| 107 111                  |    |    |     |     |     |
| FPC 7 EA3_HMC1 DRAM botm | 76 | 84 | 98  | 98  | 102 |
| 102 106                  |    |    |     |     |     |
| FPC 7 EA3_HMC2 Logic die | 81 | 89 | 103 | 103 | 107 |
| 107 111                  |    |    |     |     |     |
| FPC 7 EA3_HMC2 DRAM botm | 76 | 84 | 98  | 98  | 102 |
| 102 106                  |    |    |     |     |     |

As per the above output, the MPC7E, MPC8E, and MPC9E are installed in the FPC slots 4, 7, and 3, respectively.

### show chassis temperature-thresholds (MX2010 Router)

```
user@host> show chassis temperature-thresholds
```

| Item                | Fan speed<br>(degrees C) |      | Yellow alarm<br>(degrees C) |         | Red alarm<br>(degrees C) |         | Fire Shutdown<br>(degrees C) |  |
|---------------------|--------------------------|------|-----------------------------|---------|--------------------------|---------|------------------------------|--|
|                     | Normal                   | High | Normal                      | Bad fan | Normal                   | Bad fan | Normal                       |  |
| Routing Engine 0    | 70                       | 80   | 95                          | 95      | 110                      | 110     | 112                          |  |
| Routing Engine 1    | 70                       | 80   | 95                          | 95      | 110                      | 110     | 112                          |  |
| CB 0 IntakeA-Zone0  | 60                       | 65   | 78                          | 75      | 85                       | 80      | 95                           |  |
| CB 0 IntakeB-Zone1  | 60                       | 65   | 78                          | 75      | 85                       | 80      | 95                           |  |
| CB 0 IntakeC-Zone0  | 60                       | 65   | 78                          | 75      | 85                       | 80      | 95                           |  |
| CB 0 ExhaustA-Zone0 | 60                       | 65   | 78                          | 75      | 85                       | 80      | 95                           |  |
| CB 0 ExhaustB-Zone1 | 60                       | 65   | 78                          | 75      | 85                       | 80      | 95                           |  |
| CB 0 TCBC-Zone0     | 60                       | 65   | 78                          | 75      | 85                       | 80      | 95                           |  |
| CB 1 IntakeA-Zone0  | 60                       | 65   | 78                          | 75      | 85                       | 80      | 95                           |  |
| CB 1 IntakeB-Zone1  | 60                       | 65   | 78                          | 75      | 85                       | 80      | 95                           |  |
| CB 1 IntakeC-Zone0  | 60                       | 65   | 78                          | 75      | 85                       | 80      | 95                           |  |
| CB 1 ExhaustA-Zone0 | 60                       | 65   | 78                          | 75      | 85                       | 80      | 95                           |  |
| CB 1 ExhaustB-Zone1 | 60                       | 65   | 78                          | 75      | 85                       | 80      | 95                           |  |
| CB 1 TCBC-Zone0     | 60                       | 65   | 78                          | 75      | 85                       | 80      | 95                           |  |
| SPMB 0 Intake       | 56                       | 62   | 75                          | 63      | 83                       | 76      | 95                           |  |
| SPMB 1 Intake       | 56                       | 62   | 75                          | 63      | 83                       | 76      | 95                           |  |
| SFB 0 Intake-Zone0  | 56                       | 62   | 75                          | 63      | 82                       | 70      | 87                           |  |
| SFB 0 Exhaust-Zone1 | 56                       | 62   | 75                          | 63      | 82                       | 70      | 87                           |  |
| SFB 0 IntakeA-Zone0 | 56                       | 62   | 75                          | 63      | 82                       | 70      | 87                           |  |
| SFB 0 IntakeB-Zone1 | 56                       | 62   | 75                          | 63      | 82                       | 70      | 87                           |  |
| SFB 0 Exhaust-Zone0 | 56                       | 62   | 75                          | 63      | 82                       | 70      | 87                           |  |
| SFB 0 SFB-XF2-Zone1 | 70                       | 80   | 90                          | 90      | 107                      | 107     | 115                          |  |
| SFB 0 SFB-XF1-Zone0 | 70                       | 80   | 90                          | 90      | 107                      | 107     | 115                          |  |
| SFB 0 SFB-XF0-Zone0 | 70                       | 80   | 90                          | 90      | 107                      | 107     | 115                          |  |
| SFB 1 Intake-Zone0  | 56                       | 62   | 75                          | 63      | 82                       | 70      | 87                           |  |
| SFB 1 Exhaust-Zone1 | 56                       | 62   | 75                          | 63      | 82                       | 70      | 87                           |  |
| SFB 1 IntakeA-Zone0 | 56                       | 62   | 75                          | 63      | 82                       | 70      | 87                           |  |
| SFB 1 IntakeB-Zone1 | 56                       | 62   | 75                          | 63      | 82                       | 70      | 87                           |  |
| SFB 1 Exhaust-Zone0 | 56                       | 62   | 75                          | 63      | 82                       | 70      | 87                           |  |
| SFB 1 SFB-XF2-Zone1 | 70                       | 80   | 90                          | 90      | 107                      | 107     | 115                          |  |
| SFB 1 SFB-XF1-Zone0 | 70                       | 80   | 90                          | 90      | 107                      | 107     | 115                          |  |
| SFB 1 SFB-XF0-Zone0 | 70                       | 80   | 90                          | 90      | 107                      | 107     | 115                          |  |
| SFB 2 Intake-Zone0  | 56                       | 62   | 75                          | 63      | 82                       | 70      | 87                           |  |
| SFB 2 Exhaust-Zone1 | 56                       | 62   | 75                          | 63      | 82                       | 70      | 87                           |  |
| SFB 2 IntakeA-Zone0 | 56                       | 62   | 75                          | 63      | 82                       | 70      | 87                           |  |
| SFB 2 IntakeB-Zone1 | 56                       | 62   | 75                          | 63      | 82                       | 70      | 87                           |  |
| SFB 2 Exhaust-Zone0 | 56                       | 62   | 75                          | 63      | 82                       | 70      | 87                           |  |
| SFB 2 SFB-XF2-Zone1 | 70                       | 80   | 90                          | 90      | 107                      | 107     | 115                          |  |
| SFB 2 SFB-XF1-Zone0 | 70                       | 80   | 90                          | 90      | 107                      | 107     | 115                          |  |
| SFB 2 SFB-XF0-Zone0 | 70                       | 80   | 90                          | 90      | 107                      | 107     | 115                          |  |

|                     |    |    |    |    |     |     |     |
|---------------------|----|----|----|----|-----|-----|-----|
| SFB 3 Intake-Zone0  | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 3 Exhaust-Zone1 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 3 IntakeA-Zone0 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 3 IntakeB-Zone1 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 3 Exhaust-Zone0 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 3 SFB-XF2-Zone1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 3 SFB-XF1-Zone0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 3 SFB-XF0-Zone0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 4 Intake-Zone0  | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 4 Exhaust-Zone1 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 4 IntakeA-Zone0 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 4 IntakeB-Zone1 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 4 Exhaust-Zone0 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 4 SFB-XF2-Zone1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 4 SFB-XF1-Zone0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 4 SFB-XF0-Zone0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 5 Intake-Zone0  | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 5 Exhaust-Zone1 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 5 IntakeA-Zone0 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 5 IntakeB-Zone1 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 5 Exhaust-Zone0 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 5 SFB-XF2-Zone1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 5 SFB-XF1-Zone0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 5 SFB-XF0-Zone0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 6 Intake-Zone0  | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 6 Exhaust-Zone1 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 6 IntakeA-Zone0 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 6 IntakeB-Zone1 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 6 Exhaust-Zone0 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 6 SFB-XF2-Zone1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 6 SFB-XF1-Zone0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 6 SFB-XF0-Zone0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 7 Intake-Zone0  | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 7 Exhaust-Zone1 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 7 IntakeA-Zone0 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 7 IntakeB-Zone1 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 7 Exhaust-Zone0 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 7 SFB-XF2-Zone1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 7 SFB-XF1-Zone0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 7 SFB-XF0-Zone0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| FPC 0               | 55 | 60 | 75 | 65 | 95  | 80  | 100 |
| FPC 1               | 55 | 60 | 75 | 65 | 90  | 80  | 95  |
| FPC 2               | 55 | 60 | 75 | 65 | 95  | 80  | 100 |
| FPC 3               | 55 | 60 | 75 | 65 | 90  | 80  | 95  |
| FPC 4               | 55 | 60 | 75 | 65 | 90  | 80  | 95  |
| FPC 5               | 55 | 60 | 75 | 65 | 95  | 80  | 100 |
| FPC 6               | 55 | 60 | 75 | 65 | 90  | 80  | 95  |
| FPC 7               | 55 | 60 | 75 | 65 | 95  | 80  | 100 |
| FPC 8               | 55 | 60 | 75 | 65 | 90  | 80  | 95  |
| FPC 9               | 55 | 60 | 75 | 65 | 95  | 80  | 100 |
| ADC 0 Intake        | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 0 Exhaust       | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 0 ADC-XF1       | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 0 ADC-XF0       | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 1 Intake        | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 1 Exhaust       | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 1 ADC-XF1       | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 1 ADC-XF0       | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 2 Intake        | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 2 Exhaust       | 56 | 62 | 75 | 63 | 83  | 76  | 95  |

|               |    |    |    |    |     |     |     |
|---------------|----|----|----|----|-----|-----|-----|
| ADC 2 ADC-XF1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 2 ADC-XF0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 3 Intake  | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 3 Exhaust | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 3 ADC-XF1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 3 ADC-XF0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 4 Intake  | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 4 Exhaust | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 4 ADC-XF1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 4 ADC-XF0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 5 Intake  | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 5 Exhaust | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 5 ADC-XF1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 5 ADC-XF0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 6 Intake  | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 6 Exhaust | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 6 ADC-XF1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 6 ADC-XF0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 7 Intake  | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 7 Exhaust | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 7 ADC-XF1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 7 ADC-XF0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 8 Intake  | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 8 Exhaust | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 8 ADC-XF1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 8 ADC-XF0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 9 Intake  | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 9 Exhaust | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 9 ADC-XF1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 9 ADC-XF0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |

### show chassis temperature-thresholds (MX2020 Router)

```
user@host> show chassis temperature-thresholds
```

| Item                | Fan speed             |                     | Yellow alarm          |                        | Red alarm             |                        | Fire Shutdown         |
|---------------------|-----------------------|---------------------|-----------------------|------------------------|-----------------------|------------------------|-----------------------|
|                     | (degrees C)<br>Normal | (degrees C)<br>High | (degrees C)<br>Normal | (degrees C)<br>Bad fan | (degrees C)<br>Normal | (degrees C)<br>Bad fan | (degrees C)<br>Normal |
| Routing Engine 0    | 70                    | 80                  | 95                    | 95                     | 110                   | 110                    | 112                   |
| Routing Engine 1    | 70                    | 80                  | 95                    | 95                     | 110                   | 110                    | 112                   |
| CB 0 IntakeA-Zone0  | 60                    | 65                  | 78                    | 75                     | 85                    | 80                     | 95                    |
| CB 0 IntakeB-Zone1  | 60                    | 65                  | 78                    | 75                     | 85                    | 80                     | 95                    |
| CB 0 IntakeC-Zone0  | 60                    | 65                  | 78                    | 75                     | 85                    | 80                     | 95                    |
| CB 0 ExhaustA-Zone0 | 60                    | 65                  | 78                    | 75                     | 85                    | 80                     | 95                    |
| CB 0 ExhaustB-Zone1 | 60                    | 65                  | 78                    | 75                     | 85                    | 80                     | 95                    |
| CB 0 TCBC-Zone0     | 60                    | 65                  | 78                    | 75                     | 85                    | 80                     | 95                    |
| CB 1 IntakeA-Zone0  | 60                    | 65                  | 78                    | 75                     | 85                    | 80                     | 95                    |
| CB 1 IntakeB-Zone1  | 60                    | 65                  | 78                    | 75                     | 85                    | 80                     | 95                    |
| CB 1 IntakeC-Zone0  | 60                    | 65                  | 78                    | 75                     | 85                    | 80                     | 95                    |
| CB 1 ExhaustA-Zone0 | 60                    | 65                  | 78                    | 75                     | 85                    | 80                     | 95                    |
| CB 1 ExhaustB-Zone1 | 60                    | 65                  | 78                    | 75                     | 85                    | 80                     | 95                    |
| CB 1 TCBC-Zone0     | 60                    | 65                  | 78                    | 75                     | 85                    | 80                     | 95                    |
| SPMB 0 Intake       | 56                    | 62                  | 75                    | 63                     | 83                    | 76                     | 95                    |
| SPMB 1 Intake       | 56                    | 62                  | 75                    | 63                     | 83                    | 76                     | 95                    |
| SFB 0 Intake-Zone0  | 56                    | 62                  | 75                    | 63                     | 82                    | 70                     | 87                    |
| SFB 0 Exhaust-Zone1 | 56                    | 62                  | 75                    | 63                     | 82                    | 70                     | 87                    |
| SFB 0 IntakeA-Zone0 | 56                    | 62                  | 75                    | 63                     | 82                    | 70                     | 87                    |
| SFB 0 IntakeB-Zone1 | 56                    | 62                  | 75                    | 63                     | 82                    | 70                     | 87                    |
| SFB 0 Exhaust-Zone0 | 56                    | 62                  | 75                    | 63                     | 82                    | 70                     | 87                    |

|                     |    |    |    |    |     |     |     |
|---------------------|----|----|----|----|-----|-----|-----|
| SFB 0 SFB-XF2-Zone1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 0 SFB-XF1-Zone0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 0 SFB-XF0-Zone0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 1 Intake-Zone0  | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 1 Exhaust-Zone1 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 1 IntakeA-Zone0 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 1 IntakeB-Zone1 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 1 Exhaust-Zone0 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 1 SFB-XF2-Zone1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 1 SFB-XF1-Zone0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 1 SFB-XF0-Zone0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 2 Intake-Zone0  | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 2 Exhaust-Zone1 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 2 IntakeA-Zone0 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 2 IntakeB-Zone1 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 2 Exhaust-Zone0 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 2 SFB-XF2-Zone1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 2 SFB-XF1-Zone0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 2 SFB-XF0-Zone0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 3 Intake-Zone0  | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 3 Exhaust-Zone1 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 3 IntakeA-Zone0 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 3 IntakeB-Zone1 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 3 Exhaust-Zone0 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 3 SFB-XF2-Zone1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 3 SFB-XF1-Zone0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 3 SFB-XF0-Zone0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 4 Intake-Zone0  | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 4 Exhaust-Zone1 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 4 IntakeA-Zone0 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 4 IntakeB-Zone1 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 4 Exhaust-Zone0 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 4 SFB-XF2-Zone1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 4 SFB-XF1-Zone0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 4 SFB-XF0-Zone0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 5 Intake-Zone0  | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 5 Exhaust-Zone1 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 5 IntakeA-Zone0 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 5 IntakeB-Zone1 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 5 Exhaust-Zone0 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 5 SFB-XF2-Zone1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 5 SFB-XF1-Zone0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 5 SFB-XF0-Zone0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 6 Intake-Zone0  | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 6 Exhaust-Zone1 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 6 IntakeA-Zone0 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 6 IntakeB-Zone1 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 6 Exhaust-Zone0 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 6 SFB-XF2-Zone1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 6 SFB-XF1-Zone0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 6 SFB-XF0-Zone0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 7 Intake-Zone0  | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 7 Exhaust-Zone1 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 7 IntakeA-Zone0 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 7 IntakeB-Zone1 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 7 Exhaust-Zone0 | 56 | 62 | 75 | 63 | 82  | 70  | 87  |
| SFB 7 SFB-XF2-Zone1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 7 SFB-XF1-Zone0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| SFB 7 SFB-XF0-Zone0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| FPC 0               | 55 | 60 | 75 | 65 | 90  | 80  | 95  |

|               |    |    |    |    |     |     |     |
|---------------|----|----|----|----|-----|-----|-----|
| FPC 1         | 55 | 60 | 75 | 65 | 90  | 80  | 95  |
| FPC 2         | 55 | 60 | 75 | 65 | 90  | 80  | 95  |
| FPC 3         | 55 | 60 | 75 | 65 | 90  | 80  | 95  |
| FPC 4         | 55 | 60 | 75 | 65 | 90  | 80  | 95  |
| FPC 5         | 55 | 60 | 75 | 65 | 90  | 80  | 95  |
| FPC 6         | 55 | 60 | 75 | 65 | 90  | 80  | 95  |
| FPC 7         | 55 | 60 | 75 | 65 | 90  | 80  | 95  |
| FPC 8         | 55 | 60 | 75 | 65 | 90  | 80  | 95  |
| FPC 9         | 55 | 60 | 75 | 65 | 90  | 80  | 95  |
| FPC 10        | 55 | 60 | 75 | 65 | 90  | 80  | 95  |
| FPC 11        | 55 | 60 | 75 | 65 | 90  | 80  | 95  |
| FPC 12        | 55 | 60 | 75 | 65 | 90  | 80  | 95  |
| FPC 13        | 55 | 60 | 75 | 65 | 90  | 80  | 95  |
| FPC 14        | 55 | 60 | 75 | 65 | 90  | 80  | 95  |
| FPC 15        | 55 | 60 | 75 | 65 | 90  | 80  | 95  |
| FPC 16        | 55 | 60 | 75 | 65 | 90  | 80  | 95  |
| FPC 17        | 55 | 60 | 75 | 65 | 90  | 80  | 95  |
| FPC 18        | 55 | 60 | 75 | 65 | 90  | 80  | 95  |
| FPC 19        | 55 | 60 | 75 | 65 | 90  | 80  | 95  |
| ADC 0 Intake  | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 0 Exhaust | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 0 ADC-XF1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 0 ADC-XF0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 1 Intake  | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 1 Exhaust | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 1 ADC-XF1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 1 ADC-XF0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 2 Intake  | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 2 Exhaust | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 2 ADC-XF1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 2 ADC-XF0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 3 Intake  | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 3 Exhaust | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 3 ADC-XF1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 3 ADC-XF0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 4 Intake  | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 4 Exhaust | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 4 ADC-XF1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 4 ADC-XF0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 5 Intake  | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 5 Exhaust | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 5 ADC-XF1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 5 ADC-XF0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 6 Intake  | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 6 Exhaust | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 6 ADC-XF1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 6 ADC-XF0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 7 Intake  | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 7 Exhaust | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 7 ADC-XF1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 7 ADC-XF0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 8 Intake  | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 8 Exhaust | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 8 ADC-XF1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 8 ADC-XF0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 9 Intake  | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 9 Exhaust | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 9 ADC-XF1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 9 ADC-XF0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 10 Intake | 56 | 62 | 75 | 63 | 83  | 76  | 95  |

|                |    |    |    |    |     |     |     |
|----------------|----|----|----|----|-----|-----|-----|
| ADC 10 Exhaust | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 10 ADC-XF1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 10 ADC-XF0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 11 Intake  | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 11 Exhaust | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 11 ADC-XF1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 11 ADC-XF0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 12 Intake  | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 12 Exhaust | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 12 ADC-XF1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 12 ADC-XF0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 13 Intake  | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 13 Exhaust | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 13 ADC-XF1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 13 ADC-XF0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 14 Intake  | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 14 Exhaust | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 14 ADC-XF1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 14 ADC-XF0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 15 Intake  | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 15 Exhaust | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 15 ADC-XF1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 15 ADC-XF0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 16 Intake  | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 16 Exhaust | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 16 ADC-XF1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 16 ADC-XF0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 17 Intake  | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 17 Exhaust | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 17 ADC-XF1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 17 ADC-XF0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 18 Intake  | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 18 Exhaust | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 18 ADC-XF1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 18 ADC-XF0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 19 Intake  | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 19 Exhaust | 56 | 62 | 75 | 63 | 83  | 76  | 95  |
| ADC 19 ADC-XF1 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |
| ADC 19 ADC-XF0 | 70 | 80 | 90 | 90 | 107 | 107 | 115 |

### show chassis temperature-thresholds (MX2020 Router with MPC4E)

```
user@host> show chassis temperature-thresholds
```

| Fan speed           | Yellow alarm<br>(degrees C) |      | Red alarm<br>(degrees C) |         | Fire Shutdown<br>(degrees C) |         | (degrees C) |
|---------------------|-----------------------------|------|--------------------------|---------|------------------------------|---------|-------------|
| Item                | Normal                      | High | Normal                   | Bad fan | Normal                       | Bad fan | Normal      |
| Routing Engine 0    | 70                          | 80   | 95                       | 95      | 110                          | 110     | 112         |
| Routing Engine 1    | 70                          | 80   | 95                       | 95      | 110                          | 110     | 112         |
| CB 0 IntakeA-Zone0  | 60                          | 65   | 78                       | 75      | 85                           | 80      | 95          |
| CB 0 IntakeB-Zone1  | 60                          | 65   | 78                       | 75      | 85                           | 80      | 95          |
| CB 0 IntakeC-Zone0  | 60                          | 65   | 78                       | 75      | 85                           | 80      | 95          |
| CB 0 ExhaustA-Zone0 | 60                          | 65   | 78                       | 75      | 85                           | 80      | 95          |
| CB 0 ExhaustB-Zone1 | 60                          | 65   | 78                       | 75      | 85                           | 80      | 95          |
| CB 0 TCBC-Zone0     | 60                          | 65   | 78                       | 75      | 85                           | 80      | 95          |
| CB 1 IntakeA-Zone0  | 60                          | 65   | 78                       | 75      | 85                           | 80      | 95          |
| CB 1 IntakeB-Zone1  | 60                          | 65   | 78                       | 75      | 85                           | 80      | 95          |
| CB 1 IntakeC-Zone0  | 60                          | 65   | 78                       | 75      | 85                           | 80      | 95          |
| CB 1 ExhaustA-Zone0 | 60                          | 65   | 78                       | 75      | 85                           | 80      | 95          |

|                     |    |    |    |    |    |    |     |
|---------------------|----|----|----|----|----|----|-----|
| CB 1 ExhaustB-Zone1 | 60 | 65 | 78 | 75 | 85 | 80 | 95  |
| CB 1 TCBC-Zone0     | 60 | 65 | 78 | 75 | 85 | 80 | 95  |
| SPMB 0 Intake       | 56 | 62 | 75 | 63 | 83 | 76 | 95  |
| SPMB 1 Intake       | 56 | 62 | 75 | 63 | 83 | 76 | 95  |
| SFB 0 Intake-Zone0  | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 0 Exhaust-Zone1 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 0 IntakeA-Zone0 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 0 IntakeB-Zone1 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 0 Exhaust-Zone0 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 0 SFB-XF2-Zone1 | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| SFB 0 SFB-XF1-Zone0 | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| SFB 0 SFB-XF0-Zone0 | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| SFB 1 Intake-Zone0  | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 1 Exhaust-Zone1 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 1 IntakeA-Zone0 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 1 IntakeB-Zone1 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 1 Exhaust-Zone0 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 1 SFB-XF2-Zone1 | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| SFB 1 SFB-XF1-Zone0 | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| SFB 1 SFB-XF0-Zone0 | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| SFB 2 Intake-Zone0  | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 2 Exhaust-Zone1 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 2 IntakeA-Zone0 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 2 IntakeB-Zone1 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 2 Exhaust-Zone0 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 2 SFB-XF2-Zone1 | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| SFB 2 SFB-XF1-Zone0 | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| SFB 2 SFB-XF0-Zone0 | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| SFB 3 Intake-Zone0  | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 3 Exhaust-Zone1 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 3 IntakeA-Zone0 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 3 IntakeB-Zone1 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 3 Exhaust-Zone0 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 3 SFB-XF2-Zone1 | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| SFB 3 SFB-XF1-Zone0 | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| SFB 3 SFB-XF0-Zone0 | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| SFB 4 Intake-Zone0  | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 4 Exhaust-Zone1 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 4 IntakeA-Zone0 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 4 IntakeB-Zone1 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 4 Exhaust-Zone0 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 4 SFB-XF2-Zone1 | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| SFB 4 SFB-XF1-Zone0 | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| SFB 4 SFB-XF0-Zone0 | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| SFB 5 Intake-Zone0  | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 5 Exhaust-Zone1 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 5 IntakeA-Zone0 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 5 IntakeB-Zone1 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 5 Exhaust-Zone0 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 5 SFB-XF2-Zone1 | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| SFB 5 SFB-XF1-Zone0 | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| SFB 5 SFB-XF0-Zone0 | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| SFB 6 Intake-Zone0  | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 6 Exhaust-Zone1 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 6 IntakeA-Zone0 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 6 IntakeB-Zone1 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 6 Exhaust-Zone0 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 6 SFB-XF2-Zone1 | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| SFB 6 SFB-XF1-Zone0 | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| SFB 6 SFB-XF0-Zone0 | 70 | 75 | 90 | 85 | 95 | 90 | 100 |



|                     |    |    |    |    |    |    |     |
|---------------------|----|----|----|----|----|----|-----|
| SFB 7 Intake-Zone0  | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 7 Exhaust-Zone1 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 7 IntakeA-Zone0 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 7 IntakeB-Zone1 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 7 Exhaust-Zone0 | 56 | 62 | 70 | 70 | 85 | 85 | 89  |
| SFB 7 SFB-XF2-Zone1 | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| SFB 7 SFB-XF1-Zone0 | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| SFB 7 SFB-XF0-Zone0 | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| FPC 0               | 55 | 60 | 75 | 65 | 90 | 80 | 95  |
| FPC 9               | 55 | 60 | 75 | 65 | 90 | 80 | 95  |
| FPC 10              | 55 | 60 | 75 | 65 | 90 | 80 | 95  |
| FPC 14              | 55 | 60 | 75 | 65 | 95 | 80 | 100 |
| FPC 19              | 55 | 60 | 75 | 65 | 90 | 80 | 95  |
| ADC 0 Intake        | 50 | 55 | 60 | 60 | 65 | 65 | 80  |
| ADC 0 Exhaust       | 50 | 55 | 60 | 60 | 65 | 65 | 80  |
| ADC 0 ADC-XF1       | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| ADC 0 ADC-XF0       | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| ADC 9 Intake        | 50 | 55 | 60 | 60 | 65 | 65 | 80  |
| ADC 9 Exhaust       | 50 | 55 | 60 | 60 | 65 | 65 | 80  |
| ADC 9 ADC-XF1       | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| ADC 9 ADC-XF0       | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| ADC 10 Intake       | 50 | 55 | 60 | 60 | 65 | 65 | 80  |
| ADC 10 Exhaust      | 50 | 55 | 60 | 60 | 65 | 65 | 80  |
| ADC 10 ADC-XF1      | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| ADC 10 ADC-XF0      | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| ADC 14 Intake       | 50 | 55 | 60 | 60 | 65 | 65 | 80  |
| ADC 14 Exhaust      | 50 | 55 | 60 | 60 | 65 | 65 | 80  |
| ADC 14 ADC-XF1      | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| ADC 14 ADC-XF0      | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| ADC 19 Intake       | 50 | 55 | 60 | 60 | 65 | 65 | 80  |
| ADC 19 Exhaust      | 50 | 55 | 60 | 60 | 65 | 65 | 80  |
| ADC 19 ADC-XF1      | 70 | 75 | 90 | 85 | 95 | 90 | 100 |
| ADC 19 ADC-XF0      | 70 | 75 | 90 | 85 | 95 | 90 | 100 |

### show chassis temperature-thresholds (MX2008 Routers)

```
user@host> show chassis temperature-thresholds
```

| Shutdown<br>(degrees C)<br>Item | Fan speed   |      | Yellow alarm |         | Red alarm   |         | Fire |
|---------------------------------|-------------|------|--------------|---------|-------------|---------|------|
|                                 | (degrees C) |      | (degrees C)  |         | (degrees C) |         |      |
|                                 | Normal      | High | Normal       | Bad fan | Normal      | Bad fan |      |
| Normal                          |             |      |              |         |             |         |      |
| Routing Engine 0 CPU<br>98      | 58          | 63   | 78           | 75      | 93          | 90      |      |
| Routing Engine 1 CPU<br>98      | 58          | 63   | 78           | 75      | 93          | 90      |      |
| CB 0 Inlet1<br>85               | 55          | 60   | 65           | 62      | 75          | 72      |      |
| CB 0 Inlet2<br>90               | 45          | 50   | 61           | 58      | 80          | 77      |      |
| CB 0 Inlet3<br>90               | 57          | 62   | 68           | 65      | 80          | 77      |      |
| CB 0 Inlet4<br>95               | 55          | 60   | 80           | 77      | 90          | 87      |      |
| CB 0 Exhaust1<br>85             | 55          | 60   | 65           | 62      | 75          | 72      |      |
| CB 0 Exhaust2<br>90             | 50          | 55   | 60           | 57      | 80          | 77      |      |

|                            |    |    |    |    |     |     |
|----------------------------|----|----|----|----|-----|-----|
| CB 0 Exhaust3<br>96        | 70 | 75 | 81 | 78 | 91  | 88  |
| CB 0 Exhaust4<br>105       | 75 | 80 | 90 | 87 | 100 | 97  |
| CB 1 Inlet1<br>85          | 55 | 60 | 65 | 62 | 75  | 72  |
| CB 1 Inlet2<br>90          | 45 | 50 | 61 | 58 | 80  | 77  |
| CB 1 Inlet3<br>90          | 57 | 62 | 68 | 65 | 80  | 77  |
| CB 1 Inlet4<br>95          | 55 | 60 | 80 | 77 | 90  | 87  |
| CB 1 Exhaust1<br>85        | 55 | 60 | 65 | 62 | 75  | 72  |
| CB 1 Exhaust2<br>90        | 50 | 55 | 60 | 57 | 80  | 77  |
| CB 1 Exhaust3<br>96        | 70 | 75 | 81 | 78 | 91  | 88  |
| CB 1 Exhaust4<br>105       | 75 | 80 | 90 | 87 | 100 | 97  |
| SFB 0 Inlet1<br>81         | 49 | 54 | 62 | 59 | 76  | 73  |
| SFB 0 Inlet2<br>88         | 65 | 70 | 71 | 68 | 83  | 80  |
| SFB 0 Exhaust1<br>80       | 45 | 50 | 61 | 58 | 75  | 72  |
| SFB 0 Exhaust2<br>85       | 60 | 65 | 69 | 66 | 80  | 77  |
| SFB 0 SFB2-PF-local<br>100 | 65 | 70 | 75 | 72 | 95  | 92  |
| SFB 0 SFB2-PF-die<br>120   | 88 | 93 | 98 | 95 | 118 | 115 |
| SFB 1 Inlet1<br>81         | 49 | 54 | 62 | 59 | 76  | 73  |
| SFB 1 Inlet2<br>88         | 65 | 70 | 71 | 68 | 83  | 80  |
| SFB 1 Exhaust1<br>80       | 45 | 50 | 61 | 58 | 75  | 72  |
| SFB 1 Exhaust2<br>85       | 60 | 65 | 69 | 66 | 80  | 77  |
| SFB 1 SFB2-PF-local<br>100 | 65 | 70 | 75 | 72 | 95  | 92  |
| SFB 1 SFB2-PF-die<br>120   | 88 | 93 | 98 | 95 | 118 | 115 |
| SFB 2 Inlet1<br>81         | 49 | 54 | 62 | 59 | 76  | 73  |
| SFB 2 Inlet2<br>88         | 65 | 70 | 71 | 68 | 83  | 80  |
| SFB 2 Exhaust1<br>80       | 45 | 50 | 61 | 58 | 75  | 72  |
| SFB 2 Exhaust2<br>85       | 60 | 65 | 69 | 66 | 80  | 77  |
| SFB 2 SFB2-PF-local<br>100 | 65 | 70 | 75 | 72 | 95  | 92  |
| SFB 2 SFB2-PF-die<br>120   | 88 | 93 | 98 | 95 | 118 | 115 |
| SFB 3 Inlet1<br>81         | 49 | 54 | 62 | 59 | 76  | 73  |
| SFB 3 Inlet2<br>88         | 65 | 70 | 71 | 68 | 83  | 80  |

|                            |    |    |    |    |     |     |
|----------------------------|----|----|----|----|-----|-----|
| SFB 3 Exhaust1<br>80       | 45 | 50 | 61 | 58 | 75  | 72  |
| SFB 3 Exhaust2<br>85       | 60 | 65 | 69 | 66 | 80  | 77  |
| SFB 3 SFB2-PF-local<br>100 | 65 | 70 | 75 | 72 | 95  | 92  |
| SFB 3 SFB2-PF-die<br>120   | 88 | 93 | 98 | 95 | 118 | 115 |
| SFB 4 Inlet1<br>81         | 49 | 54 | 62 | 59 | 76  | 73  |
| SFB 4 Inlet2<br>88         | 65 | 70 | 71 | 68 | 83  | 80  |
| SFB 4 Exhaust1<br>80       | 45 | 50 | 61 | 58 | 75  | 72  |
| SFB 4 Exhaust2<br>85       | 60 | 65 | 69 | 66 | 80  | 77  |
| SFB 4 SFB2-PF-local<br>100 | 65 | 70 | 75 | 72 | 95  | 92  |
| SFB 4 SFB2-PF-die<br>120   | 88 | 93 | 98 | 95 | 118 | 115 |
| SFB 5 Inlet1<br>81         | 49 | 54 | 62 | 59 | 76  | 73  |
| SFB 5 Inlet2<br>88         | 65 | 70 | 71 | 68 | 83  | 80  |
| SFB 5 Exhaust1<br>80       | 45 | 50 | 61 | 58 | 75  | 72  |
| SFB 5 Exhaust2<br>85       | 60 | 65 | 69 | 66 | 80  | 77  |
| SFB 5 SFB2-PF-local<br>100 | 65 | 70 | 75 | 72 | 95  | 92  |
| SFB 5 SFB2-PF-die<br>120   | 88 | 93 | 98 | 95 | 118 | 115 |
| SFB 6 Inlet1<br>81         | 49 | 54 | 62 | 59 | 76  | 73  |
| SFB 6 Inlet2<br>88         | 65 | 70 | 71 | 68 | 83  | 80  |
| SFB 6 Exhaust1<br>80       | 45 | 50 | 61 | 58 | 75  | 72  |
| SFB 6 Exhaust2<br>85       | 60 | 65 | 69 | 66 | 80  | 77  |
| SFB 6 SFB2-PF-local<br>100 | 65 | 70 | 75 | 72 | 95  | 92  |
| SFB 6 SFB2-PF-die<br>120   | 88 | 93 | 98 | 95 | 118 | 115 |
| SFB 7 Inlet1<br>81         | 49 | 54 | 62 | 59 | 76  | 73  |
| SFB 7 Inlet2<br>88         | 65 | 70 | 71 | 68 | 83  | 80  |
| SFB 7 Exhaust1<br>80       | 45 | 50 | 61 | 58 | 75  | 72  |
| SFB 7 Exhaust2<br>85       | 60 | 65 | 69 | 66 | 80  | 77  |
| SFB 7 SFB2-PF-local<br>100 | 65 | 70 | 75 | 72 | 95  | 92  |
| SFB 7 SFB2-PF-die<br>120   | 88 | 93 | 98 | 95 | 118 | 115 |
| FPC 0<br>95                | 55 | 60 | 75 | 65 | 90  | 80  |
| FPC 3<br>110               | 55 | 60 | 75 | 65 | 105 | 80  |

|                               |    |    |    |    |     |     |
|-------------------------------|----|----|----|----|-----|-----|
| FPC 5<br>110                  | 55 | 60 | 75 | 65 | 105 | 80  |
| FPC 7<br>95                   | 55 | 60 | 75 | 65 | 90  | 80  |
| FPC 9 Intake<br>95            | 60 | 65 | 75 | 75 | 85  | 85  |
| FPC 9 Exhaust A<br>95         | 60 | 65 | 75 | 75 | 85  | 85  |
| FPC 9 Exhaust B<br>95         | 60 | 65 | 75 | 75 | 85  | 85  |
| FPC 9 XL 0 Chip<br>110        | 70 | 75 | 85 | 85 | 102 | 102 |
| FPC 9 XL 0 XR2 0 Chip<br>115  | 75 | 80 | 90 | 90 | 105 | 105 |
| FPC 9 XL 0 XR2 1 Chip<br>115  | 75 | 80 | 90 | 90 | 105 | 105 |
| FPC 9 XL 1 Chip<br>110        | 70 | 75 | 85 | 85 | 102 | 102 |
| FPC 9 XL 1 XR2 0 Chip<br>115  | 75 | 80 | 90 | 90 | 105 | 105 |
| FPC 9 XL 1 XR2 1 Chip<br>115  | 75 | 80 | 90 | 90 | 105 | 105 |
| FPC 9 XM 0 Chip<br>110        | 70 | 75 | 85 | 85 | 100 | 100 |
| FPC 9 XM 1 Chip<br>110        | 70 | 75 | 85 | 85 | 100 | 100 |
| FPC 9 XM 2 Chip<br>110        | 70 | 75 | 85 | 85 | 100 | 100 |
| FPC 9 XM 3 Chip<br>110        | 70 | 75 | 85 | 85 | 100 | 100 |
| FPC 9 PCIe Switch Chip<br>120 | 80 | 85 | 95 | 95 | 105 | 105 |
| ADC 0 Intake<br>80            | 50 | 55 | 65 | 65 | 75  | 75  |
| ADC 0 Exhaust<br>80           | 50 | 55 | 65 | 65 | 75  | 75  |
| ADC 0 ADC-XF1<br>100          | 70 | 75 | 90 | 85 | 95  | 90  |
| ADC 0 ADC-XF0<br>100          | 70 | 75 | 90 | 85 | 95  | 90  |
| ADC 3 Intake<br>80            | 50 | 55 | 65 | 65 | 75  | 75  |
| ADC 3 Exhaust<br>80           | 50 | 55 | 65 | 65 | 75  | 75  |
| ADC 3 ADC-XF1<br>100          | 70 | 75 | 90 | 85 | 95  | 90  |
| ADC 3 ADC-XF0<br>100          | 70 | 75 | 90 | 85 | 95  | 90  |
| ADC 5 Intake<br>80            | 50 | 55 | 65 | 65 | 75  | 75  |
| ADC 5 Exhaust<br>80           | 50 | 55 | 65 | 65 | 75  | 75  |
| ADC 5 ADC-XF1<br>100          | 70 | 75 | 90 | 85 | 95  | 90  |
| ADC 5 ADC-XF0<br>100          | 70 | 75 | 90 | 85 | 95  | 90  |
| ADC 7 Intake<br>80            | 50 | 55 | 65 | 65 | 75  | 75  |
| ADC 7 Exhaust<br>80           | 50 | 55 | 65 | 65 | 75  | 75  |

|                      |    |    |    |    |    |    |
|----------------------|----|----|----|----|----|----|
| ADC 7 ADC-XF1<br>100 | 70 | 75 | 90 | 85 | 95 | 90 |
| ADC 7 ADC-XF0<br>100 | 70 | 75 | 90 | 85 | 95 | 90 |

### show chassis temperature-thresholds (MX10003 Router)

```
user@host> show chassis temperature-thresholds
```

| Shutdown                           | Fan speed   |      | Yellow alarm |         | Red alarm   |         | Fire |
|------------------------------------|-------------|------|--------------|---------|-------------|---------|------|
| (degrees C)                        | (degrees C) |      | (degrees C)  |         | (degrees C) |         |      |
| Item                               | Normal      | High | Normal       | Bad fan | Normal      | Bad fan |      |
| Normal                             |             |      |              |         |             |         |      |
| Routing Engine 0<br>102            | 48          | 54   | 85           | 85      | 100         | 100     |      |
| Routing Engine 1<br>102            | 48          | 54   | 85           | 85      | 100         | 100     |      |
| CB 0 Exhaust Temp Sensor<br>95     | 60          | 65   | 75           | 75      | 85          | 85      |      |
| CB 0 Inlet Temp Sensor<br>95       | 60          | 65   | 75           | 75      | 85          | 85      |      |
| CB 0 CPU DIE Temp Sensor<br>110    | 83          | 90   | 98           | 98      | 105         | 105     |      |
| CB 1 Exhaust Temp Sensor<br>95     | 60          | 65   | 75           | 75      | 85          | 85      |      |
| CB 1 Inlet Temp Sensor<br>95       | 60          | 65   | 75           | 75      | 85          | 85      |      |
| CB 1 CPU DIE Temp Sensor<br>110    | 83          | 90   | 98           | 98      | 105         | 105     |      |
| FPC 0 Intake Temp Sensor<br>95     | 40          | 45   | 75           | 70      | 85          | 80      |      |
| FPC 0 Exhaust-A Temp Sensor<br>100 | 55          | 60   | 85           | 80      | 90          | 90      |      |
| FPC 0 Exhaust-B Temp Sensor<br>100 | 55          | 60   | 85           | 80      | 90          | 90      |      |
| FPC 0 EA0 Chip<br>110              | 87          | 92   | 97           | 97      | 105         | 105     |      |
| FPC 0 EA0-XR0 Chip<br>125          | 88          | 93   | 98           | 98      | 120         | 120     |      |
| FPC 0 EA0-XR1 Chip<br>125          | 88          | 93   | 98           | 98      | 120         | 120     |      |
| FPC 0 EA1 Chip<br>110              | 87          | 92   | 97           | 97      | 105         | 105     |      |
| FPC 0 EA1-XR0 Chip<br>125          | 88          | 93   | 98           | 98      | 120         | 120     |      |
| FPC 0 EA1-XR1 Chip<br>125          | 88          | 93   | 98           | 98      | 120         | 120     |      |
| FPC 0 EA2 Chip<br>110              | 87          | 92   | 97           | 97      | 105         | 105     |      |
| FPC 0 EA2-XR0 Chip<br>125          | 88          | 93   | 98           | 98      | 120         | 120     |      |
| FPC 0 EA2-XR1 Chip<br>125          | 88          | 93   | 98           | 98      | 120         | 120     |      |
| FPC 0 PF Chip<br>120               | 89          | 94   | 104          | 104     | 120         | 120     |      |
| FPC 0 EA0_HMC0 Logic die<br>125    | 88          | 93   | 103          | 103     | 120         | 120     |      |

|                                    |    |    |     |     |     |     |
|------------------------------------|----|----|-----|-----|-----|-----|
| FPC 0 EA0_HMC0 DRAM botm<br>125    | 83 | 88 | 98  | 98  | 120 | 120 |
| FPC 0 EA0_HMC1 Logic die<br>125    | 88 | 93 | 103 | 103 | 120 | 120 |
| FPC 0 EA0_HMC1 DRAM botm<br>125    | 83 | 88 | 98  | 98  | 120 | 120 |
| FPC 0 EA0_HMC2 Logic die<br>125    | 88 | 93 | 103 | 103 | 120 | 120 |
| FPC 0 EA0_HMC2 DRAM botm<br>125    | 83 | 88 | 98  | 98  | 120 | 120 |
| FPC 0 EA1_HMC0 Logic die<br>125    | 88 | 93 | 103 | 103 | 120 | 120 |
| FPC 0 EA1_HMC0 DRAM botm<br>125    | 83 | 88 | 98  | 98  | 120 | 120 |
| FPC 0 EA1_HMC1 Logic die<br>125    | 88 | 93 | 103 | 103 | 120 | 120 |
| FPC 0 EA1_HMC1 DRAM botm<br>125    | 83 | 88 | 98  | 98  | 120 | 120 |
| FPC 0 EA1_HMC2 Logic die<br>125    | 88 | 93 | 103 | 103 | 120 | 120 |
| FPC 0 EA1_HMC2 DRAM botm<br>125    | 83 | 88 | 98  | 98  | 120 | 120 |
| FPC 0 EA2_HMC0 Logic die<br>125    | 88 | 93 | 103 | 103 | 120 | 120 |
| FPC 0 EA2_HMC0 DRAM botm<br>125    | 83 | 88 | 98  | 98  | 120 | 120 |
| FPC 0 EA2_HMC1 Logic die<br>125    | 88 | 93 | 103 | 103 | 120 | 120 |
| FPC 0 EA2_HMC1 DRAM botm<br>125    | 83 | 88 | 98  | 98  | 120 | 120 |
| FPC 0 EA2_HMC2 Logic die<br>125    | 88 | 93 | 103 | 103 | 120 | 120 |
| FPC 0 EA2_HMC2 DRAM botm<br>125    | 83 | 88 | 98  | 98  | 120 | 120 |
| FPC 1 Intake Temp Sensor<br>95     | 40 | 45 | 75  | 70  | 85  | 80  |
| FPC 1 Exhaust-A Temp Sensor<br>100 | 55 | 60 | 85  | 80  | 90  | 90  |
| FPC 1 Exhaust-B Temp Sensor<br>100 | 55 | 60 | 85  | 80  | 90  | 90  |
| FPC 1 EA0 Chip<br>110              | 87 | 92 | 97  | 97  | 105 | 105 |
| FPC 1 EA0-XR0 Chip<br>125          | 88 | 93 | 98  | 98  | 120 | 120 |
| FPC 1 EA0-XR1 Chip<br>125          | 88 | 93 | 98  | 98  | 120 | 120 |
| FPC 1 EA1 Chip<br>110              | 87 | 92 | 97  | 97  | 105 | 105 |
| FPC 1 EA1-XR0 Chip<br>125          | 88 | 93 | 98  | 98  | 120 | 120 |
| FPC 1 EA1-XR1 Chip<br>125          | 88 | 93 | 98  | 98  | 120 | 120 |
| FPC 1 EA2 Chip<br>110              | 87 | 92 | 97  | 97  | 105 | 105 |
| FPC 1 EA2-XR0 Chip<br>125          | 88 | 93 | 98  | 98  | 120 | 120 |
| FPC 1 EA2-XR1 Chip<br>125          | 88 | 93 | 98  | 98  | 120 | 120 |
| FPC 1 PF Chip<br>120               | 89 | 94 | 104 | 104 | 120 | 120 |

|                          |    |    |     |     |     |     |
|--------------------------|----|----|-----|-----|-----|-----|
| FPC 1 EA0_HMC0 Logic die | 88 | 93 | 103 | 103 | 120 | 120 |
| 125                      |    |    |     |     |     |     |
| FPC 1 EA0_HMC0 DRAM botm | 83 | 88 | 98  | 98  | 120 | 120 |
| 125                      |    |    |     |     |     |     |
| FPC 1 EA0_HMC1 Logic die | 88 | 93 | 103 | 103 | 120 | 120 |
| 125                      |    |    |     |     |     |     |
| FPC 1 EA0_HMC1 DRAM botm | 83 | 88 | 98  | 98  | 120 | 120 |
| 125                      |    |    |     |     |     |     |
| FPC 1 EA0_HMC2 Logic die | 88 | 93 | 103 | 103 | 120 | 120 |
| 125                      |    |    |     |     |     |     |
| FPC 1 EA0_HMC2 DRAM botm | 83 | 88 | 98  | 98  | 120 | 120 |
| 125                      |    |    |     |     |     |     |
| FPC 1 EA1_HMC0 Logic die | 88 | 93 | 103 | 103 | 120 | 120 |
| 125                      |    |    |     |     |     |     |
| FPC 1 EA1_HMC0 DRAM botm | 83 | 88 | 98  | 98  | 120 | 120 |
| 125                      |    |    |     |     |     |     |
| FPC 1 EA1_HMC1 Logic die | 88 | 93 | 103 | 103 | 120 | 120 |
| 125                      |    |    |     |     |     |     |
| FPC 1 EA1_HMC1 DRAM botm | 83 | 88 | 98  | 98  | 120 | 120 |
| 125                      |    |    |     |     |     |     |
| FPC 1 EA1_HMC2 Logic die | 88 | 93 | 103 | 103 | 120 | 120 |
| 125                      |    |    |     |     |     |     |
| FPC 1 EA1_HMC2 DRAM botm | 83 | 88 | 98  | 98  | 120 | 120 |
| 125                      |    |    |     |     |     |     |
| FPC 1 EA2_HMC0 Logic die | 88 | 93 | 103 | 103 | 120 | 120 |
| 125                      |    |    |     |     |     |     |
| FPC 1 EA2_HMC0 DRAM botm | 83 | 88 | 98  | 98  | 120 | 120 |
| 125                      |    |    |     |     |     |     |
| FPC 1 EA2_HMC1 Logic die | 88 | 93 | 103 | 103 | 120 | 120 |
| 125                      |    |    |     |     |     |     |
| FPC 1 EA2_HMC1 DRAM botm | 83 | 88 | 98  | 98  | 120 | 120 |
| 125                      |    |    |     |     |     |     |
| FPC 1 EA2_HMC2 Logic die | 88 | 93 | 103 | 103 | 120 | 120 |
| 125                      |    |    |     |     |     |     |
| FPC 1 EA2_HMC2 DRAM botm | 83 | 88 | 98  | 98  | 120 | 120 |
| 125                      |    |    |     |     |     |     |

### show chassis temperature-thresholds (MX10008 Router)

```
user@host> show chassis temperature-thresholds
```

| Fire Shutdown              |             | Fan speed   |      | Yellow alarm |         | Red alarm |
|----------------------------|-------------|-------------|------|--------------|---------|-----------|
|                            |             | (degrees C) |      | (degrees C)  |         | (degrees  |
| C)                         | (degrees C) |             |      |              |         |           |
| Item                       |             | Normal      | High | Normal       | Bad fan | Normal    |
| Bad fan                    | Normal      |             |      |              |         |           |
| Routing Engine 0           |             | 65          | 70   | 95           | 95      | 100       |
| 100                        | 110         |             |      |              |         |           |
| Routing Engine 1           |             | 65          | 70   | 95           | 95      | 100       |
| 100                        | 110         |             |      |              |         |           |
| CB 0 Intake A Temp Sensor  |             | 30          | 35   | 80           | 80      | 85        |
| 85                         | 95          |             |      |              |         |           |
| CB 0 Intake B Temp Sensor  |             | 30          | 35   | 80           | 80      | 85        |
| 85                         | 95          |             |      |              |         |           |
| CB 0 Exhaust A Temp Sensor |             | 40          | 45   | 80           | 80      | 85        |
| 85                         | 95          |             |      |              |         |           |
| CB 0 Exhaust B Temp Sensor |             | 40          | 45   | 80           | 80      | 85        |
| 85                         | 95          |             |      |              |         |           |
| CB 0 Middle Temp Sensor    |             | 40          | 45   | 80           | 80      | 85        |

|                             |     |    |     |     |     |
|-----------------------------|-----|----|-----|-----|-----|
| 85                          | 95  |    |     |     |     |
| CB 1 Intake A Temp Sensor   | 30  | 35 | 80  | 80  | 85  |
| 85                          | 95  |    |     |     |     |
| CB 1 Intake B Temp Sensor   | 30  | 35 | 80  | 80  | 85  |
| 85                          | 95  |    |     |     |     |
| CB 1 Exhaust A Temp Sensor  | 40  | 45 | 80  | 80  | 85  |
| 85                          | 95  |    |     |     |     |
| CB 1 Exhaust B Temp Sensor  | 40  | 45 | 80  | 80  | 85  |
| 85                          | 95  |    |     |     |     |
| CB 1 Middle Temp Sensor     | 40  | 45 | 80  | 80  | 85  |
| 85                          | 95  |    |     |     |     |
| FPC 0 Intake-A Temp Sensor  | 52  | 62 | 72  | 72  | 85  |
| 85                          | 90  |    |     |     |     |
| FPC 0 Exhaust-A Temp Sensor | 75  | 85 | 98  | 98  | 103 |
| 103                         | 108 |    |     |     |     |
| FPC 0 Exhaust-B Temp Sensor | 75  | 85 | 98  | 98  | 103 |
| 103                         | 108 |    |     |     |     |
| FPC 0 EA0 Temp Sensor       | 62  | 72 | 90  | 90  | 100 |
| 100                         | 105 |    |     |     |     |
| FPC 0 EA0_XR0 Temp Sensor   | 77  | 87 | 100 | 100 | 105 |
| 105                         | 108 |    |     |     |     |
| FPC 0 EA0_XR1 Temp Sensor   | 77  | 87 | 100 | 100 | 105 |
| 105                         | 108 |    |     |     |     |
| FPC 0 EA1 Temp Sensor       | 62  | 72 | 90  | 90  | 100 |
| 100                         | 105 |    |     |     |     |
| FPC 0 EA1_XR0 Temp Sensor   | 77  | 87 | 100 | 100 | 105 |
| 105                         | 108 |    |     |     |     |
| FPC 0 EA1_XR1 Temp Sensor   | 77  | 87 | 100 | 100 | 105 |
| 105                         | 108 |    |     |     |     |
| FPC 0 EA2 Temp Sensor       | 62  | 72 | 90  | 90  | 100 |
| 100                         | 105 |    |     |     |     |
| FPC 0 EA2_XR0 Temp Sensor   | 77  | 87 | 100 | 100 | 105 |
| 105                         | 108 |    |     |     |     |
| FPC 0 EA2_XR1 Temp Sensor   | 77  | 87 | 100 | 100 | 105 |
| 105                         | 108 |    |     |     |     |
| FPC 0 EA3 Temp Sensor       | 62  | 72 | 90  | 90  | 100 |
| 100                         | 105 |    |     |     |     |
| FPC 0 EA3_XR0 Temp Sensor   | 77  | 87 | 100 | 100 | 105 |
| 105                         | 108 |    |     |     |     |
| FPC 0 EA3_XR1 Temp Sensor   | 77  | 87 | 100 | 100 | 105 |
| 105                         | 108 |    |     |     |     |
| FPC 0 EA4 Temp Sensor       | 62  | 72 | 90  | 90  | 100 |
| 100                         | 105 |    |     |     |     |
| FPC 0 EA4_XR0 Temp Sensor   | 77  | 87 | 100 | 100 | 105 |
| 105                         | 108 |    |     |     |     |
| FPC 0 EA4_XR1 Temp Sensor   | 77  | 87 | 100 | 100 | 105 |
| 105                         | 108 |    |     |     |     |
| FPC 0 EA5 Temp Sensor       | 62  | 72 | 90  | 90  | 100 |
| 100                         | 105 |    |     |     |     |
| FPC 0 EA5_XR0 Temp Sensor   | 77  | 87 | 100 | 100 | 105 |
| 105                         | 108 |    |     |     |     |
| FPC 0 EA5_XR1 Temp Sensor   | 77  | 87 | 100 | 100 | 105 |
| 105                         | 108 |    |     |     |     |
| FPC 0 EA0_HMC0 Logic die    | 79  | 89 | 103 | 103 | 110 |
| 110                         | 115 |    |     |     |     |
| FPC 0 EA0_HMC0 DRAM botm    | 74  | 84 | 98  | 98  | 105 |
| 105                         | 110 |    |     |     |     |
| FPC 0 EA0_HMC1 Logic die    | 79  | 89 | 103 | 103 | 110 |
| 110                         | 115 |    |     |     |     |
| FPC 0 EA0_HMC1 DRAM botm    | 74  | 84 | 98  | 98  | 105 |



|                          |     |    |     |     |     |
|--------------------------|-----|----|-----|-----|-----|
| 105                      | 110 |    |     |     |     |
| FPC 0 EA0_HMC2 Logic die | 79  | 89 | 103 | 103 | 110 |
| 110 115                  |     |    |     |     |     |
| FPC 0 EA0_HMC2 DRAM botm | 74  | 84 | 98  | 98  | 105 |
| 105 110                  |     |    |     |     |     |
| FPC 0 EA1_HMC0 Logic die | 79  | 89 | 103 | 103 | 110 |
| 110 115                  |     |    |     |     |     |
| FPC 0 EA1_HMC0 DRAM botm | 74  | 84 | 98  | 98  | 105 |
| 105 110                  |     |    |     |     |     |
| FPC 0 EA1_HMC1 Logic die | 79  | 89 | 103 | 103 | 110 |
| 110 115                  |     |    |     |     |     |
| FPC 0 EA1_HMC1 DRAM botm | 74  | 84 | 98  | 98  | 105 |
| 105 110                  |     |    |     |     |     |
| FPC 0 EA1_HMC2 Logic die | 79  | 89 | 103 | 103 | 110 |
| 110 115                  |     |    |     |     |     |
| FPC 0 EA1_HMC2 DRAM botm | 74  | 84 | 98  | 98  | 105 |
| 105 110                  |     |    |     |     |     |
| FPC 0 EA2_HMC0 Logic die | 79  | 89 | 103 | 103 | 110 |
| 110 115                  |     |    |     |     |     |
| FPC 0 EA2_HMC0 DRAM botm | 74  | 84 | 98  | 98  | 105 |
| 105 110                  |     |    |     |     |     |
| FPC 0 EA2_HMC1 Logic die | 79  | 89 | 103 | 103 | 110 |
| 110 115                  |     |    |     |     |     |
| FPC 0 EA2_HMC1 DRAM botm | 74  | 84 | 98  | 98  | 105 |
| 105 110                  |     |    |     |     |     |
| FPC 0 EA2_HMC2 Logic die | 79  | 89 | 103 | 103 | 110 |
| 110 115                  |     |    |     |     |     |
| FPC 0 EA2_HMC2 DRAM botm | 74  | 84 | 98  | 98  | 105 |
| 105 110                  |     |    |     |     |     |
| FPC 0 EA3_HMC0 Logic die | 79  | 89 | 103 | 103 | 110 |
| 110 115                  |     |    |     |     |     |
| FPC 0 EA3_HMC0 DRAM botm | 74  | 84 | 98  | 98  | 105 |
| 105 110                  |     |    |     |     |     |
| FPC 0 EA3_HMC1 Logic die | 79  | 89 | 103 | 103 | 110 |
| 110 115                  |     |    |     |     |     |
| FPC 0 EA3_HMC1 DRAM botm | 74  | 84 | 98  | 98  | 105 |
| 105 110                  |     |    |     |     |     |
| FPC 0 EA3_HMC2 Logic die | 79  | 89 | 103 | 103 | 110 |
| 110 115                  |     |    |     |     |     |
| FPC 0 EA3_HMC2 DRAM botm | 74  | 84 | 98  | 98  | 105 |
| 105 110                  |     |    |     |     |     |
| FPC 0 EA4_HMC0 Logic die | 79  | 89 | 103 | 103 | 110 |
| 110 115                  |     |    |     |     |     |
| FPC 0 EA4_HMC0 DRAM botm | 74  | 84 | 98  | 98  | 105 |
| 105 110                  |     |    |     |     |     |
| FPC 0 EA4_HMC1 Logic die | 79  | 89 | 103 | 103 | 110 |
| 110 115                  |     |    |     |     |     |
| FPC 0 EA4_HMC1 DRAM botm | 74  | 84 | 98  | 98  | 105 |
| 105 110                  |     |    |     |     |     |
| FPC 0 EA4_HMC2 Logic die | 79  | 89 | 103 | 103 | 110 |
| 110 115                  |     |    |     |     |     |
| FPC 0 EA4_HMC2 DRAM botm | 74  | 84 | 98  | 98  | 105 |
| 105 110                  |     |    |     |     |     |
| FPC 0 EA5_HMC0 Logic die | 79  | 89 | 103 | 103 | 110 |
| 110 115                  |     |    |     |     |     |
| FPC 0 EA5_HMC0 DRAM botm | 74  | 84 | 98  | 98  | 105 |
| 105 110                  |     |    |     |     |     |
| FPC 0 EA5_HMC1 Logic die | 79  | 89 | 103 | 103 | 110 |
| 110 115                  |     |    |     |     |     |
| FPC 0 EA5_HMC1 DRAM botm | 74  | 84 | 98  | 98  | 105 |

|                 |             |    |    |     |     |     |
|-----------------|-------------|----|----|-----|-----|-----|
| 105             | 110         |    |    |     |     |     |
| FPC 0 EA5_HMC2  | Logic die   | 79 | 89 | 103 | 103 | 110 |
| 110             | 115         |    |    |     |     |     |
| FPC 0 EA5_HMC2  | DRAM botm   | 74 | 84 | 98  | 98  | 105 |
| 105             | 110         |    |    |     |     |     |
| FPC 2 Intake-A  | Temp Sensor | 52 | 62 | 72  | 72  | 85  |
| 85              | 90          |    |    |     |     |     |
| FPC 2 Exhaust-A | Temp Sensor | 75 | 85 | 98  | 98  | 103 |
| 103             | 108         |    |    |     |     |     |
| FPC 2 Exhaust-B | Temp Sensor | 75 | 85 | 98  | 98  | 103 |
| 103             | 108         |    |    |     |     |     |
| FPC 2 EA0       | Temp Sensor | 62 | 72 | 90  | 90  | 100 |
| 100             | 105         |    |    |     |     |     |
| FPC 2 EA0_XR0   | Temp Sensor | 77 | 87 | 100 | 100 | 105 |
| 105             | 108         |    |    |     |     |     |
| FPC 2 EA0_XR1   | Temp Sensor | 77 | 87 | 100 | 100 | 105 |
| 105             | 108         |    |    |     |     |     |
| FPC 2 EA1       | Temp Sensor | 62 | 72 | 90  | 90  | 100 |
| 100             | 105         |    |    |     |     |     |
| FPC 2 EA1_XR0   | Temp Sensor | 77 | 87 | 100 | 100 | 105 |
| 105             | 108         |    |    |     |     |     |
| FPC 2 EA1_XR1   | Temp Sensor | 77 | 87 | 100 | 100 | 105 |
| 105             | 108         |    |    |     |     |     |
| FPC 2 EA2       | Temp Sensor | 62 | 72 | 90  | 90  | 100 |
| 100             | 105         |    |    |     |     |     |
| FPC 2 EA2_XR0   | Temp Sensor | 77 | 87 | 100 | 100 | 105 |
| 105             | 108         |    |    |     |     |     |
| FPC 2 EA2_XR1   | Temp Sensor | 77 | 87 | 100 | 100 | 105 |
| 105             | 108         |    |    |     |     |     |
| FPC 2 EA3       | Temp Sensor | 62 | 72 | 90  | 90  | 100 |
| 100             | 105         |    |    |     |     |     |
| FPC 2 EA3_XR0   | Temp Sensor | 77 | 87 | 100 | 100 | 105 |
| 105             | 108         |    |    |     |     |     |
| FPC 2 EA3_XR1   | Temp Sensor | 77 | 87 | 100 | 100 | 105 |
| 105             | 108         |    |    |     |     |     |
| FPC 2 EA4       | Temp Sensor | 62 | 72 | 90  | 90  | 100 |
| 100             | 105         |    |    |     |     |     |
| FPC 2 EA4_XR0   | Temp Sensor | 77 | 87 | 100 | 100 | 105 |
| 105             | 108         |    |    |     |     |     |
| FPC 2 EA4_XR1   | Temp Sensor | 77 | 87 | 100 | 100 | 105 |
| 105             | 108         |    |    |     |     |     |
| FPC 2 EA5       | Temp Sensor | 62 | 72 | 90  | 90  | 100 |
| 100             | 105         |    |    |     |     |     |
| FPC 2 EA5_XR0   | Temp Sensor | 77 | 87 | 100 | 100 | 105 |
| 105             | 108         |    |    |     |     |     |
| FPC 2 EA5_XR1   | Temp Sensor | 77 | 87 | 100 | 100 | 105 |
| 105             | 108         |    |    |     |     |     |
| FPC 2 EA0_HMC0  | Logic die   | 79 | 89 | 103 | 103 | 110 |
| 110             | 115         |    |    |     |     |     |
| FPC 2 EA0_HMC0  | DRAM botm   | 74 | 84 | 98  | 98  | 105 |
| 105             | 110         |    |    |     |     |     |
| FPC 2 EA0_HMC1  | Logic die   | 79 | 89 | 103 | 103 | 110 |
| 110             | 115         |    |    |     |     |     |
| FPC 2 EA0_HMC1  | DRAM botm   | 74 | 84 | 98  | 98  | 105 |
| 105             | 110         |    |    |     |     |     |
| FPC 2 EA0_HMC2  | Logic die   | 79 | 89 | 103 | 103 | 110 |
| 110             | 115         |    |    |     |     |     |
| FPC 2 EA0_HMC2  | DRAM botm   | 74 | 84 | 98  | 98  | 105 |
| 105             | 110         |    |    |     |     |     |
| FPC 2 EA1_HMC0  | Logic die   | 79 | 89 | 103 | 103 | 110 |

|                            |     |    |    |     |         |
|----------------------------|-----|----|----|-----|---------|
| 110                        | 115 |    |    |     |         |
| FPC 2 EA1_HMC0 DRAM botm   |     | 74 | 84 | 98  | 98 105  |
| 105                        | 110 |    |    |     |         |
| FPC 2 EA1_HMC1 Logic die   |     | 79 | 89 | 103 | 103 110 |
| 110                        | 115 |    |    |     |         |
| FPC 2 EA1_HMC1 DRAM botm   |     | 74 | 84 | 98  | 98 105  |
| 105                        | 110 |    |    |     |         |
| FPC 2 EA1_HMC2 Logic die   |     | 79 | 89 | 103 | 103 110 |
| 110                        | 115 |    |    |     |         |
| FPC 2 EA1_HMC2 DRAM botm   |     | 74 | 84 | 98  | 98 105  |
| 105                        | 110 |    |    |     |         |
| FPC 2 EA2_HMC0 Logic die   |     | 79 | 89 | 103 | 103 110 |
| 110                        | 115 |    |    |     |         |
| FPC 2 EA2_HMC0 DRAM botm   |     | 74 | 84 | 98  | 98 105  |
| 105                        | 110 |    |    |     |         |
| FPC 2 EA2_HMC1 Logic die   |     | 79 | 89 | 103 | 103 110 |
| 110                        | 115 |    |    |     |         |
| FPC 2 EA2_HMC1 DRAM botm   |     | 74 | 84 | 98  | 98 105  |
| 105                        | 110 |    |    |     |         |
| FPC 2 EA2_HMC2 Logic die   |     | 79 | 89 | 103 | 103 110 |
| 110                        | 115 |    |    |     |         |
| FPC 2 EA2_HMC2 DRAM botm   |     | 74 | 84 | 98  | 98 105  |
| 105                        | 110 |    |    |     |         |
| FPC 2 EA3_HMC0 Logic die   |     | 79 | 89 | 103 | 103 110 |
| 110                        | 115 |    |    |     |         |
| FPC 2 EA3_HMC0 DRAM botm   |     | 74 | 84 | 98  | 98 105  |
| 105                        | 110 |    |    |     |         |
| FPC 2 EA3_HMC1 Logic die   |     | 79 | 89 | 103 | 103 110 |
| 110                        | 115 |    |    |     |         |
| FPC 2 EA3_HMC1 DRAM botm   |     | 74 | 84 | 98  | 98 105  |
| 105                        | 110 |    |    |     |         |
| FPC 2 EA3_HMC2 Logic die   |     | 79 | 89 | 103 | 103 110 |
| 110                        | 115 |    |    |     |         |
| FPC 2 EA3_HMC2 DRAM botm   |     | 74 | 84 | 98  | 98 105  |
| 105                        | 110 |    |    |     |         |
| FPC 2 EA4_HMC0 Logic die   |     | 79 | 89 | 103 | 103 110 |
| 110                        | 115 |    |    |     |         |
| FPC 2 EA4_HMC0 DRAM botm   |     | 74 | 84 | 98  | 98 105  |
| 105                        | 110 |    |    |     |         |
| FPC 2 EA4_HMC1 Logic die   |     | 79 | 89 | 103 | 103 110 |
| 110                        | 115 |    |    |     |         |
| FPC 2 EA4_HMC1 DRAM botm   |     | 74 | 84 | 98  | 98 105  |
| 105                        | 110 |    |    |     |         |
| FPC 2 EA4_HMC2 Logic die   |     | 79 | 89 | 103 | 103 110 |
| 110                        | 115 |    |    |     |         |
| FPC 2 EA4_HMC2 DRAM botm   |     | 74 | 84 | 98  | 98 105  |
| 105                        | 110 |    |    |     |         |
| FPC 2 EA5_HMC0 Logic die   |     | 79 | 89 | 103 | 103 110 |
| 110                        | 115 |    |    |     |         |
| FPC 2 EA5_HMC0 DRAM botm   |     | 74 | 84 | 98  | 98 105  |
| 105                        | 110 |    |    |     |         |
| FPC 2 EA5_HMC1 Logic die   |     | 79 | 89 | 103 | 103 110 |
| 110                        | 115 |    |    |     |         |
| FPC 2 EA5_HMC1 DRAM botm   |     | 74 | 84 | 98  | 98 105  |
| 105                        | 110 |    |    |     |         |
| FPC 2 EA5_HMC2 Logic die   |     | 79 | 89 | 103 | 103 110 |
| 110                        | 115 |    |    |     |         |
| FPC 2 EA5_HMC2 DRAM botm   |     | 74 | 84 | 98  | 98 105  |
| 105                        | 110 |    |    |     |         |
| FPC 3 Intake-A Temp Sensor |     | 52 | 62 | 72  | 72 85   |

|                             |    |    |     |     |     |
|-----------------------------|----|----|-----|-----|-----|
| 85                          | 90 |    |     |     |     |
| FPC 3 Exhaust-A Temp Sensor | 75 | 85 | 98  | 98  | 103 |
| 103 108                     |    |    |     |     |     |
| FPC 3 Exhaust-B Temp Sensor | 75 | 85 | 98  | 98  | 103 |
| 103 108                     |    |    |     |     |     |
| FPC 3 EA0 Temp Sensor       | 62 | 72 | 90  | 90  | 100 |
| 100 105                     |    |    |     |     |     |
| FPC 3 EA0_XR0 Temp Sensor   | 77 | 87 | 100 | 100 | 105 |
| 105 108                     |    |    |     |     |     |
| FPC 3 EA0_XR1 Temp Sensor   | 77 | 87 | 100 | 100 | 105 |
| 105 108                     |    |    |     |     |     |
| FPC 3 EA1 Temp Sensor       | 62 | 72 | 90  | 90  | 100 |
| 100 105                     |    |    |     |     |     |
| FPC 3 EA1_XR0 Temp Sensor   | 77 | 87 | 100 | 100 | 105 |
| 105 108                     |    |    |     |     |     |
| FPC 3 EA1_XR1 Temp Sensor   | 77 | 87 | 100 | 100 | 105 |
| 105 108                     |    |    |     |     |     |
| FPC 3 EA2 Temp Sensor       | 62 | 72 | 90  | 90  | 100 |
| 100 105                     |    |    |     |     |     |
| FPC 3 EA2_XR0 Temp Sensor   | 77 | 87 | 100 | 100 | 105 |
| 105 108                     |    |    |     |     |     |
| FPC 3 EA2_XR1 Temp Sensor   | 77 | 87 | 100 | 100 | 105 |
| 105 108                     |    |    |     |     |     |
| FPC 3 EA3 Temp Sensor       | 62 | 72 | 90  | 90  | 100 |
| 100 105                     |    |    |     |     |     |
| FPC 3 EA3_XR0 Temp Sensor   | 77 | 87 | 100 | 100 | 105 |
| 105 108                     |    |    |     |     |     |
| FPC 3 EA3_XR1 Temp Sensor   | 77 | 87 | 100 | 100 | 105 |
| 105 108                     |    |    |     |     |     |
| FPC 3 EA4 Temp Sensor       | 62 | 72 | 90  | 90  | 100 |
| 100 105                     |    |    |     |     |     |
| FPC 3 EA4_XR0 Temp Sensor   | 77 | 87 | 100 | 100 | 105 |
| 105 108                     |    |    |     |     |     |
| FPC 3 EA4_XR1 Temp Sensor   | 77 | 87 | 100 | 100 | 105 |
| 105 108                     |    |    |     |     |     |
| FPC 3 EA5 Temp Sensor       | 62 | 72 | 90  | 90  | 100 |
| 100 105                     |    |    |     |     |     |
| FPC 3 EA5_XR0 Temp Sensor   | 77 | 87 | 100 | 100 | 105 |
| 105 108                     |    |    |     |     |     |
| FPC 3 EA5_XR1 Temp Sensor   | 77 | 87 | 100 | 100 | 105 |
| 105 108                     |    |    |     |     |     |
| FPC 3 EA0_HMC0 Logic die    | 79 | 89 | 103 | 103 | 110 |
| 110 115                     |    |    |     |     |     |
| FPC 3 EA0_HMC0 DRAM botm    | 74 | 84 | 98  | 98  | 105 |
| 105 110                     |    |    |     |     |     |
| FPC 3 EA0_HMC1 Logic die    | 79 | 89 | 103 | 103 | 110 |
| 110 115                     |    |    |     |     |     |
| FPC 3 EA0_HMC1 DRAM botm    | 74 | 84 | 98  | 98  | 105 |
| 105 110                     |    |    |     |     |     |
| FPC 3 EA0_HMC2 Logic die    | 79 | 89 | 103 | 103 | 110 |
| 110 115                     |    |    |     |     |     |
| FPC 3 EA0_HMC2 DRAM botm    | 74 | 84 | 98  | 98  | 105 |
| 105 110                     |    |    |     |     |     |
| FPC 3 EA1_HMC0 Logic die    | 79 | 89 | 103 | 103 | 110 |
| 110 115                     |    |    |     |     |     |
| FPC 3 EA1_HMC0 DRAM botm    | 74 | 84 | 98  | 98  | 105 |
| 105 110                     |    |    |     |     |     |
| FPC 3 EA1_HMC1 Logic die    | 79 | 89 | 103 | 103 | 110 |
| 110 115                     |    |    |     |     |     |
| FPC 3 EA1_HMC1 DRAM botm    | 74 | 84 | 98  | 98  | 105 |

|                          |     |    |    |     |     |     |
|--------------------------|-----|----|----|-----|-----|-----|
| 105                      | 110 |    |    |     |     |     |
| FPC 3 EA1_HMC2 Logic die |     | 79 | 89 | 103 | 103 | 110 |
| 110                      | 115 |    |    |     |     |     |
| FPC 3 EA1_HMC2 DRAM botm |     | 74 | 84 | 98  | 98  | 105 |
| 105                      | 110 |    |    |     |     |     |
| FPC 3 EA2_HMC0 Logic die |     | 79 | 89 | 103 | 103 | 110 |
| 110                      | 115 |    |    |     |     |     |
| FPC 3 EA2_HMC0 DRAM botm |     | 74 | 84 | 98  | 98  | 105 |
| 105                      | 110 |    |    |     |     |     |
| FPC 3 EA2_HMC1 Logic die |     | 79 | 89 | 103 | 103 | 110 |
| 110                      | 115 |    |    |     |     |     |
| FPC 3 EA2_HMC1 DRAM botm |     | 74 | 84 | 98  | 98  | 105 |
| 105                      | 110 |    |    |     |     |     |
| FPC 3 EA2_HMC2 Logic die |     | 79 | 89 | 103 | 103 | 110 |
| 110                      | 115 |    |    |     |     |     |
| FPC 3 EA2_HMC2 DRAM botm |     | 74 | 84 | 98  | 98  | 105 |
| 105                      | 110 |    |    |     |     |     |
| FPC 3 EA3_HMC0 Logic die |     | 79 | 89 | 103 | 103 | 110 |
| 110                      | 115 |    |    |     |     |     |
| FPC 3 EA3_HMC0 DRAM botm |     | 74 | 84 | 98  | 98  | 105 |
| 105                      | 110 |    |    |     |     |     |
| FPC 3 EA3_HMC1 Logic die |     | 79 | 89 | 103 | 103 | 110 |
| 110                      | 115 |    |    |     |     |     |
| FPC 3 EA3_HMC1 DRAM botm |     | 74 | 84 | 98  | 98  | 105 |
| 105                      | 110 |    |    |     |     |     |
| FPC 3 EA3_HMC2 Logic die |     | 79 | 89 | 103 | 103 | 110 |
| 110                      | 115 |    |    |     |     |     |
| FPC 3 EA3_HMC2 DRAM botm |     | 74 | 84 | 98  | 98  | 105 |
| 105                      | 110 |    |    |     |     |     |
| FPC 3 EA4_HMC0 Logic die |     | 79 | 89 | 103 | 103 | 110 |
| 110                      | 115 |    |    |     |     |     |
| FPC 3 EA4_HMC0 DRAM botm |     | 74 | 84 | 98  | 98  | 105 |
| 105                      | 110 |    |    |     |     |     |
| FPC 3 EA4_HMC1 Logic die |     | 79 | 89 | 103 | 103 | 110 |
| 110                      | 115 |    |    |     |     |     |
| FPC 3 EA4_HMC1 DRAM botm |     | 74 | 84 | 98  | 98  | 105 |
| 105                      | 110 |    |    |     |     |     |
| FPC 3 EA4_HMC2 Logic die |     | 79 | 89 | 103 | 103 | 110 |
| 110                      | 115 |    |    |     |     |     |
| FPC 3 EA4_HMC2 DRAM botm |     | 74 | 84 | 98  | 98  | 105 |
| 105                      | 110 |    |    |     |     |     |
| FPC 3 EA5_HMC0 Logic die |     | 79 | 89 | 103 | 103 | 110 |
| 110                      | 115 |    |    |     |     |     |
| FPC 3 EA5_HMC0 DRAM botm |     | 74 | 84 | 98  | 98  | 105 |
| 105                      | 110 |    |    |     |     |     |
| FPC 3 EA5_HMC1 Logic die |     | 79 | 89 | 103 | 103 | 110 |
| 110                      | 115 |    |    |     |     |     |
| FPC 3 EA5_HMC1 DRAM botm |     | 74 | 84 | 98  | 98  | 105 |
| 105                      | 110 |    |    |     |     |     |
| FPC 3 EA5_HMC2 Logic die |     | 79 | 89 | 103 | 103 | 110 |
| 110                      | 115 |    |    |     |     |     |
| FPC 3 EA5_HMC2 DRAM botm |     | 74 | 84 | 98  | 98  | 105 |
| 105                      | 110 |    |    |     |     |     |
| SFB 0 Intake-A           |     | 65 | 75 | 85  | 85  | 95  |
| 95                       | 105 |    |    |     |     |     |
| SFB 0 Intake-B           |     | 65 | 75 | 85  | 85  | 95  |
| 95                       | 105 |    |    |     |     |     |
| SFB 0 Exhaust-A          |     | 75 | 85 | 95  | 95  | 95  |
| 95                       | 105 |    |    |     |     |     |
| SFB 0 Exhaust-B          |     | 75 | 85 | 95  | 95  | 95  |

|                 |     |    |    |     |     |     |
|-----------------|-----|----|----|-----|-----|-----|
| 95              | 105 |    |    |     |     |     |
| SFB 0 PF0       |     | 65 | 75 | 100 | 100 | 105 |
| 105             | 115 |    |    |     |     |     |
| SFB 0 PF1       |     | 65 | 75 | 100 | 100 | 105 |
| 105             | 115 |    |    |     |     |     |
| SFB 1 Intake-A  |     | 65 | 75 | 85  | 85  | 95  |
| 95              | 105 |    |    |     |     |     |
| SFB 1 Intake-B  |     | 65 | 75 | 85  | 85  | 95  |
| 95              | 105 |    |    |     |     |     |
| SFB 1 Exhaust-A |     | 75 | 85 | 95  | 95  | 95  |
| 95              | 105 |    |    |     |     |     |
| SFB 1 Exhaust-B |     | 75 | 85 | 95  | 95  | 95  |
| 95              | 105 |    |    |     |     |     |
| SFB 1 PF0       |     | 65 | 75 | 100 | 100 | 105 |
| 105             | 115 |    |    |     |     |     |
| SFB 1 PF1       |     | 65 | 75 | 100 | 100 | 105 |
| 105             | 115 |    |    |     |     |     |
| SFB 2 Intake-A  |     | 65 | 75 | 85  | 85  | 95  |
| 95              | 105 |    |    |     |     |     |
| SFB 2 Intake-B  |     | 65 | 75 | 85  | 85  | 95  |
| 95              | 105 |    |    |     |     |     |
| SFB 2 Exhaust-A |     | 75 | 85 | 95  | 95  | 95  |
| 95              | 105 |    |    |     |     |     |
| SFB 2 Exhaust-B |     | 75 | 85 | 95  | 95  | 95  |
| 95              | 105 |    |    |     |     |     |
| SFB 2 PF0       |     | 65 | 75 | 100 | 100 | 105 |
| 105             | 115 |    |    |     |     |     |
| SFB 2 PF1       |     | 65 | 75 | 100 | 100 | 105 |
| 105             | 115 |    |    |     |     |     |
| SFB 3 Intake-A  |     | 65 | 75 | 85  | 85  | 95  |
| 95              | 105 |    |    |     |     |     |
| SFB 3 Intake-B  |     | 65 | 75 | 85  | 85  | 95  |
| 95              | 105 |    |    |     |     |     |
| SFB 3 Exhaust-A |     | 75 | 85 | 95  | 95  | 95  |
| 95              | 105 |    |    |     |     |     |
| SFB 3 Exhaust-B |     | 75 | 85 | 95  | 95  | 95  |
| 95              | 105 |    |    |     |     |     |
| SFB 3 PF0       |     | 65 | 75 | 100 | 100 | 105 |
| 105             | 115 |    |    |     |     |     |
| SFB 3 PF1       |     | 65 | 75 | 100 | 100 | 105 |
| 105             | 115 |    |    |     |     |     |
| SFB 4 Intake-A  |     | 65 | 75 | 85  | 85  | 95  |
| 95              | 105 |    |    |     |     |     |
| SFB 4 Intake-B  |     | 65 | 75 | 85  | 85  | 95  |
| 95              | 105 |    |    |     |     |     |
| SFB 4 Exhaust-A |     | 75 | 85 | 95  | 95  | 95  |
| 95              | 105 |    |    |     |     |     |
| SFB 4 Exhaust-B |     | 75 | 85 | 95  | 95  | 95  |
| 95              | 105 |    |    |     |     |     |
| SFB 4 PF0       |     | 65 | 75 | 100 | 100 | 105 |
| 105             | 115 |    |    |     |     |     |
| SFB 4 PF1       |     | 65 | 75 | 100 | 100 | 105 |
| 105             | 115 |    |    |     |     |     |
| SFB 5 Intake-A  |     | 65 | 75 | 85  | 85  | 95  |
| 95              | 105 |    |    |     |     |     |
| SFB 5 Intake-B  |     | 65 | 75 | 85  | 85  | 95  |
| 95              | 105 |    |    |     |     |     |
| SFB 5 Exhaust-A |     | 75 | 85 | 95  | 95  | 95  |
| 95              | 105 |    |    |     |     |     |
| SFB 5 Exhaust-B |     | 75 | 85 | 95  | 95  | 95  |

|           |     |    |    |     |     |     |
|-----------|-----|----|----|-----|-----|-----|
| 95        | 105 |    |    |     |     |     |
| SFB 5 PF0 |     | 65 | 75 | 100 | 100 | 105 |
| 105       | 115 |    |    |     |     |     |
| SFB 5 PF1 |     | 65 | 75 | 100 | 100 | 105 |
| 105       | 115 |    |    |     |     |     |

### show chassis temperature-thresholds (MX204 Router)

```
user@host> show chassis temperature-thresholds
```

| Fire Shutdown               |             | Fan speed   |      | Yellow alarm |         | Red alarm |
|-----------------------------|-------------|-------------|------|--------------|---------|-----------|
|                             |             | (degrees C) |      | (degrees C)  |         | (degrees  |
| Item                        | (degrees C) | Normal      | High | Normal       | Bad fan | Normal    |
| Bad fan                     | Normal      |             |      |              |         |           |
| Routing Engine              |             | 48          | 54   | 85           | 85      | 100       |
| 100                         | 102         |             |      |              |         |           |
| CB Top Right Inlet Sensor   |             | 35          | 40   | 63           | 63      | 85        |
| 85                          | 95          |             |      |              |         |           |
| CB Top Left Inlet Sensor    |             | 40          | 45   | 65           | 65      | 85        |
| 85                          | 95          |             |      |              |         |           |
| CB Top Right Exhaust Sensor |             | 45          | 50   | 68           | 68      | 85        |
| 85                          | 95          |             |      |              |         |           |
| CB Top Left Exhaust Sensor  |             | 65          | 70   | 78           | 78      | 85        |
| 85                          | 95          |             |      |              |         |           |
| CB CPU Core-0 Temp          |             | 65          | 70   | 80           | 80      | 90        |
| 90                          | 100         |             |      |              |         |           |
| CB CPU Core-1 Temp          |             | 65          | 70   | 80           | 80      | 90        |
| 90                          | 100         |             |      |              |         |           |
| CB CPU Core-2 Temp          |             | 65          | 70   | 80           | 80      | 90        |
| 90                          | 100         |             |      |              |         |           |
| CB CPU Core-3 Temp          |             | 65          | 70   | 80           | 80      | 90        |
| 90                          | 100         |             |      |              |         |           |
| CB CPU Core-4 Temp          |             | 65          | 70   | 80           | 80      | 90        |
| 90                          | 100         |             |      |              |         |           |
| CB CPU Core-5 Temp          |             | 65          | 70   | 80           | 80      | 90        |
| 90                          | 100         |             |      |              |         |           |
| CB CPU Core-6 Temp          |             | 65          | 70   | 80           | 80      | 90        |
| 90                          | 100         |             |      |              |         |           |
| CB CPU Core-7 Temp          |             | 65          | 70   | 80           | 80      | 90        |
| 90                          | 100         |             |      |              |         |           |
| FPC EA0_HMC0 Logic die      |             | 85          | 90   | 95           | 95      | 105       |
| 105                         | 110         |             |      |              |         |           |
| FPC EA0_HMC0 DRAM botm      |             | 80          | 85   | 90           | 90      | 105       |
| 105                         | 110         |             |      |              |         |           |
| FPC EA0_HMC1 Logic die      |             | 85          | 90   | 95           | 95      | 105       |
| 105                         | 110         |             |      |              |         |           |
| FPC EA0_HMC1 DRAM botm      |             | 80          | 85   | 90           | 90      | 105       |
| 105                         | 110         |             |      |              |         |           |
| FPC EA0 Chip                |             | 92          | 97   | 103          | 103     | 109       |
| 109                         | 115         |             |      |              |         |           |
| FPC EA0-XR0 Chip            |             | 85          | 90   | 98           | 98      | 103       |
| 103                         | 110         |             |      |              |         |           |
| FPC EA0-XR1 Chip            |             | 85          | 90   | 98           | 98      | 103       |
| 103                         | 110         |             |      |              |         |           |

## show chassis temperature-thresholds (PTX10008 Routers)

user@host&gt; show chassis temperature-thresholds

| Shutdown                    | Fan speed   |      | Yellow alarm |         | Red alarm   |         | Fire |
|-----------------------------|-------------|------|--------------|---------|-------------|---------|------|
| (degrees C)                 | (degrees C) |      | (degrees C)  |         | (degrees C) |         |      |
| Item                        | Normal      | High | Normal       | Bad fan | Normal      | Bad fan |      |
| Normal                      |             |      |              |         |             |         |      |
| Routing Engine 0            | 48          | 54   | 85           | 85      | 100         | 100     |      |
| 102                         |             |      |              |         |             |         |      |
| Routing Engine 1            | 48          | 54   | 85           | 85      | 100         | 100     |      |
| 102                         |             |      |              |         |             |         |      |
| CB 0 Intake Temp Sensor     | 30          | 35   | 80           | 80      | 85          | 85      |      |
| 95                          |             |      |              |         |             |         |      |
| CB 0 Exhaust Temp Sensor    | 30          | 35   | 80           | 80      | 85          | 85      |      |
| 95                          |             |      |              |         |             |         |      |
| CB 0 CPU Die Temp Sensor    | 40          | 45   | 95           | 95      | 100         | 100     |      |
| 110                         |             |      |              |         |             |         |      |
| CB 1 Intake Temp Sensor     | 30          | 35   | 80           | 80      | 85          | 85      |      |
| 95                          |             |      |              |         |             |         |      |
| CB 1 Exhaust Temp Sensor    | 30          | 35   | 80           | 80      | 85          | 85      |      |
| 95                          |             |      |              |         |             |         |      |
| CB 1 CPU Die Temp Sensor    | 40          | 45   | 95           | 95      | 100         | 100     |      |
| 110                         |             |      |              |         |             |         |      |
| FPC 0 Intake-A Temp Sensor  | 30          | 35   | 80           | 80      | 85          | 85      |      |
| 95                          |             |      |              |         |             |         |      |
| FPC 0 Intake-B Temp Sensor  | 30          | 35   | 80           | 80      | 85          | 85      |      |
| 95                          |             |      |              |         |             |         |      |
| FPC 0 Exhaust-A Temp Sensor | 30          | 35   | 80           | 80      | 85          | 85      |      |
| 95                          |             |      |              |         |             |         |      |
| FPC 0 Exhaust-B Temp Sensor | 30          | 35   | 80           | 80      | 85          | 85      |      |
| 95                          |             |      |              |         |             |         |      |
| FPC 0 Exhaust-C Temp Sensor | 30          | 35   | 80           | 80      | 85          | 85      |      |
| 95                          |             |      |              |         |             |         |      |
| FPC 0 PE0 Temp Sensor       | 40          | 45   | 100          | 100     | 105         | 105     |      |
| 115                         |             |      |              |         |             |         |      |
| FPC 0 PE1 Temp Sensor       | 40          | 45   | 100          | 100     | 105         | 105     |      |
| 115                         |             |      |              |         |             |         |      |
| FPC 0 PE2 Temp Sensor       | 40          | 45   | 100          | 100     | 105         | 105     |      |
| 115                         |             |      |              |         |             |         |      |
| FPC 0 LCPD Temp Sensor      | 40          | 45   | 95           | 95      | 100         | 100     |      |
| 110                         |             |      |              |         |             |         |      |
| FPC 5 Intake-A Temp Sensor  | 30          | 35   | 80           | 80      | 85          | 85      |      |
| 95                          |             |      |              |         |             |         |      |
| FPC 5 Intake-B Temp Sensor  | 30          | 35   | 80           | 80      | 85          | 85      |      |
| 95                          |             |      |              |         |             |         |      |
| FPC 5 Exhaust-A Temp Sensor | 30          | 35   | 80           | 80      | 85          | 85      |      |
| 95                          |             |      |              |         |             |         |      |
| FPC 5 Exhaust-B Temp Sensor | 30          | 35   | 80           | 80      | 85          | 85      |      |
| 95                          |             |      |              |         |             |         |      |
| FPC 5 Exhaust-C Temp Sensor | 30          | 35   | 80           | 80      | 85          | 85      |      |
| 95                          |             |      |              |         |             |         |      |
| FPC 5 PE0 Temp Sensor       | 40          | 45   | 100          | 100     | 105         | 105     |      |
| 115                         |             |      |              |         |             |         |      |
| FPC 5 PE1 Temp Sensor       | 40          | 45   | 100          | 100     | 105         | 105     |      |
| 115                         |             |      |              |         |             |         |      |
| FPC 5 PE2 Temp Sensor       | 40          | 45   | 100          | 100     | 105         | 105     |      |
| 115                         |             |      |              |         |             |         |      |
| FPC 5 PE3 Temp Sensor       | 40          | 45   | 100          | 100     | 105         | 105     |      |



|       |                       |    |    |     |     |     |     |
|-------|-----------------------|----|----|-----|-----|-----|-----|
| 115   |                       |    |    |     |     |     |     |
| FPC 5 | PE4 Temp Sensor       | 40 | 45 | 100 | 100 | 105 | 105 |
| 115   |                       |    |    |     |     |     |     |
| FPC 5 | PE5 Temp Sensor       | 40 | 45 | 100 | 100 | 105 | 105 |
| 115   |                       |    |    |     |     |     |     |
| FPC 5 | LCPU Temp Sensor      | 40 | 45 | 95  | 95  | 100 | 100 |
| 110   |                       |    |    |     |     |     |     |
| FPC 6 | Intake-A Temp Sensor  | 30 | 35 | 80  | 80  | 85  | 85  |
| 95    |                       |    |    |     |     |     |     |
| FPC 6 | Intake-B Temp Sensor  | 30 | 35 | 80  | 80  | 85  | 85  |
| 95    |                       |    |    |     |     |     |     |
| FPC 6 | Exhaust-A Temp Sensor | 30 | 35 | 80  | 80  | 85  | 85  |
| 95    |                       |    |    |     |     |     |     |
| FPC 6 | Exhaust-B Temp Sensor | 30 | 35 | 80  | 80  | 85  | 85  |
| 95    |                       |    |    |     |     |     |     |
| FPC 6 | Exhaust-C Temp Sensor | 30 | 35 | 80  | 80  | 85  | 85  |
| 95    |                       |    |    |     |     |     |     |
| FPC 6 | PE0 Temp Sensor       | 40 | 45 | 100 | 100 | 105 | 105 |
| 115   |                       |    |    |     |     |     |     |
| FPC 6 | PE1 Temp Sensor       | 40 | 45 | 100 | 100 | 105 | 105 |
| 115   |                       |    |    |     |     |     |     |
| FPC 6 | PE2 Temp Sensor       | 40 | 45 | 100 | 100 | 105 | 105 |
| 115   |                       |    |    |     |     |     |     |
| FPC 6 | PE3 Temp Sensor       | 40 | 45 | 100 | 100 | 105 | 105 |
| 115   |                       |    |    |     |     |     |     |
| FPC 6 | PE4 Temp Sensor       | 40 | 45 | 100 | 100 | 105 | 105 |
| 115   |                       |    |    |     |     |     |     |
| FPC 6 | PE5 Temp Sensor       | 40 | 45 | 100 | 100 | 105 | 105 |
| 115   |                       |    |    |     |     |     |     |
| FPC 6 | LCPU Temp Sensor      | 40 | 45 | 95  | 95  | 100 | 100 |
| 110   |                       |    |    |     |     |     |     |
| SIB 0 | Intake-A Temp Sensor  | 40 | 45 | 90  | 90  | 95  | 95  |
| 105   |                       |    |    |     |     |     |     |
| SIB 0 | Intake-B Temp Sensor  | 40 | 45 | 90  | 90  | 95  | 95  |
| 105   |                       |    |    |     |     |     |     |
| SIB 0 | Exhaust-A Temp Sensor | 40 | 45 | 90  | 90  | 95  | 95  |
| 105   |                       |    |    |     |     |     |     |
| SIB 0 | Exhaust-B Temp Sensor | 40 | 45 | 90  | 90  | 95  | 95  |
| 105   |                       |    |    |     |     |     |     |
| SIB 0 | PF0 Temp Sensor       | 50 | 55 | 100 | 100 | 105 | 105 |
| 115   |                       |    |    |     |     |     |     |
| SIB 0 | PF1 Temp Sensor       | 50 | 55 | 100 | 100 | 105 | 105 |
| 115   |                       |    |    |     |     |     |     |
| SIB 1 | Intake-A Temp Sensor  | 40 | 45 | 90  | 90  | 95  | 95  |
| 105   |                       |    |    |     |     |     |     |
| SIB 1 | Intake-B Temp Sensor  | 40 | 45 | 90  | 90  | 95  | 95  |
| 105   |                       |    |    |     |     |     |     |
| SIB 1 | Exhaust-A Temp Sensor | 40 | 45 | 90  | 90  | 95  | 95  |
| 105   |                       |    |    |     |     |     |     |
| SIB 1 | Exhaust-B Temp Sensor | 40 | 45 | 90  | 90  | 95  | 95  |
| 105   |                       |    |    |     |     |     |     |
| SIB 1 | PF0 Temp Sensor       | 50 | 55 | 100 | 100 | 105 | 105 |
| 115   |                       |    |    |     |     |     |     |
| SIB 1 | PF1 Temp Sensor       | 50 | 55 | 100 | 100 | 105 | 105 |
| 115   |                       |    |    |     |     |     |     |

#### show chassis temperature-thresholds (T4000 Core Routers)

```
user@host> show chassis temperature-thresholds
```

| Item             | Fan speed   |      | Yellow alarm |         | Red alarm   |         | Fire Shutdown |
|------------------|-------------|------|--------------|---------|-------------|---------|---------------|
|                  | (degrees C) |      | (degrees C)  |         | (degrees C) |         | (degrees C)   |
|                  | Normal      | High | Normal       | Bad fan | Normal      | Bad fan | Normal        |
| Chassis default  | 48          | 54   | 65           | 55      | 75          | 65      | 100           |
| Routing Engine 0 | 55          | 65   | 85           | 85      | 100         | 100     | 102           |
| Routing Engine 1 | 55          | 65   | 85           | 85      | 100         | 100     | 102           |
| FPC 0            | 63          | 68   | 75           | 70      | 90          | 83      | 95            |
| FPC 3            | 63          | 68   | 75           | 70      | 90          | 83      | 95            |
| FPC 5            | 56          | 62   | 75           | 63      | 83          | 76      | 95            |
| FPC 6            | 63          | 68   | 75           | 70      | 90          | 83      | 95            |
| SIB 0            | 64          | 70   | 76           | 72      | 87          | 84      | 95            |
| SIB 1            | 64          | 70   | 76           | 72      | 87          | 84      | 95            |
| SIB 2            | 64          | 70   | 76           | 72      | 87          | 84      | 95            |
| SIB 3            | 64          | 70   | 76           | 72      | 87          | 84      | 95            |
| SIB 4            | 64          | 70   | 76           | 72      | 87          | 84      | 95            |

### show chassis temperature-thresholds (TX Matrix Plus Router)

```
user@host> show chassis temperature-thresholds
```

```
sfc0-re0:
```

| Item             | Fan speed   |      | Yellow alarm |         | Red alarm   |         |
|------------------|-------------|------|--------------|---------|-------------|---------|
|                  | (degrees C) |      | (degrees C)  |         | (degrees C) |         |
|                  | Normal      | High | Normal       | Bad fan | Normal      | Bad fan |
| Chassis default  | 48          | 54   | 65           | 55      | 75          | 65      |
| Routing Engine 0 | 55          | 65   | 85           | 85      | 100         | 100     |
| Routing Engine 1 | 55          | 65   | 85           | 85      | 100         | 100     |
| SIB F13 0        | 64          | 70   | 76           | 72      | 90          | 84      |
| SIB F13 3        | 64          | 70   | 76           | 72      | 90          | 84      |
| SIB F13 6        | 64          | 70   | 76           | 72      | 90          | 84      |
| SIB F13 8        | 64          | 70   | 76           | 72      | 90          | 84      |
| SIB F13 11       | 64          | 70   | 76           | 72      | 90          | 84      |
| SIB F13 12       | 64          | 70   | 76           | 72      | 90          | 84      |
| SIB F2S 16       | 64          | 70   | 76           | 72      | 90          | 84      |
| SIB F2S 17       | 64          | 70   | 76           | 72      | 90          | 84      |
| SIB F2S 18       | 64          | 70   | 76           | 72      | 90          | 84      |
| SIB F2S 19       | 64          | 70   | 76           | 72      | 90          | 84      |
| SIB F2S 20       | 64          | 70   | 76           | 72      | 90          | 84      |
| SIB F2S 21       | 64          | 70   | 76           | 72      | 90          | 84      |
| SIB F2S 22       | 64          | 70   | 76           | 72      | 90          | 84      |
| SIB F2S 23       | 64          | 70   | 76           | 72      | 90          | 84      |
| SIB F2S 24       | 64          | 70   | 76           | 72      | 90          | 84      |
| SIB F2S 25       | 64          | 70   | 76           | 72      | 90          | 84      |
| SIB F2S 26       | 64          | 70   | 76           | 72      | 90          | 84      |
| SIB F2S 27       | 64          | 70   | 76           | 72      | 90          | 84      |
| SIB F2S 28       | 64          | 70   | 76           | 72      | 90          | 84      |
| SIB F2S 29       | 64          | 70   | 76           | 72      | 90          | 84      |
| SIB F2S 30       | 64          | 70   | 76           | 72      | 90          | 84      |
| SIB F2S 31       | 64          | 70   | 76           | 72      | 90          | 84      |
| SIB F2S 32       | 64          | 70   | 76           | 72      | 90          | 84      |
| SIB F2S 33       | 64          | 70   | 76           | 72      | 90          | 84      |
| SIB F2S 34       | 64          | 70   | 76           | 72      | 90          | 84      |
| SIB F2S 35       | 64          | 70   | 76           | 72      | 90          | 84      |

```
lcc0-re0:
```

| Fan speed |  | Yellow alarm |  | Red alarm |  |
|-----------|--|--------------|--|-----------|--|
|-----------|--|--------------|--|-----------|--|

| Item             | (degrees C) |      | (degrees C) |         | (degrees C) |         |
|------------------|-------------|------|-------------|---------|-------------|---------|
|                  | Normal      | High | Normal      | Bad fan | Normal      | Bad fan |
| Chassis default  | 48          | 54   | 65          | 55      | 75          | 65      |
| Routing Engine 0 | 55          | 65   | 85          | 85      | 100         | 100     |
| Routing Engine 1 | 55          | 65   | 85          | 85      | 100         | 100     |
| FPC 1            | 56          | 62   | 75          | 63      | 83          | 76      |
| FPC 3            | 56          | 62   | 75          | 63      | 83          | 76      |
| FPC 4            | 56          | 62   | 75          | 63      | 83          | 76      |
| FPC 6            | 56          | 62   | 75          | 63      | 83          | 76      |
| FPC 7            | 56          | 62   | 75          | 63      | 83          | 76      |
| SIB 0            | 48          | 54   | 65          | 60      | 80          | 75      |
| SIB 1            | 48          | 54   | 65          | 60      | 80          | 75      |
| SIB 2            | 48          | 54   | 65          | 60      | 80          | 75      |
| SIB 3            | 48          | 54   | 65          | 60      | 80          | 75      |
| SIB 4            | 48          | 54   | 65          | 60      | 80          | 75      |

lcc1-re0:

| Item             | Fan speed<br>(degrees C) |      | Yellow alarm<br>(degrees C) |         | Red alarm<br>(degrees C) |         |
|------------------|--------------------------|------|-----------------------------|---------|--------------------------|---------|
|                  | Normal                   | High | Normal                      | Bad fan | Normal                   | Bad fan |
| Chassis default  | 48                       | 54   | 65                          | 55      | 75                       | 65      |
| Routing Engine 0 | 55                       | 65   | 85                          | 85      | 100                      | 100     |
| Routing Engine 1 | 55                       | 65   | 85                          | 85      | 100                      | 100     |
| FPC 1            | 56                       | 62   | 75                          | 63      | 83                       | 76      |
| FPC 3            | 56                       | 62   | 75                          | 63      | 83                       | 76      |
| FPC 4            | 56                       | 62   | 75                          | 63      | 83                       | 76      |
| FPC 6            | 56                       | 62   | 75                          | 63      | 83                       | 76      |
| ...              |                          |      |                             |         |                          |         |

### show chassis temperature-thresholds lcc (TX Matrix Plus Router)

```
user@host> show chassis temperature-thresholds lcc 1
```

lcc1-re0:

| Item             | Fan speed<br>(degrees C) |      | Yellow alarm<br>(degrees C) |         | Red alarm<br>(degrees C) |         |
|------------------|--------------------------|------|-----------------------------|---------|--------------------------|---------|
|                  | Normal                   | High | Normal                      | Bad fan | Normal                   | Bad fan |
| Chassis default  | 48                       | 54   | 65                          | 55      | 75                       | 65      |
| Routing Engine 0 | 55                       | 65   | 85                          | 85      | 100                      | 100     |
| Routing Engine 1 | 55                       | 65   | 85                          | 85      | 100                      | 100     |
| FPC 1            | 56                       | 62   | 75                          | 63      | 83                       | 76      |
| FPC 3            | 56                       | 62   | 75                          | 63      | 83                       | 76      |
| FPC 4            | 56                       | 62   | 75                          | 63      | 83                       | 76      |
| FPC 6            | 56                       | 62   | 75                          | 63      | 83                       | 76      |
| SIB 0            | 48                       | 54   | 65                          | 60      | 80                       | 75      |
| SIB 1            | 48                       | 54   | 65                          | 60      | 80                       | 75      |
| SIB 2            | 48                       | 54   | 65                          | 60      | 80                       | 75      |
| SIB 3            | 48                       | 54   | 65                          | 60      | 80                       | 75      |
| SIB 4            | 48                       | 54   | 65                          | 60      | 80                       | 75      |

### show chassis temperature-thresholds sfc (TX Matrix Plus Router)

```
user@host> show chassis temperature-thresholds sfc 0
```

sfc0-re0:

| Fan speed |  | Yellow alarm |  | Red alarm |  |
|-----------|--|--------------|--|-----------|--|
|-----------|--|--------------|--|-----------|--|

| Item             | (degrees C) |      | (degrees C) |         | (degrees C) |         |
|------------------|-------------|------|-------------|---------|-------------|---------|
|                  | Normal      | High | Normal      | Bad fan | Normal      | Bad fan |
| Chassis default  | 48          | 54   | 65          | 55      | 75          | 65      |
| Routing Engine 0 | 55          | 65   | 85          | 85      | 100         | 100     |
| Routing Engine 1 | 55          | 65   | 85          | 85      | 100         | 100     |
| SIB F13 0        | 64          | 70   | 76          | 72      | 90          | 84      |
| SIB F13 3        | 64          | 70   | 76          | 72      | 90          | 84      |
| SIB F13 6        | 64          | 70   | 76          | 72      | 90          | 84      |
| SIB F13 8        | 64          | 70   | 76          | 72      | 90          | 84      |
| SIB F13 11       | 64          | 70   | 76          | 72      | 90          | 84      |
| SIB F13 12       | 64          | 70   | 76          | 72      | 90          | 84      |
| SIB F2S 16       | 64          | 70   | 76          | 72      | 90          | 84      |
| SIB F2S 17       | 64          | 70   | 76          | 72      | 90          | 84      |
| SIB F2S 18       | 64          | 70   | 76          | 72      | 90          | 84      |
| SIB F2S 19       | 64          | 70   | 76          | 72      | 90          | 84      |
| SIB F2S 20       | 64          | 70   | 76          | 72      | 90          | 84      |
| SIB F2S 21       | 64          | 70   | 76          | 72      | 90          | 84      |
| SIB F2S 22       | 64          | 70   | 76          | 72      | 90          | 84      |
| SIB F2S 23       | 64          | 70   | 76          | 72      | 90          | 84      |
| SIB F2S 24       | 64          | 70   | 76          | 72      | 90          | 84      |
| SIB F2S 25       | 64          | 70   | 76          | 72      | 90          | 84      |
| SIB F2S 26       | 64          | 70   | 76          | 72      | 90          | 84      |
| SIB F2S 27       | 64          | 70   | 76          | 72      | 90          | 84      |
| SIB F2S 28       | 64          | 70   | 76          | 72      | 90          | 84      |
| SIB F2S 29       | 64          | 70   | 76          | 72      | 90          | 84      |
| SIB F2S 30       | 64          | 70   | 76          | 72      | 90          | 84      |
| SIB F2S 31       | 64          | 70   | 76          | 72      | 90          | 84      |
| SIB F2S 32       | 64          | 70   | 76          | 72      | 90          | 84      |
| SIB F2S 33       | 64          | 70   | 76          | 72      | 90          | 84      |
| SIB F2S 34       | 64          | 70   | 76          | 72      | 90          | 84      |
| SIB F2S 35       | 64          | 70   | 76          | 72      | 90          | 84      |

### show chassis temperature-thresholds (TX Matrix Plus routers with 3D SIBs)

```
user@host> show chassis temperature-thresholds
```

```
sfc0-re0:
```

| Shutdown<br>(degrees C)<br>Item | Fan speed   |      | Yellow alarm |         | Red alarm   |         | Fire |
|---------------------------------|-------------|------|--------------|---------|-------------|---------|------|
|                                 | (degrees C) |      | (degrees C)  |         | (degrees C) |         |      |
|                                 | Normal      | High | Normal       | Bad fan | Normal      | Bad fan |      |
| Normal                          |             |      |              |         |             |         |      |
| Chassis default                 | 48          | 54   | 65           | 55      | 75          | 65      |      |
| 100 Routing Engine 0            | 70          | 75   | 90           | 87      | 102         | 97      |      |
| 115 Routing Engine 1            | 70          | 75   | 90           | 87      | 102         | 97      |      |
| 115 SIB F13 0 Board             | 60          | 65   | 78           | 75      | 85          | 80      |      |
| 95 SIB F13 0 XF Junction        | 70          | 75   | 82           | 74      | 105         | 100     |      |
| 107 SIB F13 4 Board             | 60          | 65   | 78           | 75      | 85          | 80      |      |
| 95 SIB F13 4 XF Junction        | 70          | 75   | 82           | 74      | 105         | 100     |      |
| 107 SIB F13 6 Board             | 60          | 65   | 78           | 75      | 85          | 80      |      |
| 95                              |             |      |              |         |             |         |      |

|                               |    |    |    |    |     |     |
|-------------------------------|----|----|----|----|-----|-----|
| SIB F13 6 XF Junction<br>107  | 70 | 75 | 82 | 74 | 105 | 100 |
| SIB F2S 16 Board<br>95        | 60 | 65 | 78 | 75 | 85  | 80  |
| SIB F2S 16 XF Junction<br>107 | 70 | 75 | 82 | 74 | 105 | 100 |
| SIB F2S 17 Board<br>95        | 60 | 65 | 78 | 75 | 85  | 80  |
| SIB F2S 17 XF Junction<br>107 | 70 | 75 | 82 | 74 | 105 | 100 |
| SIB F2S 18 Board<br>95        | 60 | 65 | 78 | 75 | 85  | 80  |
| SIB F2S 18 XF Junction<br>107 | 70 | 75 | 82 | 74 | 105 | 100 |
| SIB F2S 19 Board<br>95        | 60 | 65 | 78 | 75 | 85  | 80  |
| SIB F2S 19 XF Junction<br>107 | 70 | 75 | 82 | 74 | 105 | 100 |
| SIB F2S 24 Board<br>95        | 60 | 65 | 78 | 75 | 85  | 80  |
| SIB F2S 24 XF Junction<br>107 | 70 | 75 | 82 | 74 | 105 | 100 |
| SIB F2S 25 Board<br>95        | 60 | 65 | 78 | 75 | 85  | 80  |
| SIB F2S 25 XF Junction<br>107 | 70 | 75 | 82 | 74 | 105 | 100 |
| SIB F2S 26 Board<br>95        | 60 | 65 | 78 | 75 | 85  | 80  |
| SIB F2S 26 XF Junction<br>107 | 70 | 75 | 82 | 74 | 105 | 100 |
| SIB F2S 27 Board<br>95        | 60 | 65 | 78 | 75 | 85  | 80  |
| SIB F2S 27 XF Junction<br>107 | 70 | 75 | 82 | 74 | 105 | 100 |

lcc0-re0:

| Shutdown<br>(degrees C)<br>Item<br>Normal | Fan speed   |      | Yellow alarm |         | Red alarm   |         | Fire |
|---|-------------|------|--------------|---------|-------------|---------|------|
|   | (degrees C) |      | (degrees C)  |         | (degrees C) |         |      |
|   | Normal      | High | Normal       | Bad fan | Normal      | Bad fan |      |
| Chassis default<br>100                    | 48          | 54   | 65           | 55      | 75          | 65      |      |
| Routing Engine 0<br>102                   | 55          | 65   | 85           | 85      | 100         | 100     |      |
| FPC 0<br>95                               | 63          | 68   | 75           | 70      | 90          | 83      |      |
| FPC 1<br>95                               | 56          | 62   | 75           | 63      | 83          | 76      |      |
| FPC 7<br>95                               | 56          | 62   | 75           | 63      | 83          | 76      |      |
| SIB 0<br>95                               | 64          | 70   | 76           | 72      | 87          | 84      |      |
| SIB 0 ASIC Junction<br>107                | 63          | 68   | 75           | 70      | 105         | 100     |      |
| SIB 2<br>95                               | 64          | 70   | 76           | 72      | 87          | 84      |      |
| SIB 2 ASIC Junction                       | 63          | 68   | 75           | 70      | 105         | 100     |      |

|                     |    |    |    |    |     |     |
|---------------------|----|----|----|----|-----|-----|
| 107                 |    |    |    |    |     |     |
| SIB 3               | 64 | 70 | 76 | 72 | 87  | 84  |
| 95                  |    |    |    |    |     |     |
| SIB 3 ASIC Junction | 63 | 68 | 75 | 70 | 105 | 100 |
| 107                 |    |    |    |    |     |     |

### show chassis temperature-thresholds (QFX3500 Switch and QFX3600)

```
user@switch> show chassis temperature-thresholds
```

| Item                   | Fan speed<br>(degrees C) |      | Yellow alarm<br>(degrees C) |         | Red alarm<br>(degrees C) |         |
|------------------------|--------------------------|------|-----------------------------|---------|--------------------------|---------|
|                        | Normal                   | High | Normal                      | Bad fan | Normal                   | Bad fan |
| rmal                   |                          |      |                             |         |                          |         |
| FPC Sensor TopLeft I   | 48                       | 56   | 53                          | 43      | 56                       | 46      |
| FPC Sensor TopRight I  | 46                       | 54   | 51                          | 41      | 54                       | 44      |
| FPC Sensor TopLeft E   | 58                       | 65   | 62                          | 52      | 65                       | 55      |
| FPC Sensor TopRight E  | 56                       | 64   | 61                          | 51      | 64                       | 54      |
| FPC Sensor TopMiddle I | 58                       | 64   | 61                          | 51      | 64                       | 54      |
| FPC Sensor TopMiddle E | 67                       | 74   | 71                          | 61      | 74                       | 64      |
| FPC Sensor Bottom I    | 59                       | 67   | 64                          | 54      | 67                       | 57      |
| FPC Sensor Bottom E    | 66                       | 73   | 70                          | 60      | 73                       | 63      |
| FPC Sensor Die Temp    | 69                       | 75   | 72                          | 62      | 75                       | 65      |
| FPC Sensor Mgmt Brd I  | 46                       | 54   | 51                          | 41      | 54                       | 44      |
| FPC Sensor Switch I    | 56                       | 63   | 60                          | 50      | 63                       | 53      |

### show chassis temperature-thresholds interconnect-device (QFabric System)

```
user@switch> show chassis temperature-thresholds interconnect-device interconnect1
```

| Item   | Fan speed |      | Yellow alarm |         | Red alarm |         |
|--|-----------|------|--------------|---------|-----------|---------|
|  | Normal    | High | Normal       | Bad fan | Normal    | Bad fan |
| temperature-thresholds interconnect-device interconnect1 |           |      |              |         |           |         |
| Chassis default  | 48        | 54   | 65           | 55      | 75        | 65      |

### show chassis temperature-thresholds (PTX5000 Packet Transport Router)

```
user@switch> show chassis temperature-thresholds
```

```
user@switch> show chassis temperature-thresholds
```

| Item             | Fan speed |      | Yellow alarm |         | Red alarm |         | Fire |
|------------------|-----------|------|--------------|---------|-----------|---------|------|
|                  | Normal    | High | Normal       | Bad fan | Normal    | Bad fan |      |
| Shutdown         |           |      |              |         |           |         |      |
| (degrees C)      |           |      |              |         |           |         |      |
| Routing Engine 0 | 80        | 90   | 95           | 85      | 105       | 95      |      |
| 115              |           |      |              |         |           |         |      |
| CB 0 Exhaust A   | 60        | 65   | 78           | 75      | 85        | 80      |      |
| 95               |           |      |              |         |           |         |      |
| CB 0 Exhaust B   | 60        | 65   | 78           | 75      | 85        | 80      |      |
| 95               |           |      |              |         |           |         |      |
| CB 1 Exhaust A   | 60        | 65   | 78           | 75      | 85        | 80      |      |
| 95               |           |      |              |         |           |         |      |
| CB 1 Exhaust B   | 60        | 65   | 78           | 75      | 85        | 80      |      |
| 95               |           |      |              |         |           |         |      |
| FPC 3 Exhaust A  | 80        | 90   | 95           | 85      | 105       | 95      |      |
| 115              |           |      |              |         |           |         |      |

|                        |    |    |    |    |     |    |
|------------------------|----|----|----|----|-----|----|
| FPC 3 Exhaust B<br>115 | 80 | 90 | 95 | 85 | 105 | 95 |
| FPC 3 TL5<br>115       | 80 | 90 | 95 | 85 | 105 | 95 |
| FPC 3 TQ5<br>115       | 80 | 90 | 95 | 85 | 105 | 95 |
| FPC 3 TL6<br>115       | 80 | 90 | 95 | 85 | 105 | 95 |
| FPC 3 TQ6<br>115       | 80 | 90 | 95 | 85 | 105 | 95 |
| FPC 3 TL1<br>115       | 80 | 90 | 95 | 85 | 105 | 95 |
| FPC 3 TQ1<br>115       | 80 | 90 | 95 | 85 | 105 | 95 |
| FPC 3 TL2<br>115       | 80 | 90 | 95 | 85 | 105 | 95 |
| FPC 3 TQ2<br>115       | 80 | 90 | 95 | 85 | 105 | 95 |
| FPC 3 TL4<br>115       | 80 | 90 | 95 | 85 | 105 | 95 |
| FPC 3 TQ4<br>115       | 80 | 90 | 95 | 85 | 105 | 95 |
| FPC 3 TL7<br>115       | 80 | 90 | 95 | 85 | 105 | 95 |
| FPC 3 TQ7<br>115       | 80 | 90 | 95 | 85 | 105 | 95 |
| FPC 3 TL0<br>115       | 80 | 90 | 95 | 85 | 105 | 95 |
| FPC 3 TQ0<br>115       | 80 | 90 | 95 | 85 | 105 | 95 |
| FPC 3 TL3<br>115       | 80 | 90 | 95 | 85 | 105 | 95 |
| FPC 3 TQ3<br>115       | 80 | 90 | 95 | 85 | 105 | 95 |
| SIB 0 Exhaust<br>95    | 60 | 65 | 78 | 75 | 85  | 80 |
| SIB 0 Junction<br>115  | 75 | 80 | 90 | 85 | 105 | 95 |
| SIB 1 Exhaust<br>95    | 60 | 65 | 78 | 75 | 85  | 80 |
| SIB 1 Junction<br>115  | 75 | 80 | 90 | 85 | 105 | 95 |
| SIB 2 Exhaust<br>95    | 60 | 65 | 78 | 75 | 85  | 80 |
| SIB 2 Junction<br>115  | 75 | 80 | 90 | 85 | 105 | 95 |
| SIB 3 Exhaust<br>95    | 60 | 65 | 78 | 75 | 85  | 80 |
| SIB 3 Junction<br>115  | 75 | 80 | 90 | 85 | 105 | 95 |
| SIB 4 Exhaust<br>95    | 60 | 65 | 78 | 75 | 85  | 80 |
| SIB 4 Junction<br>115  | 75 | 80 | 90 | 85 | 105 | 95 |
| SIB 5 Exhaust<br>95    | 60 | 65 | 78 | 75 | 85  | 80 |
| SIB 5 Junction<br>115  | 75 | 80 | 90 | 85 | 105 | 95 |
| SIB 6 Exhaust<br>95    | 60 | 65 | 78 | 75 | 85  | 80 |

|                       |    |    |    |    |     |    |
|-----------------------|----|----|----|----|-----|----|
| SIB 6 Junction<br>115 | 75 | 80 | 90 | 85 | 105 | 95 |
| SIB 7 Exhaust<br>95   | 60 | 65 | 78 | 75 | 85  | 80 |
| SIB 7 Junction<br>115 | 75 | 80 | 90 | 85 | 105 | 95 |
| SIB 8 Exhaust<br>95   | 60 | 65 | 78 | 75 | 85  | 80 |
| SIB 8 Junction<br>115 | 75 | 80 | 90 | 85 | 105 | 95 |

### show chassis temperature-thresholds (PTX1000 Packet Transport Router)

```
user@host> show chassis temperature-thresholds
```

| Shutdown                         | Fan speed   |      | Yellow alarm |         | Red alarm   |         | Fire |
|----------------------------------|-------------|------|--------------|---------|-------------|---------|------|
| (degrees C)                      | (degrees C) |      | (degrees C)  |         | (degrees C) |         |      |
| Item                             | Normal      | High | Normal       | Bad fan | Normal      | Bad fan |      |
| Normal                           |             |      |              |         |             |         |      |
| FPC 0 Intake Temp Sensor<br>75   | 30          | 65   | 65           | 65      | 70          | 70      |      |
| FPC 0 Exhaust Temp Sensor<br>75  | 30          | 65   | 65           | 65      | 70          | 70      |      |
| FPC 0 Mezz Temp Sensor 0<br>75   | 30          | 65   | 65           | 65      | 70          | 70      |      |
| FPC 0 Mezz Temp Sensor 1<br>75   | 30          | 65   | 65           | 65      | 70          | 70      |      |
| FPC 0 PE2 Temp Sensor<br>103     | 50          | 90   | 90           | 90      | 100         | 100     |      |
| FPC 0 PE1 Temp Sensor<br>103     | 50          | 90   | 90           | 90      | 100         | 100     |      |
| FPC 0 PF0 Temp Sensor<br>103     | 50          | 90   | 90           | 90      | 100         | 100     |      |
| FPC 0 PE0 Temp Sensor<br>103     | 50          | 90   | 90           | 90      | 100         | 100     |      |
| FPC 0 PE5 Temp Sensor<br>103     | 50          | 90   | 90           | 90      | 100         | 100     |      |
| FPC 0 PE4 Temp Sensor<br>103     | 50          | 90   | 90           | 90      | 100         | 100     |      |
| FPC 0 PF1 Temp Sensor<br>103     | 50          | 90   | 90           | 90      | 100         | 100     |      |
| FPC 0 PE3 Temp Sensor<br>103     | 50          | 90   | 90           | 90      | 100         | 100     |      |
| FPC 0 CPU Die Temp Sensor<br>103 | 50          | 90   | 90           | 90      | 100         | 100     |      |
| FPC 0 OCX0 Temp Sensor<br>103    | 50          | 90   | 90           | 90      | 100         | 100     |      |

### show chassis temperature-thresholds (MX Routers with Media Services Blade [MSB])

```
user@switch> show chassis temperature-thresholds
```



| Fan speed<br>(degrees C) | Yellow alarm<br>(degrees C) |      | Red alarm<br>(degrees C) |         | Fire Shutdown<br>(degrees C) |         |
|--------------------------|-----------------------------|------|--------------------------|---------|------------------------------|---------|
| Item                     | Normal                      | High | Normal                   | Bad fan | Normal                       | Bad fan |
| Normal                   |                             |      |                          |         |                              |         |
| Chassis default          | 48                          | 54   | 65                       | 55      | 75                           | 65      |
| 100                      |                             |      |                          |         |                              |         |
| Routing Engine 0         | 70                          | 80   | 95                       | 95      | 110                          | 110     |
| 112                      |                             |      |                          |         |                              |         |
| Routing Engine 1         | 70                          | 80   | 95                       | 95      | 110                          | 110     |
| 112                      |                             |      |                          |         |                              |         |
| FPC 0                    | 55                          | 60   | 75                       | 65      | 90                           | 80      |
| 95                       |                             |      |                          |         |                              |         |
| FPC 1                    | 55                          | 60   | 75                       | 65      | 90                           | 80      |
| 95                       |                             |      |                          |         |                              |         |
| FPC 2                    | 55                          | 60   | 75                       | 65      | 90                           | 80      |
| 95                       |                             |      |                          |         |                              |         |
| FPC 4                    | 55                          | 60   | 75                       | 65      | 90                           | 80      |
| 95                       |                             |      |                          |         |                              |         |
| FPC 5                    | 55                          | 60   | 75                       | 65      | 90                           | 80      |
| 95                       |                             |      |                          |         |                              |         |

#### show chassis temperature-thresholds (EX9251 Switches)

```
user@switch> show chassis temperature-thresholds
```

| Shutdown                    | Fan speed<br>(degrees C) |      | Yellow alarm<br>(degrees C) |         | Red alarm<br>(degrees C) |         | Fire |
|-----------------------------|--------------------------|------|-----------------------------|---------|--------------------------|---------|------|
| (degrees C)                 | Normal                   | High | Normal                      | Bad fan | Normal                   | Bad fan |      |
| Item                        |                          |      |                             |         |                          |         |      |
| Normal                      |                          |      |                             |         |                          |         |      |
| Routing Engine              |                          |      | 48                          | 54      | 85                       | 85      | 100  |
| 100 102                     |                          |      |                             |         |                          |         |      |
| CB Top Right Inlet Sensor   |                          |      | 35                          | 40      | 63                       | 63      | 85   |
| 85 95                       |                          |      |                             |         |                          |         |      |
| CB Top Left Inlet Sensor    |                          |      | 40                          | 45      | 65                       | 65      | 85   |
| 85 95                       |                          |      |                             |         |                          |         |      |
| CB Top Right Exhaust Sensor |                          |      | 45                          | 50      | 68                       | 68      | 85   |
| 85 95                       |                          |      |                             |         |                          |         |      |
| CB Top Left Exhaust Sensor  |                          |      | 65                          | 70      | 78                       | 78      | 85   |
| 85 95                       |                          |      |                             |         |                          |         |      |
| CB CPU Core-0 Temp          |                          |      | 65                          | 70      | 80                       | 80      | 90   |
| 90 100                      |                          |      |                             |         |                          |         |      |
| CB CPU Core-1 Temp          |                          |      | 65                          | 70      | 80                       | 80      | 90   |
| 90 100                      |                          |      |                             |         |                          |         |      |
| CB CPU Core-2 Temp          |                          |      | 65                          | 70      | 80                       | 80      | 90   |
| 90 100                      |                          |      |                             |         |                          |         |      |
| CB CPU Core-3 Temp          |                          |      | 65                          | 70      | 80                       | 80      | 90   |
| 90 100                      |                          |      |                             |         |                          |         |      |
| CB CPU Core-4 Temp          |                          |      | 65                          | 70      | 80                       | 80      | 90   |
| 90 100                      |                          |      |                             |         |                          |         |      |
| CB CPU Core-5 Temp          |                          |      | 65                          | 70      | 80                       | 80      | 90   |
| 90 100                      |                          |      |                             |         |                          |         |      |
| CB CPU Core-6 Temp          |                          |      | 65                          | 70      | 80                       | 80      | 90   |
| 90 100                      |                          |      |                             |         |                          |         |      |
| CB CPU Core-7 Temp          |                          |      | 65                          | 70      | 80                       | 80      | 90   |
| 90 100                      |                          |      |                             |         |                          |         |      |

|                        |    |    |     |     |     |
|------------------------|----|----|-----|-----|-----|
| FPC EA0_HMC0 Logic die | 85 | 90 | 95  | 95  | 105 |
| 105 110                |    |    |     |     |     |
| FPC EA0_HMC0 DRAM botm | 80 | 85 | 90  | 90  | 105 |
| 105 110                |    |    |     |     |     |
| FPC EA0_HMC1 Logic die | 85 | 90 | 95  | 95  | 105 |
| 105 110                |    |    |     |     |     |
| FPC EA0_HMC1 DRAM botm | 80 | 85 | 90  | 90  | 105 |
| 105 110                |    |    |     |     |     |
| FPC EA0 Chip           | 92 | 97 | 103 | 103 | 109 |
| 109 115                |    |    |     |     |     |
| FPC EA0-XR0 Chip       | 85 | 90 | 98  | 98  | 103 |
| 103 110                |    |    |     |     |     |
| FPC EA0-XR1 Chip       | 85 | 90 | 98  | 98  | 103 |
| 103 110                |    |    |     |     |     |

### show chassis temperature-thresholds (EX9253 witches)

```
user@switch> show chassis temperature-thresholds
```

| Shutdown                    | Fan speed   |      | Yellow alarm |         | Red alarm   |         | Fire |
|-----------------------------|-------------|------|--------------|---------|-------------|---------|------|
|                             | (degrees C) |      | (degrees C)  |         | (degrees C) |         |      |
|                             | Normal      | High | Normal       | Bad fan | Normal      | Bad fan |      |
| Normal                      |             |      |              |         |             |         |      |
| Routing Engine 0            |             |      | 48           | 54      | 85          | 85      | 100  |
| 100 102                     |             |      |              |         |             |         |      |
| CB 0 Exhaust Temp Sensor    |             |      | 60           | 65      | 75          | 75      | 85   |
| 85 95                       |             |      |              |         |             |         |      |
| CB 0 Inlet Temp Sensor      |             |      | 60           | 65      | 75          | 75      | 85   |
| 85 95                       |             |      |              |         |             |         |      |
| CB 0 CPU DIE Temp Sensor    |             |      | 83           | 90      | 98          | 98      | 105  |
| 105 110                     |             |      |              |         |             |         |      |
| CB 1 Exhaust Temp Sensor    |             |      | 60           | 65      | 75          | 75      | 85   |
| 85 95                       |             |      |              |         |             |         |      |
| CB 1 Inlet Temp Sensor      |             |      | 60           | 65      | 75          | 75      | 85   |
| 85 95                       |             |      |              |         |             |         |      |
| CB 1 CPU DIE Temp Sensor    |             |      | 83           | 90      | 98          | 98      | 105  |
| 105 110                     |             |      |              |         |             |         |      |
| FPC 0 Intake Temp Sensor    |             |      | 40           | 45      | 75          | 70      | 85   |
| 80 95                       |             |      |              |         |             |         |      |
| FPC 0 Exhaust-A Temp Sensor |             |      | 55           | 60      | 85          | 80      | 90   |
| 90 100                      |             |      |              |         |             |         |      |
| FPC 0 Exhaust-B Temp Sensor |             |      | 55           | 60      | 85          | 80      | 90   |
| 90 100                      |             |      |              |         |             |         |      |
| FPC 0 EA0 Chip              |             |      | 87           | 92      | 97          | 97      | 105  |
| 105 110                     |             |      |              |         |             |         |      |
| FPC 0 EA0-XR0 Chip          |             |      | 88           | 93      | 98          | 98      | 120  |
| 120 125                     |             |      |              |         |             |         |      |
| FPC 0 EA0-XR1 Chip          |             |      | 88           | 93      | 98          | 98      | 120  |
| 120 125                     |             |      |              |         |             |         |      |
| FPC 0 EA1 Chip              |             |      | 87           | 92      | 97          | 97      | 105  |
| 105 110                     |             |      |              |         |             |         |      |
| FPC 0 EA1-XR0 Chip          |             |      | 88           | 93      | 98          | 98      | 120  |
| 120 125                     |             |      |              |         |             |         |      |
| FPC 0 EA1-XR1 Chip          |             |      | 88           | 93      | 98          | 98      | 120  |
| 120 125                     |             |      |              |         |             |         |      |
| FPC 0 EA2 Chip              |             |      | 87           | 92      | 97          | 97      | 105  |
| 105 110                     |             |      |              |         |             |         |      |

|                             |    |    |     |     |     |
|-----------------------------|----|----|-----|-----|-----|
| FPC 0 EA2-XR0 Chip          | 88 | 93 | 98  | 98  | 120 |
| 120 125                     |    |    |     |     |     |
| FPC 0 EA2-XR1 Chip          | 88 | 93 | 98  | 98  | 120 |
| 120 125                     |    |    |     |     |     |
| FPC 0 PF Chip               | 89 | 94 | 104 | 104 | 120 |
| 120 120                     |    |    |     |     |     |
| FPC 0 EA0_HMC0 Logic die    | 88 | 93 | 103 | 103 | 120 |
| 120 125                     |    |    |     |     |     |
| FPC 0 EA0_HMC0 DRAM botm    | 83 | 88 | 98  | 98  | 120 |
| 120 125                     |    |    |     |     |     |
| FPC 0 EA0_HMC1 Logic die    | 88 | 93 | 103 | 103 | 120 |
| 120 125                     |    |    |     |     |     |
| FPC 0 EA0_HMC1 DRAM botm    | 83 | 88 | 98  | 98  | 120 |
| 120 125                     |    |    |     |     |     |
| FPC 0 EA0_HMC2 Logic die    | 88 | 93 | 103 | 103 | 120 |
| 120 125                     |    |    |     |     |     |
| FPC 0 EA0_HMC2 DRAM botm    | 83 | 88 | 98  | 98  | 120 |
| 120 125                     |    |    |     |     |     |
| FPC 0 EA1_HMC0 Logic die    | 88 | 93 | 103 | 103 | 120 |
| 120 125                     |    |    |     |     |     |
| FPC 0 EA1_HMC0 DRAM botm    | 83 | 88 | 98  | 98  | 120 |
| 120 125                     |    |    |     |     |     |
| FPC 0 EA1_HMC1 Logic die    | 88 | 93 | 103 | 103 | 120 |
| 120 125                     |    |    |     |     |     |
| FPC 0 EA1_HMC1 DRAM botm    | 83 | 88 | 98  | 98  | 120 |
| 120 125                     |    |    |     |     |     |
| FPC 0 EA1_HMC2 Logic die    | 88 | 93 | 103 | 103 | 120 |
| 120 125                     |    |    |     |     |     |
| FPC 0 EA1_HMC2 DRAM botm    | 83 | 88 | 98  | 98  | 120 |
| 120 125                     |    |    |     |     |     |
| FPC 0 EA2_HMC0 Logic die    | 88 | 93 | 103 | 103 | 120 |
| 120 125                     |    |    |     |     |     |
| FPC 0 EA2_HMC0 DRAM botm    | 83 | 88 | 98  | 98  | 120 |
| 120 125                     |    |    |     |     |     |
| FPC 0 EA2_HMC1 Logic die    | 88 | 93 | 103 | 103 | 120 |
| 120 125                     |    |    |     |     |     |
| FPC 0 EA2_HMC1 DRAM botm    | 83 | 88 | 98  | 98  | 120 |
| 120 125                     |    |    |     |     |     |
| FPC 0 EA2_HMC2 Logic die    | 88 | 93 | 103 | 103 | 120 |
| 120 125                     |    |    |     |     |     |
| FPC 0 EA2_HMC2 DRAM botm    | 83 | 88 | 98  | 98  | 120 |
| 120 125                     |    |    |     |     |     |
| FPC 1 Intake Temp Sensor    | 40 | 45 | 75  | 70  | 85  |
| 80 95                       |    |    |     |     |     |
| FPC 1 Exhaust-A Temp Sensor | 55 | 60 | 85  | 80  | 90  |
| 90 100                      |    |    |     |     |     |
| FPC 1 Exhaust-B Temp Sensor | 55 | 60 | 85  | 80  | 90  |
| 90 100                      |    |    |     |     |     |
| FPC 1 EA0 Chip              | 87 | 92 | 97  | 97  | 105 |
| 105 110                     |    |    |     |     |     |
| FPC 1 EA0-XR0 Chip          | 88 | 93 | 98  | 98  | 120 |
| 120 125                     |    |    |     |     |     |
| FPC 1 EA0-XR1 Chip          | 88 | 93 | 98  | 98  | 120 |
| 120 125                     |    |    |     |     |     |
| FPC 1 EA1 Chip              | 87 | 92 | 97  | 97  | 105 |
| 105 110                     |    |    |     |     |     |
| FPC 1 EA1-XR0 Chip          | 88 | 93 | 98  | 98  | 120 |
| 120 125                     |    |    |     |     |     |
| FPC 1 EA1-XR1 Chip          | 88 | 93 | 98  | 98  | 120 |
| 120 125                     |    |    |     |     |     |

|                          |    |    |     |     |     |
|--------------------------|----|----|-----|-----|-----|
| FPC 1 EA2 Chip           | 87 | 92 | 97  | 97  | 105 |
| 105 110                  |    |    |     |     |     |
| FPC 1 EA2-XR0 Chip       | 88 | 93 | 98  | 98  | 120 |
| 120 125                  |    |    |     |     |     |
| FPC 1 EA2-XR1 Chip       | 88 | 93 | 98  | 98  | 120 |
| 120 125                  |    |    |     |     |     |
| FPC 1 PF Chip            | 89 | 94 | 104 | 104 | 120 |
| 120 120                  |    |    |     |     |     |
| FPC 1 EA0_HMC0 Logic die | 88 | 93 | 103 | 103 | 120 |
| 120 125                  |    |    |     |     |     |
| FPC 1 EA0_HMC0 DRAM botm | 83 | 88 | 98  | 98  | 120 |
| 120 125                  |    |    |     |     |     |
| FPC 1 EA0_HMC1 Logic die | 88 | 93 | 103 | 103 | 120 |
| 120 125                  |    |    |     |     |     |
| FPC 1 EA0_HMC1 DRAM botm | 83 | 88 | 98  | 98  | 120 |
| 120 125                  |    |    |     |     |     |
| FPC 1 EA0_HMC2 Logic die | 88 | 93 | 103 | 103 | 120 |
| 120 125                  |    |    |     |     |     |
| FPC 1 EA0_HMC2 DRAM botm | 83 | 88 | 98  | 98  | 120 |
| 120 125                  |    |    |     |     |     |
| FPC 1 EA1_HMC0 Logic die | 88 | 93 | 103 | 103 | 120 |
| 120 125                  |    |    |     |     |     |
| FPC 1 EA1_HMC0 DRAM botm | 83 | 88 | 98  | 98  | 120 |
| 120 125                  |    |    |     |     |     |
| FPC 1 EA1_HMC1 Logic die | 88 | 93 | 103 | 103 | 120 |
| 120 125                  |    |    |     |     |     |
| FPC 1 EA1_HMC1 DRAM botm | 83 | 88 | 98  | 98  | 120 |
| 120 125                  |    |    |     |     |     |
| FPC 1 EA1_HMC2 Logic die | 88 | 93 | 103 | 103 | 120 |
| 120 125                  |    |    |     |     |     |
| FPC 1 EA1_HMC2 DRAM botm | 83 | 88 | 98  | 98  | 120 |
| 120 125                  |    |    |     |     |     |
| FPC 1 EA2_HMC0 Logic die | 88 | 93 | 103 | 103 | 120 |
| 120 125                  |    |    |     |     |     |
| FPC 1 EA2_HMC0 DRAM botm | 83 | 88 | 98  | 98  | 120 |
| 120 125                  |    |    |     |     |     |
| FPC 1 EA2_HMC1 Logic die | 88 | 93 | 103 | 103 | 120 |
| 120 125                  |    |    |     |     |     |
| FPC 1 EA2_HMC1 DRAM botm | 83 | 88 | 98  | 98  | 120 |
| 120 125                  |    |    |     |     |     |
| FPC 1 EA2_HMC2 Logic die | 88 | 93 | 103 | 103 | 120 |
| 120 125                  |    |    |     |     |     |
| FPC 1 EA2_HMC2 DRAM botm | 83 | 88 | 98  | 98  | 120 |
| 120 125                  |    |    |     |     |     |

## show interfaces extensive satellite-device

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>show interfaces extensive satellite-device (device-alias   all)</code>  |
| <b>Release Information</b>      | Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.<br>Command introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.<br>Command introduced in Junos OS Release 17.2R1 for Junos Fusion Enterprise.   |
| <b>Description</b>              | Display the satellite device extended ports in a Junos Fusion.  |
| <b>Options</b>                  | <p><b>device-alias <i>device-alias</i></b>—Display extended port information for the satellite device using the specified device alias only.</p> <p><b>all</b>—Display information for all extended ports and aggregated Ethernet interfaces with extended ports as members configured on all of the satellite devices.</p> |
| <b>Required Privilege Level</b> | view  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Configuring or Expanding a Junos Fusion Enterprise</i></li> </ul>   |
| <b>List of Sample Output</b>    | <a href="#">show interfaces extensive satellite-device all on page 527</a>  |
| <b>Output Fields</b>            | <a href="#">Table 28 on page 521</a> lists the output fields for the <b>show interfaces extensive satellite-device</b> command. Output fields are listed in the approximate order in which they appear.   |

*Table 28: show interfaces extensive satellite-device 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>Interface index</b>           | Index number of the physical interface, which reflects its initialization sequence.   | <b>detail extensive none</b> |
| <b>Device flags</b>              | Information about the physical device.  | All levels                   |
| <b>Flow control</b>              | Flow control status: <b>Enabled</b> or <b>Disabled</b> .<br><br><i>NOTE:</i> This field is only displayed if asymmetric flow control is not configured. | All levels                   |
| <b>Pad to minimum frame size</b> | Pad Tx VLAN-tagged frame to minimum of 68 bytes.  |                              |
| <b>Device flags</b>              | Information about the physical device.  | All levels                   |
| <b>Interface flags</b>           | Information about the interface.  | All levels                   |

Table 28: *show interfaces extensive satellite-device Output Fields (continued)*

| Field Name                | Field Description  | Level of Output       |
|---------------------------|--|-----------------------|
| Current address           | Configured MAC address.  | detail extensive none |
| Last flapped              | 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: 2008-01-16 10:52:40 UTC (3d 22:58 ago)</b> .   | detail extensive none |
| Statistics last cleared   | Time when the statistics for the interface were last set to zero.  | detail extensive      |
| Extended port information | Satellite device port ID   |                       |
| Traffic statistics        | <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> <p><b>NOTE:</b> The bandwidth bps counter is not enabled.</p>   | detail extensive      |
| IPv6 transit statistics   | <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> <p><b>NOTE:</b> The bandwidth bps counter is not enabled.</p>   | detail extensive      |
| Input errors              | <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>Runts</b>—Number of frames received that are smaller than the runt threshold.</li> <li>• <b>Giants</b>—Number of frames received that are greater than the giant threshold.</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>Resource errors</b>—Sum of transmit drops.</li> </ul> | extensive             |

Table 28: *show interfaces extensive satellite-device 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 then 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>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>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>   | <b>detail extensive</b>      |
| <b>Queue Number</b>                     | The CoS queue number and the forwarding classes mapped to the queue number. The <b>Mapped forwarding class</b> column lists the forwarding classes mapped to each CoS queue.  | <b>detail extensive</b>      |
| <b>Active alarms and Active defects</b> | <p>Ethernet-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 switch configuration, an alarm can ring the red or yellow alarm bell on the switch, or turn on the red or yellow alarm LED on the craft interface. These fields can contain the value <b>None</b> or <b>Link</b>.</p> <ul style="list-style-type: none"> <li>• <b>None</b>—There are no active defects or alarms.</li> <li>• <b>Link</b>—Interface has lost its link state, which usually means that the cable is unplugged, the far-end system has been turned off, or the PIC is malfunctioning.</li> </ul>   | <b>detail extensive none</b> |

Table 28: *show interfaces extensive satellite-device Output Fields (continued)*

| Field Name               | Field Description  | Level of Output  |
|--------------------------|--|------------------|
| <b>MAC statistics</b>    | <p>Receive and Transmit statistics reported by the PIC's MAC subsystem.</p> <ul style="list-style-type: none"> <li>• <b>Total octets</b> and <b>total packets</b>—Total number of octets and packets. For Gigabit Ethernet IQ PICs, the received octets count varies by interface type.</li> <li>• <b>Unicast packets</b>, <b>Broadcast packets</b>, and <b>Multicast packets</b>—Number of unicast, broadcast, and multicast packets.</li> <li>• <b>CRC/Align errors</b>—Total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, and had either a bad FCS with an integral number of octets (FCS Error) or a bad FCS with a nonintegral number of octets (Alignment Error).</li> <li>• <b>FIFO error</b>—Number of FIFO errors that are reported by the ASIC on the PIC. If this value is ever nonzero, the PIC is probably malfunctioning.</li> <li>• <b>MAC control frames</b>—Number of MAC control frames.</li> <li>• <b>MAC pause frames</b>—Number of MAC control frames with <b>pause</b> operational code.</li> <li>• <b>Oversized frames</b>—Number of packets that exceeds the configured MTU.</li> <li>• <b>Jabber frames</b>—Number of frames that were longer than 1518 octets (excluding framing bits, but including FCS octets), and had either an FCS error or an alignment error. This definition of jabber is different from the definition in IEEE-802.3 section 8.2.1.5 (10BASE5) and section 10.3.1.4 (10BASE2). These documents define jabber as the condition in which any packet exceeds 20 ms. The allowed range to detect jabber is from 20 ms to 150 ms.</li> <li>• <b>Fragment frames</b>—Total number of packets that were less than 64 octets in length (excluding framing bits, but including FCS octets), and had either an FCS error or an alignment error. Fragment frames normally increment because both runts (which are normal occurrences caused by collisions) and noise hits are counted.</li> <li>• <b>VLAN tagged frames</b>—Number of frames that are VLAN tagged. The system uses the TPID of 0x8100 in the frame to determine whether a frame is tagged or not. This counter is not supported on EX Series switches and is always displayed as 0.</li> <li>• <b>Code violations</b>—Number of times an event caused the PHY to indicate "Data reception error" or "invalid data symbol error."</li> </ul> | <b>extensive</b> |
| <b>Filter statistics</b> | <p>Receive and Transmit statistics reported by the PIC's MAC address filter subsystem.</p>   | <b>extensive</b> |



Table 28: *show interfaces extensive satellite-device Output Fields (continued)*

| Field Name                                    | Field Description  | Level of Output              |
|---|--|------------------------------|
| <b>Packet Forwarding Engine configuration</b> | 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>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>                                  | Index number of the logical interface, which reflects its initialization sequence.   | <b>detail extensive none</b> |
| <b>SNMP ifIndex</b>                           | SNMP interface index number for 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>Flags</b>                                  | Information about the logical interface.   | All levels                   |
| <b>Statistics</b>                             | <ul style="list-style-type: none"> <li>• <b>Packets</b></li> <li>• <b>pps</b></li> <li>• <b>Bytes</b></li> <li>• <b>bps</b></li> </ul>   | All levels                   |
| <b>Bundle</b>                                 | Provide information for each active bundle link. <ul style="list-style-type: none"> <li>• <b>Input</b> <ul style="list-style-type: none"> <li>• <b>Packets</b>—</li> <li>• <b>pps</b></li> <li>• <b>Bytes</b></li> <li>• <b>bps</b></li> </ul> </li> <li>• <b>Output</b> <ul style="list-style-type: none"> <li>• <b>Packets</b>—</li> <li>• <b>pps</b></li> <li>• <b>Bytes</b></li> <li>• <b>bps</b></li> </ul> </li> </ul>   | All levels                   |

Table 28: *show interfaces extensive satellite-device Output Fields (continued)*

| Field Name                 | Field Description  | Level of Output |
|----------------------------|--|-----------------|
| <b>Adaptive Statistics</b> | <ul style="list-style-type: none"> <li>• <b>Adaptive Adjusts</b></li> <li>• <b>Adaptive Scans</b></li> <li>• <b>Adaptive Updates</b></li> </ul>  | All levels      |
| <b>Link</b>                | Link state: up or down.  | All levels      |
| <b>LACP info</b>           | <p>LACP state information for each aggregated interface:</p> <ul style="list-style-type: none"> <li>• <b>Role priority</b>—Role played by the interface. It can be one of the following: <ul style="list-style-type: none"> <li>• <b>Actor</b>—Local device participating in LACP negotiation.</li> <li>• <b>Partner</b>—Remote device participating in LACP negotiation.</li> <li>• <b>System identifier</b>—48-bit (6-byte) globally unique field.</li> <li>• <b>System priority</b>—LACP system priority at the aggregated Ethernet interface level. This system priority value takes precedence over a system priority value configured at the global [edit chassis] hierarchy level.</li> </ul> </li> <li>• <b>Port number</b></li> <li>• <b>Port key</b></li> <li>• <b>Port</b></li> </ul> | All levels      |
| <b>LACP Statistics</b>     | <p>LACP statistics are returned when the <b>extensive</b> option is used and provides the following information:</p> <ul style="list-style-type: none"> <li>• <b>LACP Rx</b>—LACP received counter that increments for each normal hello.</li> <li>• <b>LACP Tx</b>—Number of LACP transmit packet errors logged.</li> <li>• <b>Unknown Rx</b>—Number of unrecognized packet errors logged.</li> <li>• <b>Illegal Rx</b>—Number of invalid packets received.</li> </ul>  | All levels      |
| <b>Marker statistics</b>   | <p>Marker statistics are returned when the <b>extensive</b> option is used and provides the following information:</p> <ul style="list-style-type: none"> <li>• <b>Marker Rx</b>—Marker received counter that increments for each normal hello.</li> <li>• <b>Resp Tx</b>—Number of RESP transmit packet errors logged.</li> <li>• <b>Unknown Rx</b>—Number of unrecognized packet errors logged.</li> <li>• <b>Illegal Rx</b>—Number of invalid packets received.</li> </ul>  | All levels      |
| <b>Protocol</b>            | Protocol family configured on the logical interface.   | All levels      |
| <b>MTU</b>                 | MTU size on the logical interface. If the MTU value is negotiated down to meet the MRRU requirement on the remote side, this value is marked Adjusted.   | All levels      |
| <b>Generation</b>          | Unique number for use by Juniper Networks technical support only.  | All levels      |
| <b>Route table</b>         | Routing table in which this address exists. For example, Route table:0 refers to inet.0.   | All levels      |
| <b>Mesh table</b>          | Information regarding mesh topology.   | All levels      |

## Sample Output

### show interfaces extensive satellite-device all

```
user@aggregation-device> show interfaces extensive satellite-device all
```

```
Physical interface: ae0 (Extended Port, Enabled, Physical link is Up
  Interface index: 128, SNMP ifIndex: 574, Generation: 131
  Link-level type: Ethernet, MTU: 1514, Speed: 2Gbps, BPDU Error: None, MAC-REWRITE
  Error: None, Loopback: Disabled, Source filtering: Disabled,
  Flow control: Disabled
  Pad to minimum frame size: Disabled
  Minimum links needed: 1, Minimum bandwidth needed: 1bps
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  Current address: f4:b5:2f:f7:3f:c0, Hardware address: f4:b5:2f:f7:3f:c0
  Last flapped   : 2015-03-31 18:36:43 PDT (07:05:56 ago)
  Statistics last cleared: Never
  Extended port information:
    Satellite device port id : 415
  Traffic statistics:
    Input bytes :          13515908          2032 bps
    Output bytes :          12289920          2032 bps
    Input packets:           99514           2 pps
    Output packets:          96015           2 pps
  IPv6 transit statistics:
    Input bytes :          0
    Output bytes :          0
    Input packets:          0
    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, 7 in use
  Queue counters:      Queued packets  Transmitted packets  Dropped packets

    0                      0              95867                0
    1                      0              0                  0
    2                      0              0                  0
    3                      0              0                  0
    4                      0              0                  0
    5                      0              0                  0
    7                      0              0                  0

  Queue number:      Mapped forwarding classes
    0                FC0
    1                FC1
    2                FC2
    3                FC3
    4                FC4
    5                FC5, be-3
```

```

7                                be-2

Logical interface ae0.0 (Index 337) (SNMP ifIndex 575) (Generation 1194)
Flags: Up SNMP-Traps 0x24024000 Encapsulation: Ethernet-Bridge
Statistics          Packets          pps          Bytes          bps
Bundle:
  Input :             1729             0          601692           0
  Output:              0             0              0           0
Adaptive Statistics:
  Adaptive Adjusts:           0
  Adaptive Scans :           0
  Adaptive Updates:          0
Link:
  ge-104/0/24.0
    Input :              0             0              0           0
    Output:              0             0              0           0
  ge-103/0/0.0
    Input :             1729             0          601692           0
    Output:              0             0              0           0
LACP info:          Role    System                               System    Port    Port    Port
                                priority          identifier  priority  number  key

  ge-104/0/24.0    Actor      127    f4:b5:2f:f7:3f:c0          127      31      1
  ge-104/0/24.0    Partner    127    f4:b5:2f:41:0a:40          127      24      1
  ge-103/0/0.0     Actor      127    f4:b5:2f:f7:3f:c0          127       7      1
  ge-103/0/0.0     Partner    127    f4:b5:2f:41:0a:40          127       1      1

LACP Statistics:          LACP Rx    LACP Tx    Unknown Rx    Illegal Rx
  ge-104/0/24.0          25470    25495           0           0
  ge-103/0/0.0          25469    25512           0           0
Marker Statistics:    Marker Rx    Resp Tx    Unknown Rx    Illegal Rx
  ge-104/0/24.0           0           0           0           0
  ge-103/0/0.0           0           0           0           0
Protocol bridge, MTU: 1514, Generation: 1229, Route table: 3, Mesh Group:
__all_ces__
Physical interface: ae1 (Extended Port, Enabled, Physical link is Up)
Interface index: 129, SNMP ifIndex: 790, Generation: 132
Link-level type: Ethernet, MTU: 1514, Speed: 200mbps, BPDU Error: None,
MAC-REWRITE Error: None, Loopback: Disabled, Source filtering: Disabled,
Flow control: Disabled
Pad to minimum frame size: Disabled
Minimum links needed: 1, Minimum bandwidth needed: 1bps
Device flags : Present Running
Interface flags: SNMP-Traps Internal: 0x4000
Current address: f4:b5:2f:f7:3f:c1, Hardware address: f4:b5:2f:f7:3f:c1
Last flapped : 2015-03-31 18:36:44 PDT (07:05:55 ago)
Statistics last cleared: Never
Extended port information:
  Satellite device port id : 431
Traffic statistics:
  Input bytes :             13285288          2032 bps
  Output bytes :            12166400          2032 bps
  Input packets:             98447           2 pps
  Output packets:           95050           2 pps
IPv6 transit statistics:
  Input bytes :              0

```

```

Output bytes :          0
Input  packets:         0
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, 7 in use
Queue counters:      Queued packets  Transmitted packets      Dropped packets

0                    0                94909                    0
1                    0                0                      0
2                    0                0                      0
3                    0                0                      0
4                    0                0                      0
5                    0                0                      0
7                    0                0                      0

Queue number:      Mapped forwarding classes
0                  FC0
1                  FC1
2                  FC2
3                  FC3
4                  FC4
5                  FC5, be-3
7                  be-2

Logical interface ae1.0 (Index 338) (SNMP ifIndex 1216) (Generation 1195)
Flags: Up SNMP-Traps 0x24024000 Encapsulation: Ethernet-Bridge
Statistics      Packets      pps      Bytes      bps
Bundle:
  Input :      2785      0      688380      0
  Output:      0        0        0          0
Adaptive Statistics:
  Adaptive Adjusts:      0
  Adaptive Scans :      0
  Adaptive Updates:      0
Link:
  ge-104/0/25.0
    Input :      10      0        600      0
    Output:      0      0         0      0
  ge-103/0/1.0
    Input :      2775      0      687780      0
    Output:      0      0         0      0
LACP info:      Role      System      System      Port      Port      Port
                  priority      identifier      priority      number      key

ge-104/0/25.0  Actor      127  f4:b5:2f:f7:3f:c0      127      32      2
ge-104/0/25.0  Partner    127  f4:b5:2f:41:0a:40      127      25      2

```

```

    ge-103/0/1.0    Actor      127  f4:b5:2f:f7:3f:c0      127      8      2

    ge-103/0/1.0    Partner    127  f4:b5:2f:41:0a:40      127      2      2

    LACP Statistics:      LACP Rx      LACP Tx      Unknown Rx      Illegal Rx
    ge-104/0/25.0        25470        25494         0              0
    ge-103/0/1.0         25469        25513         0              0
    Marker Statistics:    Marker Rx      Resp Tx      Unknown Rx      Illegal Rx
    ge-104/0/25.0         0             0            0              0
    ge-103/0/1.0         0             0            0              0
    Protocol bridge, MTU: 1514, Generation: 1230, Route table: 3, Mesh Group:
    __all_ces__
Physical interface: ae0 (Extended Port, Enabled, Physical link is Up
  Interface index: 128, SNMP ifIndex: 574, Generation: 131
  Link-level type: Ethernet, MTU: 1514, Speed: 2Gbps, BPDU Error: None, MAC-REWRITE
  Error: None, Loopback: Disabled, Source filtering: Disabled,
  Flow control: Disabled
  Pad to minimum frame size: Disabled
  Minimum links needed: 1, Minimum bandwidth needed: 1bps
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  Current address: f4:b5:2f:f7:3f:c0, Hardware address: f4:b5:2f:f7:3f:c0
  Last flapped   : 2015-03-31 18:36:43 PDT (07:05:56 ago)
  Statistics last cleared: Never
  Extended port information:
    Satellite device port id : 415
  Traffic statistics:
    Input bytes :      13515908      2032 bps
    Output bytes :      12289920      2032 bps
    Input packets:       99514        2 pps
    Output packets:      96015        2 pps
  IPv6 transit statistics:
    Input bytes :      0
    Output bytes :      0
    Input packets:      0
    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, 7 in use
  Queue counters:      Queued packets      Transmitted packets      Dropped packets

    0                   0                   95867                   0
    1                   0                   0                       0
    2                   0                   0                       0
    3                   0                   0                       0
    4                   0                   0                       0
    5                   0                   0                       0
    7                   0                   0                       0

  Queue number:      Mapped forwarding classes

```

```

0          FC0
1          FC1
2          FC2
3          FC3
4          FC4
5          FC5, be-3
7          be-2

```

Logical interface ae0.0 (Index 337) (SNMP ifIndex 575) (Generation 1194)

Flags: Up SNMP-Traps 0x24024000 Encapsulation: Ethernet-Bridge

| Statistics | Packets | pps | Bytes  | bps |
|------------|---------|-----|--------|-----|
| Bundle:    |         |     |        |     |
| Input :    | 1729    | 0   | 601692 | 0   |
| Output:    | 0       | 0   | 0      | 0   |

Adaptive Statistics:

|                   |   |
|-------------------|---|
| Adaptive Adjusts: | 0 |
| Adaptive Scans :  | 0 |
| Adaptive Updates: | 0 |

Link:

ge-104/0/24.0

|         |   |   |   |   |
|---------|---|---|---|---|
| Input : | 0 | 0 | 0 | 0 |
| Output: | 0 | 0 | 0 | 0 |

ge-103/0/0.0

|         |      |   |        |   |
|---------|------|---|--------|---|
| Input : | 1729 | 0 | 601692 | 0 |
| Output: | 0    | 0 | 0      | 0 |

| LACP info:    | Role    | System   | System            | Port     | Port   | Port |
|---------------|---------|----------|-------------------|----------|--------|------|
|               |         | priority | identifier        | priority | number | key  |
| ge-104/0/24.0 | Actor   | 127      | f4:b5:2f:f7:3f:c0 | 127      | 31     | 1    |
| ge-104/0/24.0 | Partner | 127      | f4:b5:2f:41:0a:40 | 127      | 24     | 1    |
| ge-103/0/0.0  | Actor   | 127      | f4:b5:2f:f7:3f:c0 | 127      | 7      | 1    |
| ge-103/0/0.0  | Partner | 127      | f4:b5:2f:41:0a:40 | 127      | 1      | 1    |

| LACP Statistics: | LACP Rx | LACP Tx | Unknown Rx | Illegal Rx |
|------------------|---------|---------|------------|------------|
| ge-104/0/24.0    | 25470   | 25495   | 0          | 0          |
| ge-103/0/0.0     | 25469   | 25512   | 0          | 0          |

| Marker Statistics: | Marker Rx | Resp Tx | Unknown Rx | Illegal Rx |
|--------------------|-----------|---------|------------|------------|
| ge-104/0/24.0      | 0         | 0       | 0          | 0          |
| ge-103/0/0.0       | 0         | 0       | 0          | 0          |

Protocol bridge, MTU: 1514, Generation: 1229, Route table: 3, Mesh Group:

\_\_all\_ces\_\_

Physical interface: ae1 (Extended Port, Enabled, Physical link is Up)

Interface index: 129, SNMP ifIndex: 790, Generation: 132

Link-level type: Ethernet, MTU: 1514, Speed: 200mbps, BPDU Error: None,  
MAC-REWRITE Error: None, Loopback: Disabled, Source filtering: Disabled,  
Flow control: Disabled

Pad to minimum frame size: Disabled

Minimum links needed: 1, Minimum bandwidth needed: 1bps

Device flags : Present Running

Interface flags: SNMP-Traps Internal: 0x4000

Current address: f4:b5:2f:f7:3f:c1, Hardware address: f4:b5:2f:f7:3f:c1

Last flapped : 2015-03-31 18:36:44 PDT (07:05:55 ago)

Statistics last cleared: Never

Extended port information:

Satellite device port id : 431

Traffic statistics:

```

Input bytes :          13285288          2032 bps
Output bytes :          12166400          2032 bps
Input packets:          98447            2 pps
Output packets:         95050            2 pps
IPv6 transit statistics:
  Input bytes :          0
  Output bytes :          0
  Input packets:          0
  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, 7 in use
Queue counters:      Queued packets  Transmitted packets      Dropped packets

  0                   0                94909                   0
  1                   0                0                     0
  2                   0                0                     0
  3                   0                0                     0
  4                   0                0                     0
  5                   0                0                     0
  7                   0                0                     0

Queue number:      Mapped forwarding classes
  0                FC0
  1                FC1
  2                FC2
  3                FC3
  4                FC4
  5                FC5, be-3
  7                be-2

Logical interface ae1.0 (Index 338) (SNMP ifIndex 1216) (Generation 1195)
Flags: Up SNMP-Traps 0x24024000 Encapsulation: Ethernet-Bridge
Statistics      Packets      pps      Bytes      bps
Bundle:
  Input :        2785         0      688380       0
  Output:         0         0         0         0
Adaptive Statistics:
  Adaptive Adjusts:      0
  Adaptive Scans :      0
  Adaptive Updates:      0
Link:
  ge-104/0/25.0
    Input :         10         0         600         0
    Output:          0         0          0         0
  ge-103/0/1.0
    Input :        2775         0      687780       0
    Output:         0         0         0         0
LACP info:      Role      System      System      Port      Port      Port

```



```

                                priority      identifier priority number  key
ge-104/0/25.0  Actor      127  f4:b5:2f:f7:3f:c0      127      32    2
ge-104/0/25.0  Partner    127  f4:b5:2f:41:0a:40      127      25    2
ge-103/0/1.0   Actor      127  f4:b5:2f:f7:3f:c0      127       8    2
ge-103/0/1.0   Partner    127  f4:b5:2f:41:0a:40      127       2    2

LACP Statistics:      LACP Rx      LACP Tx      Unknown Rx      Illegal Rx
ge-104/0/25.0          25470          25494             0             0
ge-103/0/1.0          25469          25513             0             0
Marker Statistics:    Marker Rx      Resp Tx      Unknown Rx      Illegal Rx
ge-104/0/25.0             0             0             0             0
ge-103/0/1.0             0             0             0             0
Protocol bridge, MTU: 1514, Generation: 1230, Route table: 3, Mesh Group:
__all_ces__

Physical interface: ae0 (Extended Port, Enabled, Physical link is Up
Interface index: 128, SNMP ifIndex: 574, Generation: 131
Link-level type: Ethernet, MTU: 1514, Speed: 2Gbps, BPDU Error: None, MAC-REWRITE
Error: None, Loopback: Disabled, Source filtering: Disabled,
Flow control: Disabled
Pad to minimum frame size: Disabled
Minimum links needed: 1, Minimum bandwidth needed: 1bps
Device flags   : Present Running
Interface flags: SNMP-Traps Internal: 0x4000
Current address: f4:b5:2f:f7:3f:c0, Hardware address: f4:b5:2f:f7:3f:c0
Last flapped   : 2015-03-31 18:36:43 PDT (07:05:56 ago)
Statistics last cleared: Never
Extended port information:
  Satellite device port id : 415
Traffic statistics:
Input bytes :          13515908          2032 bps
Output bytes :          12289920          2032 bps
Input packets:           99514           2 pps
Output packets:          96015           2 pps
IPv6 transit statistics:
Input bytes :             0
Output bytes :             0
Input packets:             0
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, 7 in use
Queue counters:      Queued packets  Transmitted packets      Dropped packets
0                    0                95867                    0
1                    0                0                      0
2                    0                0                      0
3                    0                0                      0

```

```

4                                0                                0                                0
5                                0                                0                                0
7                                0                                0                                0

Queue number:      Mapped forwarding classes
0                  FC0
1                  FC1
2                  FC2
3                  FC3
4                  FC4
5                  FC5, be-3
7                  be-2

Logical interface ae0.0 (Index 337) (SNMP ifIndex 575) (Generation 1194)
Flags: Up SNMP-Traps 0x24024000 Encapsulation: Ethernet-Bridge
Statistics          Packets          pps          Bytes          bps
Bundle:
  Input :           1729             0          601692           0
  Output:            0             0            0           0
Adaptive Statistics:
  Adaptive Adjusts:           0
  Adaptive Scans :           0
  Adaptive Updates:           0
Link:
  ge-104/0/24.0
    Input :            0             0            0           0
    Output:            0             0            0           0
  ge-103/0/0.0
    Input :           1729             0          601692           0
    Output:            0             0            0           0
LACP info:          Role      System          System          Port      Port      Port
                  priority      identifier      priority      number      key

  ge-104/0/24.0  Actor      127  f4:b5:2f:f7:3f:c0      127      31      1
  ge-104/0/24.0  Partner    127  f4:b5:2f:41:0a:40      127      24      1
  ge-103/0/0.0   Actor      127  f4:b5:2f:f7:3f:c0      127      7       1
  ge-103/0/0.0   Partner    127  f4:b5:2f:41:0a:40      127      1       1

LACP Statistics:      LACP Rx      LACP Tx      Unknown Rx      Illegal Rx
  ge-104/0/24.0      25470      25495         0              0
  ge-103/0/0.0       25469      25512         0              0
Marker Statistics:    Marker Rx      Resp Tx      Unknown Rx      Illegal Rx
  ge-104/0/24.0         0           0           0              0
  ge-103/0/0.0         0           0           0              0
Protocol bridge, MTU: 1514, Generation: 1229, Route table: 3, Mesh Group:
__all_ces__
Physical interface: ae1 (Extended Port, Enabled, Physical link is Up)
Interface index: 129, SNMP ifIndex: 790, Generation: 132
Link-level type: Ethernet, MTU: 1514, Speed: 200mbps, BPDU Error: None,
MAC-REWRITE Error: None, Loopback: Disabled, Source filtering: Disabled,
Flow control: Disabled
Pad to minimum frame size: Disabled
Minimum links needed: 1, Minimum bandwidth needed: 1bps
Device flags : Present Running

```

```

Interface flags: SNMP-Traps Internal: 0x4000
Current address: f4:b5:2f:f7:3f:c1, Hardware address: f4:b5:2f:f7:3f:c1
Last flapped : 2015-03-31 18:36:44 PDT (07:05:55 ago)
Statistics last cleared: Never
Extended port information:
  Satellite device port id : 431
Traffic statistics:
  Input bytes :          13285288          2032 bps
  Output bytes :         12166400          2032 bps
  Input packets:          98447           2 pps
  Output packets:         95050           2 pps
IPv6 transit statistics:
  Input bytes :          0
  Output bytes :          0
  Input packets:          0
  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, 7 in use
Queue counters:      Queued packets  Transmitted packets      Dropped packets

  0                      0              94909              0
  1                      0              0              0
  2                      0              0              0
  3                      0              0              0
  4                      0              0              0
  5                      0              0              0
  7                      0              0              0

Queue number:      Mapped forwarding classes
  0                FC0
  1                FC1
  2                FC2
  3                FC3
  4                FC4
  5                FC5, be-3
  7                be-2

Logical interface ae1.0 (Index 338) (SNMP ifIndex 1216) (Generation 1195)
Flags: Up SNMP-Traps 0x24024000 Encapsulation: Ethernet-Bridge
Statistics      Packets      pps      Bytes      bps
Bundle:
  Input :        2785          0      688380          0
  Output:          0          0          0          0
Adaptive Statistics:
  Adaptive Adjusts:          0
  Adaptive Scans :          0
  Adaptive Updates:          0
Link:
  ge-104/0/25.0

```

```

    Input :          10          0          600          0
    Output:          0          0          0          0
ge-103/0/1.0
    Input :        2775          0        687780          0
    Output:          0          0          0          0
LACP info:          Role      System              System      Port      Port      Port
                  priority          identifier priority number key

ge-104/0/25.0 Actor      127 f4:b5:2f:f7:3f:c0      127      32      2
ge-104/0/25.0 Partner    127 f4:b5:2f:41:0a:40      127      25      2
ge-103/0/1.0 Actor      127 f4:b5:2f:f7:3f:c0      127       8      2
ge-103/0/1.0 Partner    127 f4:b5:2f:41:0a:40      127       2      2

LACP Statistics:      LACP Rx      LACP Tx      Unknown Rx      Illegal Rx
ge-104/0/25.0        25470        25494          0          0
ge-103/0/1.0         25469        25513          0          0
Marker Statistics:    Marker Rx      Resp Tx      Unknown Rx      Illegal Rx
ge-104/0/25.0          0          0          0          0
ge-103/0/1.0          0          0          0          0
Protocol bridge, MTU: 1514, Generation: 1230, Route table: 3, Mesh Group:
__all_ces__
Physical interface: ge-101/0/7 (Extended Port, Enabled, Physical link is Down
Interface index: 328, SNMP ifIndex: 1587, Generation: 331
Link-level type: Ethernet, MTU: 1514, LAN-PHY mode, Speed: 1000mbps
Device flags : Present Running
Interface flags: Hardware-Down SNMP-Traps Internal: 0x4000
Link flags : None
CoS queues : 8 supported, 8 maximum usable queues
Hold-times : Up 0 ms, Down 0 ms
Damping : half-life: 0 sec, max-suppress: 0 sec, reuse: 0, suppress: 0,
state: unsuppressed
Current address: 10:0e:7e:bf:2d:0c, Hardware address: 10:0e:7e:bf:2d:0c
Last flapped : Never
Statistics last cleared: Never
Extended port information:
  Satellite device port id : 143
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, 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: 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, 7 in use
Queue counters:      Queued packets  Transmitted packets      Dropped packets

```

|   |           |           |                 |
|---|-----------|-----------|-----------------|
| 0   | 0         | 0         | 0               |
| 1   | 0         | 0         | 0               |
| 2   | 0         | 0         | 0               |
| 3   | 0         | 0         | 0               |
| 4   | 0         | 0         | 0               |
| 5   | 0         | 0         | 0               |
| 7   | 0         | 0         | 0               |
| Queue number: Mapped forwarding classes           |           |           |                 |
| 0   | FC0       |           |                 |
| 1   | FC1       |           |                 |
| 2   | FC2       |           |                 |
| 3   | FC3       |           |                 |
| 4   | FC4       |           |                 |
| 5   | FC5, be-3 |           |                 |
| 7   | be-2      |           |                 |
| Active alarms : None                              |           |           |                 |
| Active defects : None                             |           |           |                 |
| MAC statistics:                                   |           | Receive   | Transmit        |
| Total octets                                      |           | 0         | 0               |
| 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         |                 |
| Total errors                                      |           | 0         | 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 |           |           |                 |
| Packet Forwarding Engine configuration:           |           |           |                 |
| Destination slot: 0 (0x00)                        |           |           |                 |
| CoS information:                                  |           |           |                 |
| Direction : Output                                |           |           |                 |
| CoS transmit queue                                |           | Bandwidth | Buffer Priority |
| Limit   |           |           |                 |
|   | %         | bps       | %               |
| 0 FC0   | 95        | 950000000 | 95              |
| 0   |           |           | 0               |
| low   |           |           |                 |
| 3 FC3   | 5         | 50000000  | 5               |
| 0   |           |           | 0               |
| low   |           |           |                 |

```

Interface transmit statistics: Disabled

Physical interface: ge-101/0/8 (Extended Port, Enabled, Physical link is Down
Interface index: 329, SNMP ifIndex: 1586, Generation: 332
Link-level type: Ethernet, MTU: 1514, LAN-PHY mode, Speed: 1000mbps
Device flags   : Present Running
Interface flags: Hardware-Down SNMP-Traps Internal: 0x4000
Link flags     : None
CoS queues    : 8 supported, 8 maximum usable queues
Hold-times    : Up 0 ms, Down 0 ms
Damping       : half-life: 0 sec, max-suppress: 0 sec, reuse: 0, suppress: 0,
state: unsuppressed
Current address: 10:0e:7e:bf:2d:0d, Hardware address: 10:0e:7e:bf:2d:0d
Last flapped   : Never
Statistics last cleared: Never
Extended port information:
  Satellite device port id : 159
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, 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: 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, 7 in use
Queue counters:      Queued packets  Transmitted packets      Dropped packets

  0                    0                0                0
  1                    0                0                0
  2                    0                0                0
  3                    0                0                0
  4                    0                0                0
  5                    0                0                0
  7                    0                0                0

Queue number:      Mapped forwarding classes
  0                FC0
  1                FC1
  2                FC2
  3                FC3
  4                FC4
  5                FC5, be-3
  7                be-2
Active alarms   : None

```

```

Active defects : None
MAC statistics:
    Receive      Transmit
Total octets      0          0
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
Total errors       0          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
Packet Forwarding Engine configuration:
Destination slot: 0 (0x00)
CoS information:
Direction : Output
CoS transmit queue      Bandwidth      Buffer Priority
Limit
    %      bps      %      usec      low
0 FC0      95      950000000      95      0
none
3 FC3       5       50000000      5      0
none
Interface transmit statistics: Disabled

```

## show interfaces satellite-device

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>show interfaces satellite-device (device-alias   all)</code>  |
| <b>Release Information</b>      | Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.<br>Command introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.<br>Command introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.  |
| <b>Description</b>              | Display the satellite device extended ports in a Junos Fusion.  |
| <b>Options</b>                  | <p><b>device-alias <i>device-alias</i></b>—Display extended port information for the satellite device using the specified device alias only.</p> <p><b>all</b>—Display information for all extended ports and aggregated Ethernet interfaces with extended ports as members configured on all of the satellite devices.</p> |
| <b>Required Privilege Level</b> | view  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Configuring or Expanding a Junos Fusion Enterprise</i></li> </ul>   |
| <b>List of Sample Output</b>    | <a href="#">show interfaces satellite-device all on page 542</a>  |
| <b>Output Fields</b>            | <a href="#">Table 29 on page 540</a> lists the output fields for the <b>show interfaces satellite-device</b> command. Output fields are listed in the approximate order in which they appear.   |

Table 29: show interfaces satellite-device 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>Interface index</b>           | Index number of the physical interface, which reflects its initialization sequence.   | <b>detail extensive none</b> |
| <b>Link-level type</b>           | Encapsulation being used on the physical interface.   | All levels                   |
| <b>Device flags</b>              | Information about the physical device.  | All levels                   |
| <b>Flow control</b>              | Flow control status: <b>Enabled</b> or <b>Disabled</b> .<br><br><i>NOTE:</i> This field is only displayed if asymmetric flow control is not configured. | All levels                   |
| <b>Pad to minimum frame size</b> | Pad Tx VLAN-tagged frame to minimum of 68 bytes.  | All levels                   |



Table 29: *show interfaces satellite-device Output Fields (continued)*

| Field Name                              | Field Description   | Level of Output              |
|---|---|------------------------------|
| <b>Minimum links needed</b>             | Minimum number of aggregated links.   | All levels                   |
| <b>Minimum bandwidth needed</b>         | Minimum bandwidth configured for aggregated bundle.   | All levels                   |
| <b>Device flags</b>                     | Information about the physical device.  | All levels                   |
| <b>Interface flags</b>                  | Information about the interface.  | All levels                   |
| <b>Current address</b>                  | Configured MAC address.   | <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: 2008-01-16 10:52:40 UTC (3d 22:58 ago)</b> .  | <b>detail extensive none</b> |
| <b>Input rate</b>                       | Input rate in bits per second (bps) and packets per second (pps). The value in this field also includes the Layer 2 overhead bytes for ingress traffic on Ethernet interfaces if you enable accounting of Layer 2 overhead at the PIC level or the logical interface level.   | All levels                   |
| <b>Output rate</b>                      | Output rate in bps and pps. The value in this field also includes the Layer 2 overhead bytes for egress traffic on Ethernet interfaces if you enable accounting of Layer 2 overhead at the PIC level or the logical interface level.  | All levels                   |
| <b>Extended port information</b>        | Satellite device port ID  | All levels                   |
| <b>Active alarms and Active defects</b> | <p>Ethernet-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 switch configuration, an alarm can ring the red or yellow alarm bell on the switch, or turn on the red or yellow alarm LED on the craft interface. These fields can contain the value <b>None</b> or <b>Link</b>.</p> <ul style="list-style-type: none"> <li>• <b>None</b>—There are no active defects or alarms.</li> <li>• <b>Link</b>—Interface has lost its link state, which usually means that the cable is unplugged, the far-end system has been turned off, or the PIC is malfunctioning.</li> </ul> | <b>detail extensive none</b> |
| <b>Interface transmit statistics</b>    | All levels  | All levels                   |
| <b>Logical Interface</b>                |   |                              |
| <b>Logical interface</b>                | Name of the logical interface.  | All levels                   |
| <b>Index</b>                            | Index number of the logical interface, which reflects its initialization sequence.  | <b>detail extensive none</b> |
| <b>SNMP ifIndex</b>                     | SNMP interface index number for 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>      |

Table 29: *show interfaces satellite-device* Output Fields (continued)

| Field Name                 | Field Description  | Level of Output |
|----------------------------|--|-----------------|
| <b>Flags</b>               | Information about the logical interface.   | All levels      |
| <b>Statistics</b>          | <ul style="list-style-type: none"> <li>• Packets</li> <li>• pps</li> <li>• Bytes</li> <li>• bps</li> </ul>   | All levels      |
| <b>Bundle</b>              | Provides information for each active bundle link. <ul style="list-style-type: none"> <li>• Input               <ul style="list-style-type: none"> <li>• Packets</li> <li>• pps</li> <li>• Bytes</li> <li>• bps</li> </ul> </li> <li>• Output               <ul style="list-style-type: none"> <li>• Packets—</li> <li>• pps</li> <li>• Bytes</li> <li>• bps</li> </ul> </li> </ul> | All levels      |
| <b>Adaptive Statistics</b> | <ul style="list-style-type: none"> <li>• Adaptive Adjusts</li> <li>• Adaptive Scans</li> <li>• Adaptive Updates</li> </ul>   | All levels      |
| <b>Protocol</b>            | Protocol family configured on the logical interface.   | All levels      |

## Sample Output

### Sample Output

*show interfaces satellite-device all*

```

user@aggregation-device> show interfaces satellite-device all

Physical interface: ae0 (Extended Port, Enabled, Physical link is Up
  Interface index: 128, SNMP ifIndex: 574
  Link-level type: Ethernet, MTU: 1514, Speed: 2Gbps, BPDU Error: None, MAC-REWRITE
  Error: None, Loopback: Disabled, Source filtering: Disabled,
  Flow control: Disabled
  Pad to minimum frame size: Disabled
  Minimum links needed: 1, Minimum bandwidth needed: 1bps
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  Current address: f4:b5:2f:f7:3f:c0, Hardware address: f4:b5:2f:f7:3f:c0
  Last flapped   : 2015-03-31 18:36:43 PDT (06:54:08 ago)
  Input rate     : 2032 bps (2 pps)
  Output rate    : 3048 bps (2 pps)

Logical interface ae0.0 (Index 337) (SNMP ifIndex 575)

```

```

Flags: Up SNMP-Traps 0x24024000 Encapsulation: Ethernet-Bridge
Statistics          Packets          pps          Bytes          bps
Bundle:
  Input :           1704             0          592992           0
  Output:             0             0             0           0
Adaptive Statistics:
  Adaptive Adjusts:             0
  Adaptive Scans :             0
  Adaptive Updates:            0
Protocol bridge, MTU: 1514

Physical interface: ae1 (Extended Port, Enabled, Physical link is Up
Interface index: 129, SNMP ifIndex: 790
Link-level type: Ethernet, MTU: 1514, Speed: 200mbps, BPDU Error: None,
MAC-REWRITE Error: None, Loopback: Disabled, Source filtering: Disabled,
Flow control: Disabled
Pad to minimum frame size: Disabled
Minimum links needed: 1, Minimum bandwidth needed: 1bps
Device flags : Present Running
Interface flags: SNMP-Traps Internal: 0x4000
Current address: f4:b5:2f:f7:3f:c1, Hardware address: f4:b5:2f:f7:3f:c1
Last flapped   : 2015-03-31 18:36:44 PDT (06:54:07 ago)
Input rate     : 2032 bps (2 pps)
Output rate    : 2032 bps (2 pps)

Logical interface ae1.0 (Index 338) (SNMP ifIndex 1216)
Flags: Up SNMP-Traps 0x24024000 Encapsulation: Ethernet-Bridge
Statistics          Packets          pps          Bytes          bps
Bundle:
  Input :           2759             0          679982           0
  Output:             0             0             0           0
Adaptive Statistics:
  Adaptive Adjusts:             0
  Adaptive Scans :             0
  Adaptive Updates:            0
Protocol bridge, MTU: 1514

Physical interface: xe-101/0/31 (Extended Port, Enabled, Physical link is Up
Interface index: 336, SNMP ifIndex: 829
Link-level type: Ethernet, MTU: 1514, LAN-PHY mode, Speed: 10Gbps
Device flags : Present Running
Interface flags: SNMP-Traps Internal: 0x4000
Link flags   : None
CoS queues   : 8 supported, 8 maximum usable queues
Current address: 10:0e:7e:bf:2d:24, Hardware address: 10:0e:7e:bf:2d:24
Last flapped  : 2015-03-31 08:28:23 PDT (17:02:29 ago)
Input rate    : 0 bps (0 pps)
Output rate   : 0 bps (0 pps)
Active alarms : None
Active defects: None
Interface transmit statistics: Disabled

Logical interface xe-101/0/31.0 (Index 491) (SNMP ifIndex 926)
Flags: Up SNMP-Traps 0x24024000 Encapsulation: Ethernet-Bridge
Input packets : 0
Output packets: 0
Protocol bridge, MTU: 1514

Physical interface: xe-101/0/32 (Extended Port, Enabled, Physical link is Up
Interface index: 337, SNMP ifIndex: 836
Link-level type: Ethernet, MTU: 1514, LAN-PHY mode, Speed: 10Gbps

```

```
Device flags      : Present Running
Interface flags:  SNMP-Traps Internal: 0x4000
Link flags       : None
CoS queues       : 8 supported, 8 maximum usable queues
Current address:  10:0e:7e:bf:2d:25, Hardware address: 10:0e:7e:bf:2d:25
Last flapped    : 2015-03-31 08:28:23 PDT (17:02:29 ago)
Input rate      : 0 bps (0 pps)
Output rate     : 0 bps (0 pps)
Active alarms   : None
Active defects  : None
Interface transmit statistics: Disabled

Logical interface xe-101/0/32.0 (Index 492) (SNMP ifIndex 935)
  Flags: Up SNMP-Traps 0x24024000 Encapsulation: Ethernet-Bridge
  Input packets : 0
  Output packets: 0
  Protocol bridge, MTU: 1514
```

## show interfaces statistics

**Syntax** `show interfaces statistics interface-name`  
`<satellite-device [device-alias-name | all ]>`  
`<detail>`

**Release Information** Command introduced before Junos OS Release 7.4.  
 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 Routers.  
**satellite-device** option introduced in Junos OS Release 14.2R3.

**Description** Display static interface statistics, such as errors.



**NOTE:** When the `show interfaces statistics` command is executed on an interface that is configured on T4000 Type 5 FPC, the *IPv6 transit statistics* field displays:

- Total statistics (sum of transit and local statistics) at the physical interface level
- Transit statistics at the logical interface level

**Options** *interface-name*—Name of an interface.

**satellite-device [*device-alias-name* | all ]**—(Junos Fusion only) (Optional) Display interface statistics for interfaces on the specified satellite device in the Junos Fusion, or on all satellite devices in the Junos Fusion.



**NOTE:** In a Junos Fusion Enterprise, logical interface statistics are not synced across aggregation devices in a dual-aggregation device topology.

**detail**—(Optional) Display detailed output.

**Required Privilege Level** view

**Related Documentation**

- *clear interfaces statistics*

**List of Sample Output** [show interfaces statistics \(Fast Ethernet\) on page 546](#)  
[show interfaces statistics \(Gigabit Ethernet PIC—Egress\) on page 547](#)

[show interfaces statistics detail \(Aggregated Ethernet\) on page 549](#)  
[show interfaces statistics detail \(Aggregated Ethernet—Ingress\) on page 550](#)  
[show interfaces statistics detail \(Aggregated Ethernet—Egress\) on page 551](#)  
[show interfaces statistics \(SONET/SDH\) on page 552](#)  
[show interfaces statistics \(Aggregated SONET/SDH—Ingress\) on page 554](#)  
[show interfaces statistics \(Aggregated SONET/SDH—Egress\) on page 555](#)  
[show interfaces statistics \(MX Series Routers\) on page 556](#)  
[show interfaces statistics \(MX Series Routers: Dynamic Interfaces with RPF Check Detail\) on page 556](#)  
[show interfaces statistics \(PTX Series Packet Transport Routers\) on page 557](#)  
[show interfaces statistics \(ACX Series routers\) on page 557](#)

**Output Fields** Output from both the **show interfaces *interface-name* detail** and the **show interfaces *interface-name* extensive** commands include all the information displayed in the output from the **show interfaces statistics** 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 *Common Output Fields Description*. For information about the input errors and output errors, see *Fast Ethernet and Gigabit Ethernet Counters*.

## 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: 00:00:5E:00:53:dc, Hardware address: 00:00:5E:00:53: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: 00:00:5E:00:53:74, Hardware address: 00:00:5E:00:53:74
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, 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: 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 account overhead: 100
Ingress account 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
  Output bytes :       37461038
  Input packets:           0
  Output packets:      882131
IPv6 transit statistics:
  Input bytes :           0
  Output bytes :       16681118
  Input packets:           0
  Output packets:      362633
Multicast statistics:
IPv4 multicast statistics:
  Input bytes :          112048
  Output bytes :       20779920
  Input packets:          1801
  Output packets:      519498
IPv6 multicast statistics:
  Input bytes :          156500
  Output bytes :       16681118
  Input packets:          1818
  Output packets:      362633
Protocol inet, MTU: 1500, Generation: 151, Route table: 0
  Addresses, Flags: Is-Preferred Is-Primary
  Destination: 10.40.40.0/30, Local: 10.40.40.2, Broadcast: 10.40.40.3,
Generation: 167
  Protocol inet6, MTU: 1500, Generation: 152, Route table: 0
  Addresses, Flags: Is-Preferred Is-Primary
  Destination: ::10.40.40.0/126, Local: ::10.40.40.2
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&gt; 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: 00:00:5E:0053:f0, Hardware address: 00:00:5E:00:53: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: 00:00:5E:00:53:f0, Hardware address: 00:00:5E:00:53: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
Bundle:
  Packets      pps      Bytes      bps
  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: 10.30.30.0/30, Local: 10.30.30.2, Broadcast: 10.30.30.3,
Generation: 310
Protocol inet6, MTU: 1500, Generation: 237, Route table: 0
Addresses, Flags: Is-Preferred Is-Primary
Destination: ::10.30.30.0/126, Local: ::10.30.30.2
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: 00:00:5E:00:53:f0, Hardware address: 00:00:5E:00:53: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: 10.30.30.0/30, Local: 10.30.30.1, Broadcast: 10.30.30.3,
Generation: 420
Protocol inet6, MTU: 1500, Generation: 292, Route table: 0
Addresses, Flags: Is-Preferred Is-Primary
Destination: ::/26, Local: ::10.30.30.1
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: 0C192,
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, mp1s: 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: 10.30.30.0/30, Local: 10.30.30.2, Broadcast: 10.30.30.3,
Generation: 322
  Protocol inet6, MTU: 4470, Generation: 245, Route table: 0
  Addresses, Flags: Is-Preferred Is-Primary
    Destination: ::10.30.30.0/126, Local: ::10.30.30.2
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: 10.30.30.0/30, Local: 10.30.30.2, Broadcast: 10.30.30.3,
Generation: 316
Protocol inet6, MTU: 4470, Generation: 241, Route table: 0
Addresses, Flags: Is-Preferred Is-Primary
Destination: ::10.30.30.0/126, Local: ::10.30.30.2
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: 10.30.30.0/30, Local: 10.30.30.1, Broadcast: 10.30.30.3,
  Generation: 426
  Protocol inet6, MTU: 4470, Generation: 296, Route table: 0

```

```

Addresses, Flags: Is-Preferred Is-Primary
Destination: ::/26, Local: ::10.30.30.1
Generation: 428
Addresses, Flags: Is-Preferred
Destination: fe80::/64, Local: fe80::2a0:a5ff:fe63:1d0a
Generation: 429

```

### show interfaces statistics (MX Series Routers)

```
user@host> show interfaces xe-0/0/0 statistics
```

```

Physical interface: xe-0/0/0, Enabled, Physical link is Up
Interface index: 145, SNMP ifIndex: 592
Link-level type: Ethernet, MTU: 1514, LAN-PHY mode, Speed: 10Gbps, BPDU Error:
None, Loopback: None, Source filtering: Disabled, Flow control: Enabled
Pad to minimum frame size: Enabled
Device flags   : Present Running
Interface flags: SNMP-Traps Internal: 0x0
Link flags     : None
CoS queues     : 8 supported, 8 maximum usable queues
Current address: 00:00:5E:00:53:f0, Hardware address: 00:00:5E:00:53:f0
Last flapped   : 2013-10-26 03:20:40 test (2w3d 03:29 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  : LINK
Active defects : LINK
PCS statistics
  Bit errors           Seconds
  Errored blocks       109
Interface transmit statistics: Disabled

```

### show interfaces statistics (MX Series Routers: Dynamic Interfaces with RPF Check Detail)

```
user@host> show interfaces statistics pp0.3221225475 detail
```

```

Logical interface pp0.3221225475(Index 536870921)(SNMP ifIndex 200000009)
(Generation 6)
Flags: Up Point-To-Point Encapsulation: PPPoE
PPPoE:
  State: SessionUp, Session ID: 1,
  Session AC name: B, Remote MAC address:00:00:5E:00:53:01,
  Underlying interface: xe-1/0/0.3221225474 (Index 536870919)
  Ignore End-Of-List tag: Disable
Bandwidth: 0
Traffic statistics:
  Input bytes   : 34
  Output bytes  : 0
  Input packets: 1
  Output packets: 1
Local statistics:
  Input bytes   : 0
  Output bytes  : 0
  Input packets: 0
  Output packets: 0
Transit statistics:
  Input bytes   : 34
  Output bytes  : 0

```



```

    Input  packets:                1                0 pps
    Output packets:                1                0 pps
    Keepalive settings: Interval 30 seconds, Up-count 3, Down-count 3
    LCP state: Opened
    NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured, mpls:
Not-configured
    CHAP state: Success
    PAP state: Closed
    Protocol inet, MTU: 1492
    Max nh cache: 0, New hold nh limit: 0, Curr nh cnt: 0, Curr new hold cnt: 0,
NH drop cnt: 0
    Generation: 0, Route table: 0
    Flags: uRPF, Unnumbered
    RPF Failures: Packets: 0, Bytes: 0
    Donor interface: lo0.0 (Index 320)
    Input Filters: upstrm1-inet-pp0.3221225475-in
    Output Filters: dwnstrm1-inet-pp0.3221225475-out
    Addresses, Flags: Is-Primary
    Destination: Unspecified, Local: 10.255.96.19, Broadcast: Unspecified,
Generation: 0

```

#### 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: 00:00:5E:00:53:1b, Hardware address: 00:00:5E:00:53:1b
  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: 00:00:5E:00:53:a3, Hardware address: 00:00:5E:00:53: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 interfaces terse satellite-device

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>show interfaces terse satellite-device (device-alias   all)</code>  |
| <b>Release Information</b>      | Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.<br>Command introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.<br>Command introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.  |
| <b>Description</b>              | Display the satellite device extended ports in a Junos Fusion.  |
| <b>Options</b>                  | <p><b>device-alias</b> <i>device-alias</i>—Display extended port information for the satellite device using the specified device alias only.</p> <p><b>all</b>—Display information for all extended ports and aggregated Ethernet interfaces with extended ports as members configured on all of the satellite devices.</p> |
| <b>Required Privilege Level</b> | view  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Configuring or Expanding a Junos Fusion Enterprise</i></li> </ul>   |
| <b>List of Sample Output</b>    | <p><a href="#">show interfaces terse satellite-device device-alias on page 560</a></p> <p><a href="#">show interfaces terse satellite-device all on page 560</a></p>  |
| <b>Output Fields</b>            | <a href="#">Table 30 on page 559</a> lists the output fields for the <b>show interfaces terse satellite-device</b> command. Output fields are listed in the approximate order in which they appear.   |

*Table 30: show interfaces terse satellite-device Output Fields*

| Field Name | Field Description                                      |
|------------|--|
| Interface  | Interface name.  |
| Admin      | Whether the interface is turned on (up) or off (down). |
| Link       | Link state: <b>up</b> or <b>down</b> .                 |
| Proto      | Protocol family configured on the logical interface.   |
| Local      | Local IP address of the logical interface.             |
| Remote     | Remote IP address of the logical interface.            |

## Sample Output

### show interfaces terse satellite-device device-alias

```
user@aggregation-device> show interfaces terse satellite-device TOR1
```

| Interface        | Admin | Link | Proto  | Local | Remote |
|------------------|-------|------|--------|-------|--------|
| sd-101/0/0       | up    | up   |        |       |        |
| sd-101/0/0.32770 | up    | up   | bridge |       |        |
| xe-101/0/14      | up    | up   |        |       |        |
| xe-101/0/15      | up    | up   |        |       |        |
| xe-101/0/16      | up    | up   |        |       |        |
| xe-101/0/17      | up    | up   |        |       |        |
| xe-101/0/24      | up    | up   |        |       |        |
| xe-101/0/25      | up    | up   |        |       |        |
| xe-101/0/31      | up    | up   |        |       |        |
| xe-101/0/31.0    | up    | up   | bridge |       |        |
| xe-101/0/32      | up    | down |        |       |        |
| xe-101/0/32.0    | up    | down | bridge |       |        |
| xe-101/0/33      | up    | down |        |       |        |
| xe-101/0/33.0    | up    | down | bridge |       |        |
| ge-101/0/36      | up    | down |        |       |        |
| et-101/0/48      | up    | down |        |       |        |
| xe-101/0/50:0    | up    | up   |        |       |        |
| xe-101/0/50:0.0  | up    | up   | bridge |       |        |
| xe-101/0/50:1    | up    | up   |        |       |        |
| xe-101/0/50:2    | up    | up   |        |       |        |
| xe-101/0/50:2.0  | up    | up   | bridge |       |        |
| xe-101/0/50:3    | up    | up   |        |       |        |

## Sample Output

### show interfaces terse satellite-device all

```
user@aggregation-device> show interfaces terse satellite-device all
```

| Interface   | Admin | Link | Proto  | Local | Remote |
|-------------|-------|------|--------|-------|--------|
| ae0         | up    | up   |        |       |        |
| ae0.0       | up    | up   | bridge |       |        |
| ae1         | up    | up   |        |       |        |
| ae1.0       | up    | up   | bridge |       |        |
| ae2         | up    | up   |        |       |        |
| ae2.0       | up    | up   | bridge |       |        |
| ae3         | up    | up   |        |       |        |
| ae3.0       | up    | up   | bridge |       |        |
| ae4         | up    | up   |        |       |        |
| ae4.0       | up    | up   | bridge |       |        |
| ae5         | up    | up   |        |       |        |
| ae5.0       | up    | up   | bridge |       |        |
| ae6         | up    | up   |        |       |        |
| ae6.0       | up    | up   | bridge |       |        |
| ae7         | up    | up   |        |       |        |
| ae7.0       | up    | up   | bridge |       |        |
| ae8         | up    | up   |        |       |        |
| ae8.0       | up    | up   | bridge |       |        |
| ae9         | up    | up   |        |       |        |
| ae9.0       | up    | up   | bridge |       |        |
| ae10        | up    | down |        |       |        |
| ae10.0      | up    | down | bridge |       |        |
| xe-101/0/14 | up    | up   |        |       |        |

|                 |    |      |        |           |
|-----------------|----|------|--------|-----------|
| xe-101/0/15     | up | up   |        |           |
| xe-101/0/16     | up | up   |        |           |
| xe-101/0/17     | up | up   |        |           |
| xe-101/0/24     | up | up   |        |           |
| xe-101/0/25     | up | up   |        |           |
| xe-101/0/31     | up | up   |        |           |
| xe-101/0/31.0   | up | up   | bridge |           |
| xe-101/0/32     | up | down |        |           |
| xe-101/0/32.0   | up | down | bridge |           |
| xe-101/0/33     | up | down |        |           |
| xe-101/0/33.0   | up | down | bridge |           |
| ge-101/0/36     | up | down |        |           |
| et-101/0/48     | up | down |        |           |
| xe-101/0/50:0   | up | up   |        |           |
| xe-101/0/50:0.0 | up | up   | bridge |           |
| xe-101/0/50:1   | up | up   |        |           |
| xe-101/0/50:2   | up | up   |        |           |
| xe-101/0/50:2.0 | up | up   | bridge |           |
| xe-101/0/50:3   | up | up   |        |           |
| xe-102/0/10     | up | up   |        |           |
| xe-102/0/11     | up | up   |        |           |
| xe-102/0/12     | up | down |        |           |
| xe-102/0/13     | up | up   |        |           |
| xe-102/0/14     | up | up   |        |           |
| xe-102/0/15     | up | up   |        |           |
| xe-102/0/16     | up | up   |        |           |
| xe-102/0/17     | up | up   |        |           |
| xe-102/0/24     | up | up   |        |           |
| xe-102/0/25     | up | up   |        |           |
| xe-102/0/31     | up | up   |        |           |
| xe-102/0/31.0   | up | up   | bridge |           |
| xe-102/0/32     | up | up   |        |           |
| xe-102/0/32.0   | up | up   | bridge |           |
| xe-102/0/33     | up | up   |        |           |
| xe-102/0/45     | up | down |        |           |
| ge-102/0/46     | up | down |        |           |
| xe-102/0/47     | up | down |        |           |
| et-102/0/48     | up | down |        |           |
| et-102/0/49     | up | down |        |           |
| et-102/0/50     | up | down |        |           |
| et-102/0/51     | up | down |        |           |
| et-102/0/52     | up | down |        |           |
| et-102/0/53     | up | down |        |           |
| ge-103/0/0      | up | up   |        |           |
| ge-103/0/0.0    | up | up   | aenet  | --> ae0.0 |
| ge-103/0/1      | up | down |        |           |
| ge-103/0/1.0    | up | down | aenet  | --> ae1.0 |
| ge-103/0/2      | up | up   |        |           |
| ge-103/0/2.0    | up | up   | aenet  | --> ae2.0 |
| ge-103/0/3      | up | up   |        |           |

## show system core-dumps

|   |  |
|---|--|
| <b>List of Syntax</b>                     | <a href="#">Syntax on page 562</a><br><a href="#">Syntax (SRX Series) on page 562</a><br><a href="#">Syntax (Junos OS Evolved) on page 562</a><br><a href="#">Syntax (EX Series Switches) on page 562</a><br><a href="#">Syntax (TX Matrix Router) on page 562</a><br><a href="#">Syntax (TX Matrix Plus Router) on page 562</a><br><a href="#">Syntax (QFX Series and OCX Series) on page 562</a> |
| <b>Syntax</b>                             | <pre>show system core-dumps &lt;re0&gt; &lt;re1&gt; &lt;routing-engine&gt; &lt;satellite [<i>fpc-slot-id</i>   <i>device-alias alias-name</i>]&gt;</pre>   |
| <b>Syntax (SRX Series)</b>                | <pre>show system core-dumps</pre>  |
| <b>Syntax (Junos OS Evolved)</b>          | <pre>show system core-dumps</pre>  |
| <b>Syntax (EX Series Switches)</b>        | <pre>show system core-dumps &lt;all-members&gt; &lt;local&gt; &lt;member <i>member-id</i>&gt;</pre>  |
| <b>Syntax (TX Matrix Router)</b>          | <pre>show system core-dumps &lt;all-chassis   all-lcc   lcc <i>number</i>   scc&gt;</pre>  |
| <b>Syntax (TX Matrix Plus Router)</b>     | <pre>show system core-dumps &lt;all-chassis   all-lcc   lcc <i>number</i>   sfc <i>number</i>&gt;</pre>  |
| <b>Syntax (QFX Series and OCX Series)</b> | <pre>show system core-dumps &lt;component (<i>UUID</i>   <i>serial number</i>   all)&gt; &lt;display-period (<i>hours</i>   <i>minutes</i>   <i>seconds</i>)&gt; &lt;display-order&gt; &lt;kernel-crashinfo component (<i>UUID</i>   <i>serial number</i>)&gt; &lt;repository (core   log)&gt;</pre>   |
| <b>Release Information</b>                | <p>Command introduced before Junos OS Release 8.5.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>sfc</b> option introduced in Junos OS Release 9.6 for the TX Matrix Plus router.</p> <p>Command introduced in Junos OS Release 11.1 for the QFX Series.</p>   |

**re0**, **re1**, and **routing-engine** options introduced for dual Routing Engines in Junos OS Release 13.1.

Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**satellite** option introduced in Junos OS Release 14.2R3.

**core-file-info** option is deprecated in Junos OS Release 16.1R3.

**Description** Show core files on all routers or switches running Junos OS. You can use the **show system core-dumps** command to show a list of system core files created when the router or switch has failed. This command can be useful for diagnostic purposes. Each list item includes the file permissions, number of links, owner, group, size, modification date, and path and filename. If dual Routing Engines are present, you can view core-dump files for either routing engine or both routing engines together. On a QFabric system, you can view core-dump files on individual QFabric system devices as well as on the entire QFabric system.

The core files are placed in the **/var/tmp/corefiles** on the SPC3 cards. Each PIC of the SPC3 card has five core files quota on the RE. When no more than five core files from one SPC3 PIC are on the RE, and the RE hard drive has more than 5 GB capacity, core file from the specific PIC is saved at the time it arrives. When there are already five core files from one SPC3 PIC on the RE, the newly arrived core file from the specific PIC replaces the last core file created by that PIC on the RE. When 5 GB capacity limit is reached, core file is not copied onto the RE. Only a zero sized shadow file with the same file name suffixed by ".shadow" is created. The core file is reached on the specific SPC3 PIC.

**Options** **none**—Display a list of all existing core-dump files.



**NOTE:** If dual Routing Engines are present, then only the core-dump files for the active Routing Engine are listed. For Junos OS Evolved, core-dump files for all Routing Engines are listed.

**all-chassis**—(TX Matrix and TX Matrix Plus routers only) (Optional) On a routing matrix based on a TX Matrix router, display system core files for the TX Matrix router switch-card chassis [SCC] and all the T640 routers [LCCs] connected to the TX Matrix router.

On a routing matrix based on a TX Matrix Plus router, display system core files for the TX Matrix Plus router (switch-fabric chassis [SFC]) and all the T1600 routers [LCCs] connected to the TX Matrix Plus router.

**<all-lcc | lcc number>**—(TX Matrix and TX Matrix Plus routers only) (Optional) On a routing matrix based on the TX Matrix router, display core dump files for all T640 routers (line-card chassis [LCCs]) or a specific T640 router [LCC] connected to the TX Matrix router.

On a routing matrix based on the TX Matrix Plus router, display logging information for all T1600 routers (line-card chassis [LCCs]) or a specific T1600 router (LCC)

connected to the TX Matrix Plus router. When using the **lcc number** option, replace **number** with a value from 0 through 3.



**NOTE:** The all-chassis option displays system core files for the SCC or SFC and the LCCs connected to the SCC or SFC in the routing matrix while the all-lcc option only displays system core files for the LCCs in the routing matrix.

**all-members**—(EX4200 switches) (Optional) Display system core files on all members of the Virtual Chassis configuration.

**component (UUID | serial number | all)**—(QFabric systems only) (Optional) Display a list of core-dump files located on individual QFabric system device or on the entire QFabric system.

**display-order (timestamp-sort | alphanumeric-sort)**—(QFabric systems only) (Optional) Display list of debug artifacts generated within the specified period—for example, within the last hour, within the last 20 minutes, or within the last 32 seconds—or according to their filename.

**display-period (hours | minutes | seconds)**—(QFabric systems only) (Optional) Display core-dump files generated within the specified period—for example, within the last hour, within the last 20 minutes, or within the last 32 seconds.

**kernel-crashinfo component (UUID | serial number)**—(QFabric systems only) (Optional) Display kernel crash information from the EEPROM on a QFabric system device.

**local**—(EX4200 switches only) (Optional) Display system core files on the local Virtual Chassis member.

**member member-id**—(EX4200 switches only) (Optional) Display system core files on the specified member of the Virtual Chassis configuration. Replace **member-id** with a value from 0 through 9.

**node node-name**—(Optional) (Junos OS Evolved only) Display system core files generated on the specified node.

**re0**—(Dual Routing Engines only) Display the core-dump files on re0.

**re1**—(Dual Routing Engines only) Display the coredump files on re1.

**repository (core | log)**—(QFabric systems only) (Optional) Specify either the core or log repository in which to view core-dump files.

**routing-engine (backup | both | local | master | other)**—(Dual routing engines only) Display a list of core-dump files for either the backup, local, master, or other routing engine or both routing engines.



**satellite** [*fpc-slot-id* | *device-alias alias-name*]**—**(Junos Fusion only) (Optional) Display system core files for the specified satellite device in a Junos Fusion, or for all satellite devices in the Junos Fusion if no satellite devices are specified.

**scc**—(TX Matrix routers only) (Optional) Display system core files on the TX Matrix router (or switch-card chassis).

**sfc**—(TX Matrix Plus routers only) (Optional) Display system core files on the TX Matrix Plus router (or switch-fabric chassis).

**Required Privilege Level** view

**List of Sample Output** [show system core-dumps on page 567](#)  
[show system core-dumps on page 567](#)  
[show system core-dumps routing-engine both on page 567](#)  
[show system core-dumps \(SRX Series\) on page 568](#)  
[show system core-dumps \(TX Matrix Plus Router\) on page 568](#)  
[show system core-dumps \(QFX3500 Switch\) on page 570](#)  
[show system core-dumps \(QFabric Systems\) on page 570](#)  
[show system core-dumps component serial number display-order alphanumeric-sort repository core \(QFabric Systems\) on page 571](#)  
[show system core-dumps display-period \(QFabric Systems\) on page 571](#)  
[show system core-dumps kernel-crashinfo component serial number \(QFabric Systems\) on page 573](#)  
[show system core-dumps repository core \(QFabric Systems\) on page 575](#)  
[show system core-dumps repository log \(QFabric Systems\) on page 575](#)

**Output Fields** [Table 31 on page 565](#) describes the output fields for the **show system core-dumps** command. Output fields are listed in the approximate order in which they appear.

*Table 31: show system core-dumps Output Fields*

| Field Name         | Field Description                          |
|--------------------|--|
| <i>Permissions</i> | Read/write permissions for the file named. |
| <i>Links</i>       | Number of links to the file.               |
| <i>Owner</i>       | Name of the file owner.                    |
| <i>Group</i>       | Name of the group with file access.        |
| <i>File size</i>   | File size in bytes.                        |
| <i>Modified</i>    | Last file modification date and time.      |

Table 31: show system core-dumps Output Fields (continued)

| Field Name                                | Field Description   |
|---|---|
| <i>Path/filename</i>                      | File path where the file resides and the filename.<br><br>(MX Series routers only) When you display the core files for an MX Series Virtual Chassis, the <b>show system core-dumps</b> command does not display information about files pertaining to the relayd process.   |
| <b>Repository scope:</b>                  | Repository where core-dump files and log files are stored. The core-dump files are located in the <b>core</b> repository, and the log files are located in the <b>log</b> repository. The default <b>Repository scope</b> is shared since both the <b>core</b> and <b>log</b> repositories are shared by all of the QFabric system devices. |
| <b>Repository head:</b>                   | Path to the top-level repository location.  |
| <b>Repository name:</b>                   | Name of the repository: <b>core</b> or <b>log</b> .   |
| <b>List of nodes for core repository:</b> | List of core-dump files associated with a particular QFabric system device located in the core repository.  |
| <b>Node Group</b>                         | Name of the QFabric system device.  |
| <b>Node Identifier</b>                    | UUID or serial number of the QFabric system device.   |
| <b>Num</b>                                | Number of core-dump and log files.  |
| <b>Model</b>                              | Model number of the QFabric system device.  |
| <b>Usage</b>                              | Usage of the repository in megabytes.   |
| <b>Total usage of core repository:</b>    | Total usage of core-dump files associated with a particular QFabric system device located in the core repository. Usage is specified in megabytes and as a percentage.  |
| <b>Total usage of log repository:</b>     | Total usage of log files associated with a particular QFabric system device located in the log repository. Usage is specified in megabytes and as a percentage.   |
| <b>List of nodes for core repository:</b> | List of core-dump files associated with a particular QFabric system device located in the core repository.  |
| <b>List of nodes for log repository:</b>  | List of log files associated with a particular QFabric system device located in the log repository.   |
| <b>Filename</b>                           | Name of the core-dump file.   |
| <b>Date</b>                               | Last core-dump file modification date and time.   |
| <b>Size</b>                               | Size of the core-dump file.   |

Table 31: show system core-dumps Output Fields (continued)

| Field Name    | Field Description  |
|---------------|--|
| Core filename | Filename of the core-dump file.                                      |
| Process name  | Name of the process that is generating a core-dump file or log file. |
| Release       | Junos OS release.  |
| Build server  | Junos OS build server.   |
| Build date    | Junos OS build date.   |
| Stack trace   | Stack trace of the core-dump file.                                   |

## Sample Output

### show system core-dumps

This example shows the command output if core files exist.

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

### show system core-dumps

This example shows the command output if core files do not exist.

```
user@host> show system core-dumps
/var/crash/*core*: No such file or directory
/var/tmp/*core*: No such file or directory
/var/tmp/pics/*core*: No such file or directory
/var/crash/kernel.*: No such file or directory
```

### show system core-dumps routing-engine both

This example shows the command output if dual Routing Engines are present.

```
user@host> show system core-dumps routing-engine both
re0:
-----
/var/crash/*core*: No such file or directory
/var/tmp/pics/*core*: No such file or directory
/var/crash/kernel.*: No such file or directory

/var/tmp/cores:
total blocks: 496776
-rw-rw---- 1 root field 11910589 Nov 8 13:20 chassisd.core.0.201311081320
...
```

```
-rw-rw---- 1 root field 11737227 Oct 28 14:21
rpd.core-tarball.4.tgz.201310281421.3458162
total files: 10
```

```
rel:
```

```
-----
/var/crash/*core*: No such file or directory
/var/tmp/pics/*core*: No such file or directory
/var/crash/kernel.*: No such file or directory
```

```
/var/tmp/cores:
total blocks: 3178420
-rw-rw---- 1 root field 19039721 Nov 8 14:29
chassisd.core.0.201311081429.3485600.gz
-rw-rw---- 1 root field 19039793 Nov 8 14:37
chassisd.core.1.201311081437.3485599.gz
..

-rw-rw---- 1 root field 11710113 Oct 17 15:26
rpd.core-tarball.1.tgz.201310171526.3430028
```

### show system core-dumps (SRX Series)

```
user@host> show system core-dumps
```

```
/var/crash/*core*: No such file or directory
-rw-r--r-- 1 nobody wheel 1439949 Apr 24 10:38
/var/tmp/FPC0_PIC0.localhost.J-UKERN.23421.1556127502.core.tgz
-rw-r--r-- 1 nobody wheel 1435531 Apr 24 10:44
/var/tmp/FPC0_PIC0.localhost.J-UKERN.24702.1556127821.core.tgz
-rw-r--r-- 1 nobody wheel 288761042 Apr 24 10:32
/var/tmp/FPC0_PIC0.localhost.flowd_spc3.elf.31620.1556126342.core.tgz
-rw-r--r-- 1 nobody wheel 35082 Apr 24 10:47
/var/tmp/FPC0_PIC0.localhost.tnp_hello.20972.1556128038.core.tgz
-rw-r--r-- 1 nobody wheel 35367 Apr 24 10:49
/var/tmp/FPC0_PIC0.localhost.tnp_hello.27233.1556128140.core.tgz
-rw-r--r-- 1 nobody wheel 35372 Apr 24 11:32
/var/tmp/FPC0_PIC1.localhost.tnp_hello.22289.1556130737.core.tgz
-rw-r--r-- 1 nobody wheel 35357 Apr 24 10:51
/var/tmp/FPC0_PIC1.localhost.tnp_hello.22492.1556128268.core.tgz
-rw-r--r-- 1 nobody wheel 34812 Apr 24 11:33
/var/tmp/FPC0_PIC1.localhost.tnp_hello.24235.1556130795.core.tgz
-rw-r--r-- 1 nobody wheel 35383 Apr 24 11:18
/var/tmp/FPC0_PIC1.localhost.tnp_hello.27070.1556129899.core.tgz
-rw-r--r-- 1 nobody wheel 34675 Apr 24 11:18
/var/tmp/FPC0_PIC1.localhost.tnp_hello.31621.1556129928.core.tgz
/var/tmp/pics/*core*: No such file or directory
/var/crash/kernel.*: No such file or directory
/var/jails/rest-api/tmp/*core*: No such file or directory
/tftpboot/corefiles/*core*: No such file or directory
total files: 10
```

### show system core-dumps (TX Matrix Plus Router)

```
user@host> show system core-dumps
```

```
sfc0-re0:
```

```

/var/crash/kernel.*: No such file or directory
/tftpboot/corefiles/*core*: No such file or directory

/var/crash/cores:
total 8

/var/tmp/cores:
total 1627592
-rw-r--r-- 1 root field 535346090 May 15 07:36
rpd.core-tarball.0.090515.0736.tgz
-rw-r--r-- 1 root field 105632057 May 15 07:37
rpd.core-tarball.1.090515.0737.tgz
-rw-r--r-- 1 root field 101981681 May 15 07:38
rpd.core-tarball.2.090515.0738.tgz
-rw-r--r-- 1 root field 85854573 May 15 07:40
rpd.core-tarball.3.090515.0740.tgz
-rw-r--r-- 1 root field 4157845 May 15 08:18
rpd.core-tarball.4.090515.0818.tgz

lcc0-re0:
-----
/var/crash/kernel.*: No such file or directory
/tftpboot/corefiles/*core*: No such file or directory

/var/crash/cores:
total 8

/var/tmp/cores:
total 12

lcc1-re0:
-----
/var/crash/kernel.*: No such file or directory
/tftpboot/corefiles/*core*: No such file or directory

/var/crash/cores:
total 8

/var/tmp/cores:
total 10024
-rw-r--r-- 1 root field 1875794 Apr 22 15:47
chassisd.core-tarball.0.090422.1547.tgz
-rw-r--r-- 1 root field 1894183 Apr 22 19:02
chassisd.core-tarball.0.090422.1902.tgz
-rw-r--r-- 1 root field 1290240 Apr 26 16:01 ksyncd_1558.core.0.090426.1601

lcc2-re0:
-----
/var/crash/kernel.*: No such file or directory
/tftpboot/corefiles/*core*: No such file or directory

/var/crash/cores:
total 21124008
-rw-r--r-- 1 root wheel 1022376528 May 2 06:43
core-LCC2-EGFPC7.core.0.090502.0643
-rw-r--r-- 1 root wheel 1022376528 May 2 08:13
core-LCC2-EGFPC7.core.0.090502.0813
-rw-r--r-- 1 root wheel 1022376544 May 5 06:15
core-LCC2-EGFPC7.core.0.090505.0615
-rw-r--r-- 1 root wheel 1022376544 May 6 10:59

```

```

core-LCC2-EGFPC7.core.0.090506.1059
-rw-r--r-- 1 root wheel 1022376528 May 2 06:58
core-LCC2-EGFPC7.core.1.090502.0658
-rw-r--r-- 1 root wheel 754271232 May 5 06:33
core-LCC2-EGFPC7.core.1.090505.0633
-rw-r--r-- 1 root wheel 264897536 May 6 11:12
core-LCC2-EGFPC7.core.1.090506.1112
-rw-r--r-- 1 root wheel 1022376528 May 2 07:22
core-LCC2-EGFPC7.core.2.090502.0722
-rw-r--r-- 1 root wheel 163633152 May 5 06:52
core-LCC2-EGFPC7.core.2.090505.0652
-rw-r--r-- 1 root wheel 171312128 May 6 12:13
core-LCC2-EGFPC7.core.2.090506.1213
-rw-r--r-- 1 root wheel 1022376528 May 2 07:39
core-LCC2-EGFPC7.core.3.090502.0739
-rw-r--r-- 1 root wheel 1022376528 May 2 07:55
core-LCC2-EGFPC7.core.4.090502.0755
-rw-r--r-- 1 root wheel 427277312 May 7 04:47
core-LCC2-STFPC4.core.0.090507.0447
-rw-r--r-- 1 root wheel 419609600 May 7 04:47
core-LCC2-STFPC5.core.0.090507.0447
-rw-r--r-- 1 root wheel 432356352 May 7 04:47
core-LCC2-STFPC6.core.0.090507.0447

/var/tmp/cores:
total 2568
-rw-r--r-- 1 root field 1290240 May 14 14:26 ksyncd_1540.core.0.090514.1426
...
```

### show system core-dumps (QFX3500 Switch)

```

user@switch> show system core-dumps

/var/crash/*core*: No such file or directory
-rw-rw---- 1 root field 1545143 Jun 4 2012 /var/tmp/pafxpc.core.0.gz
-rw-rw---- 1 root field 1545146 Jun 4 2012 /var/tmp/pafxpc.core.1.gz
-rw-rw---- 1 root field 1545141 Jun 4 2012 /var/tmp/pafxpc.core.2.gz
-rw-rw---- 1 root field 1545146 Jun 4 2012 /var/tmp/pafxpc.core.3.gz
-rw-rw---- 1 root field 1545142 Jun 5 2012 /var/tmp/pafxpc.core.4.gz
/var/tmp/pics/*core*: No such file or directory
/var/crash/kernel.*: No such file or directory
/tftpboot/corefiles/*core*: No such file or directory
total 5
```

### show system core-dumps (QFabric Systems)

```

user@switch> show system core-dumps

Repository scope: shared
Repository head: /pbdata/export
List of nodes for core repository: /pbdata/export/r.dumps/
Node Group      Node Identifier                               Num  Model      Usage
-----
DG-0            BCF7208D-E44F-E011-802F-4171BAAC781D         0    qfx3100    OM
FM-0            73747cd8-0710-11e1-b6a4-00e081c5297e         0    fx-jvre    OM
DRE-0           77116f18-0710-11e1-a2a0-00e081c5297e         0    fx-jvre    OM
NW-NG-0         BBAK0394                                       0    qfx3500    OM
NW-NG-0         cd78871a-0710-11e1-878e-00e081c5297e         0    fx-jvre    OM
NW-NG-0         d0afda1e-0710-11e1-a1d0-00e081c5297e         0    fx-jvre    OM
```

| FC-0  | d31ab7a6-0710-11e1-ad1b-00e081c5297e | 0   | fx-jvre     | OM    |
|---|--------------------------------------|-----|-------------|-------|
| FC-1  | d4d0f254-0710-11e1-90c3-00e081c5297e | 0   | fx-jvre     | OM    |
| IC-WS001  | WS001                                | 0   | -           | -     |
| IC-WS001  | WS001/YW3803                         | 0   | qfxc08-3008 | OM    |
| IC-WS001  | WS001/YN5999                         | 0   | qfxc08-3008 | OM    |
| node-device1  | BBAK0372                             | 0   | qfx3500     | OM    |
| node-device1  | EE3093                               | 0   | qfx3500     | OM    |
| Total usage of core repository:0M of 70000M (0.0%)      |                                      |     |             |       |
| List of nodes for log repository: /pbdata/export/rlogs/ |                                      |     |             |       |
| Node Group  | Node Identifier                      | Num | Model       | Usage |
| DG-0  | BCF7208D-E44F-E011-802F-4171BAAC781D | 0   | qfx3100     | OM    |
| FM-0  | 73747cd8-0710-11e1-b6a4-00e081c5297e | 1   | fx-jvre     | OM    |
| DRE-0   | 77116f18-0710-11e1-a2a0-00e081c5297e | 1   | fx-jvre     | OM    |
| NW-NG-0   | BBAK0394                             | 1   | qfx3500     | OM    |
| NW-NG-0   | cd78871a-0710-11e1-878e-00e081c5297e | 1   | fx-jvre     | OM    |
| NW-NG-0   | d0afda1e-0710-11e1-a1d0-00e081c5297e | 3   | fx-jvre     | OM    |
| FC-0  | d31ab7a6-0710-11e1-ad1b-00e081c5297e | 1   | fx-jvre     | OM    |
| FC-1  | d4d0f254-0710-11e1-90c3-00e081c5297e | 1   | fx-jvre     | OM    |
| IC-WS001  | WS001                                | 0   | -           | -     |
| IC-WS001  | WS001/YN5999                         | 1   | qfxc08-3008 | OM    |
| IC-WS001  | WS001/YW3803                         | 1   | qfxc08-3008 | OM    |
| node-device1  | BBAK0372                             | 1   | qfx3500     | OM    |
| node-device1  | EE3093                               | 1   | qfx3500     | OM    |
| Total usage of log repository:0M of 70000M (0.0%)       |                                      |     |             |       |

### show system core-dumps component serial number display-order alphanumeric-sort repository core (QFabric Systems)

```
user@switch> show system core-dumps component BBAK8891 display-order alphanumeric-sort repository core
```

|   |                      |         |  |  |
|---|----------------------|---------|--|--|
| Repository scope: shared                            |                      |         |  |  |
| Repository head: /pbdata/export                     |                      |         |  |  |
| Repository name: core                               |                      |         |  |  |
| List of core dumps for component BBAK8891           |                      |         |  |  |
| Repository location: /pbdata/export/rdumps/BBAK8891 |                      |         |  |  |
| Filename  | Date                 | Size    |  |  |
| eswd.core.0.1361.11172011214257.gz                  | Nov 17 21:43:10 2011 | 4779553 |  |  |
| eswd.core.1.80267.11172011214514.gz                 | Nov 17 21:45:19 2011 | 3541648 |  |  |
| eswd.core.2.80682.11172011214535.gz                 | Nov 17 21:45:43 2011 | 2156683 |  |  |
| vccpd.core.0.1195.11182011151131.gz                 | Nov 18 15:11:35 2011 | 375617  |  |  |
| Number of core dumps in repository:4                |                      |         |  |  |

### show system core-dumps display-period (QFabric Systems)

```
user@switch> show system core-dumps display-period 24h
```

| show system core-dumps display-period 24h               |                      |        |  |  |
|---|----------------------|--------|--|--|
| Repository scope: shared                                |                      |        |  |  |
| Repository head: /pbdata/export                         |                      |        |  |  |
| List of core dumps at repository: /pbdata/export/rdumps |                      |        |  |  |
| Delta timespec: Last 24h                                |                      |        |  |  |
| Component: BBAK8273                                     |                      |        |  |  |
| Filename  | Size                 | Date   |  |  |
| vccpd.core.0.1195.11182011151131.gz                     | Nov 18 15:11:35 2011 | 375794 |  |  |

|   |                      |        |
|---|----------------------|--------|
| Component: cedb7b0e-0025-11e1-9a5f-00e081c52990       |                      |        |
| Filename  | Size                 | Date   |
| vccpd.core.0.1461.11182011151131.gz                   | Nov 18 15:11:31 2011 | 120951 |
| Component: ee19c4f8-0025-11e1-aef6-00e081c52990       |                      |        |
| Filename  | Size                 | Date   |
| vccpd.core.0.1462.11182011151131.gz                   | Nov 18 15:11:31 2011 | 109420 |
| Component: BBAK8281                                   |                      |        |
| Filename  | Size                 | Date   |
| vccpd.core.0.1196.11182011151131.gz                   | Nov 18 15:11:36 2011 | 375373 |
| Component: BBAK8891                                   |                      |        |
| Filename  | Size                 | Date   |
| vccpd.core.0.1195.11182011151131.gz                   | Nov 18 15:11:35 2011 | 375617 |
| Component: BBAK8276                                   |                      |        |
| Filename  | Size                 | Date   |
| vccpd.core.0.1196.11182011151131.gz                   | Nov 18 15:11:35 2011 | 375350 |
| Component: BBAK8868                                   |                      |        |
| Filename  | Size                 | Date   |
| vccpd.core.0.1196.11182011151130.gz                   | Nov 18 15:11:34 2011 | 376211 |
| Component: BBAK8835                                   |                      |        |
| Filename  | Size                 | Date   |
| vccpd.core.0.1195.11182011151130.gz                   | Nov 18 15:11:35 2011 | 375700 |
| Component: BBAK8283                                   |                      |        |
| Filename  | Size                 | Date   |
| vccpd.core.0.1195.11182011151131.gz                   | Nov 18 15:11:36 2011 | 368298 |
| Component: YW3781/YW3781                              |                      |        |
| Filename  | Size                 | Date   |
| vccpd.core.0.1220.11182011151131.gz                   | Nov 18 15:11:38 2011 | 380002 |
| Component: 09726be2-0026-11e1-82d9-00e081c52990       |                      |        |
| Filename  | Size                 | Date   |
| vccpd.core.0.1461.11182011151130.gz                   | Nov 18 15:11:31 2011 | 119965 |
| Component: BBAK8309                                   |                      |        |
| Filename  | Size                 | Date   |
| vccpd.core.0.1196.11182011151131.gz                   | Nov 18 15:11:36 2011 | 378930 |
| Component: 303d476a-0026-11e1-abf4-00e081c52990       |                      |        |
| Filename  | Size                 | Date   |
| vccpd.core.0.1460.11182011151131.gz                   | Nov 18 15:11:31 2011 | 118385 |
| Component: YW3798/YW3798                              |                      |        |
| Filename  | Size                 | Date   |
| vccpd.core.0.1219.11182011151131.gz                   | Nov 18 15:11:36 2011 | 380455 |
| List of log dumps at repository: /pbdata/export/rlogs |                      |        |
| Delta timespec: Last 24h                              |                      |        |
| Component: BBAK8273                                   |                      |        |
| Filename  | Size                 | Date   |
| vccpd.tarball.0.1195.11182011151138.tgz               | Nov 18 15:11:39 2011 | 20415  |
| Component: cedb7b0e-0025-11e1-9a5f-00e081c52990       |                      |        |
| Filename  | Size                 | Date   |



|   |                      |       |
|---|----------------------|-------|
| vccpd.tarball.0.1461.11182011151131.tgz         | Nov 18 15:11:33 2011 | 19651 |
| Component: ee19c4f8-0025-11e1-aef6-00e081c52990 |                      |       |
| Filename  | Size                 | Date  |
| vccpd.tarball.0.1462.11182011151133.tgz         | Nov 18 15:11:36 2011 | 24650 |
| Component: BBAK8281                             |                      |       |
| Filename  | Size                 | Date  |
| vccpd.tarball.0.1196.11182011151137.tgz         | Nov 18 15:11:41 2011 | 19445 |
| Component: BBAK8891                             |                      |       |
| Filename  | Size                 | Date  |
| vccpd.tarball.0.1195.11182011151138.tgz         | Nov 18 15:11:41 2011 | 21916 |
| Component: BBAK8276                             |                      |       |
| Filename  | Size                 | Date  |
| vccpd.tarball.0.1196.11182011151137.tgz         | Nov 18 15:11:39 2011 | 20461 |
| Component: BBAK8868                             |                      |       |
| Filename  | Size                 | Date  |
| vccpd.tarball.0.1196.11182011151137.tgz         | Nov 18 15:11:41 2011 | 21924 |
| Component: BBAK8835                             |                      |       |
| Filename  | Size                 | Date  |
| vccpd.tarball.0.1195.11182011151137.tgz         | Nov 18 15:11:39 2011 | 19424 |
| Component: BBAK8283                             |                      |       |
| Filename  | Size                 | Date  |
| vccpd.tarball.0.1195.11182011151138.tgz         | Nov 18 15:11:42 2011 | 31186 |
| Component: YW3781/YW3781                        |                      |       |
| Filename  | Size                 | Date  |
| vccpd.tarball.0.1220.11182011151141.tgz         | Nov 18 15:11:45 2011 | 27565 |
| Component: 09726be2-0026-11e1-82d9-00e081c52990 |                      |       |
| Filename  | Size                 | Date  |
| vccpd.tarball.0.1461.11182011151130.tgz         | Nov 18 15:11:34 2011 | 19613 |
| Component: BBAK8309                             |                      |       |
| Filename  | Size                 | Date  |
| vccpd.tarball.0.1196.11182011151138.tgz         | Nov 18 15:11:46 2011 | 50362 |
| Component: 303d476a-0026-11e1-abf4-00e081c52990 |                      |       |
| Filename  | Size                 | Date  |
| vccpd.tarball.0.1460.11182011151133.tgz         | Nov 18 15:11:33 2011 | 19360 |
| Component: YW3798/YW3798                        |                      |       |
| Filename  | Size                 | Date  |
| vccpd.tarball.0.1219.11182011151140.tgz         | Nov 18 15:11:49 2011 | 24473 |

#### show system core-dumps kernel-crashinfo component serial number (QFabric Systems)

```

user@switch> show system core-dumps kernel-crashinfo component A0001/YA0197
Node: A0001/YA0197

Information about previous kernel crash:

-- Kernel panic data --

```

```

Panic string: kdb_sysctl_panic
System uptime: 3 day 20 hr 59 min 40 sec Kernel crash time: 2011-11-15 Wed 15:25:17
Kernel build linkstamp: JUNOS 11.3I #0: 2011-11-10 20:42:27 UTC

-- Stacktrace of panicing context --
Processor 1 (crash monarch):
savectx+0x0 (c9552800,80214efc,802a7fbc,c88ad05c) ra 801b93a8 sz 0
kdm_kcore_save_crashinfo+0x254 (c9552800,0,802a7fbc,c88ad05c) ra 801b9f44 sz 784
  kdm_kcore_kern_panic_event_handler+0x4b0 (c9552800,0,802a7fbc,c88ad05c) ra
  8022a9b8 sz 88
panic+0x1d0 (c9552800,0,4,77fed534) ra 802540c0 sz 56
kdb_sysctl_panic+0x70 (c9552800,0,4,77fed534) ra 80237e58 sz 40 sysctl_root+0x12c
  (c9552800,0,4,e8bc5cf8) ra 80238e50 sz 48
userland_sysctl+0x164 (c9552800,0,4,e8bc5cf8) ra 8023956c sz 104
__sysctl+0xe4 (c9552800,0,4,e8bc5cf8) ra 806d62e8 sz 160
trap+0xe1c (c9552800,0,4,e8bc5cf8) ra 80896e68 sz 128
MipsUserGenException+0x1a4 (c9552800,0,4,405cd12c) ra 0 sz 0
pid 82340, process: sysctl

Processor 0:
restoreintr+0x14 (1,81bca820,3,0) ra 806cdc3c sz 0
spinlock_exit+0x30 (1,81bca820,3,0) ra 8025d354 sz 24
sleepq_release+0x64 (1,81bca820,3,0) ra 8025e670 sz 24
sleepq_timeout+0x224 (1,81bca820,3,0) ra 80240294 sz 48
softclock+0x434 (1,81bca820,3,0) ra 802067f8 sz 80
ithread_loop+0x244 (1,81bca820,3,0) ra 80200e28 sz 64 fork_exit+0xc0
  (1,81bca820,3,0) ra 80897c28 sz 48
MipsNMIException+0x34 (1,81bca820,3,0) ra 0 sz 0
pid 82340, process: sysctl

Processor 2:
cpu_idle+0x20 (80960000,51bbc,2031df,81bca1b8) ra 80204948 sz 24 idle_proc+0x130
  (80960000,51bbc,2031df,81bca1b8) ra 80200e28 sz 56 fork_exit+0xc0
  (80960000,51bbc,2031df,81bca1b8) ra 80897c28 sz 48
MipsNMIException+0x34 (80960000,51bbc,2031df,81bca1b8) ra 0 sz 0
pid 82340, process: sysctl

Processor 3:
cpu_idle+0x20 (80960000,51bbc,2038df,81bca300) ra 80204948 sz 24 idle_proc+0x130
  (80960000,51bbc,2038df,81bca300) ra 80200e28 sz 56 fork_exit+0xc0
  (80960000,51bbc,2038df,81bca300) ra 80897c28 sz 48
MipsNMIException+0x34 (80960000,51bbc,2038df,81bca300) ra 0 sz 0
pid 82340, process: sysctl

Processor 4:
cpu_idle+0x20 (80960000,51bbc,2037df,81bca448) ra 80204948 sz 24 idle_proc+0x130
  (80960000,51bbc,2037df,81bca448) ra 80200e28 sz 56 fork_exit+0xc0
  (80960000,51bbc,2037df,81bca448) ra 80897c28 sz 48
MipsNMIException+0x34 (80960000,51bbc,2037df,81bca448) ra 0 sz 0
pid 82340, process: sysctl

Processor 5:
restoreintr+0x14 (1,51bbc,203edf,81bca590) ra 806cdc3c sz 0
spinlock_exit+0x30 (1,51bbc,203edf,81bca590) ra 80204a34 sz 24 idle_proc+0x21c
  (1,51bbc,203edf,81bca590) ra 80200e28 sz 56 fork_exit+0xc0
  (1,51bbc,203edf,81bca590) ra 80897c28 sz 48
MipsNMIException+0x34 (1,51bbc,203edf,81bca590) ra 0 sz 0
pid 82340, process: sysctl

```

```

Processor 6:
cpu_idle+0x20 (80960000,51bbc,205cdf,81bca6d8) ra 80204948 sz 24 idle_proc+0x130
(80960000,51bbc,205cdf,81bca6d8) ra 80200e28 sz 56 fork_exit+0xc0
(80960000,51bbc,205cdf,81bca6d8) ra 80897c28 sz 48
MipsNMIException+0x34 (80960000,51bbc,205cdf,81bca6d8) ra 0 sz 0
pid 82340, process: sysctl

Processor 7:
lockmgr+0x5ac (c97e8484,c8dd9800,0,c8dd9800) ra 8c11c81c sz 48
sal_sem_take+0x134 (c97e8484,c8dd9800,0,c8dd9800) ra 8c351108 sz 56
_bcm_esw_linkscan_thread+0x45c (c97e8484,c8dd9800,0,c8dd9800) ra 8c11cdb4 sz 104
sal_thread_start_wrap+0x74 (c97e8484,c8dd9800,0,c8dd9800) ra 80200e28 sz 32
fork_exit+0xc0 (c97e8484,c8dd9800,0,c8dd9800) ra 80897c28 sz 48
MipsNMIException+0x34 (c97e8484,c8dd9800,0,c8dd9800) ra 0 sz 0
pid 82340, process: sysctl
-- End of stacktrace --

```

### show system core-dumps repository core (QFabric Systems)

```

user@switch> show system core-dumps repository core

Repository scope: shared
Repository head: /pbdata/export
Repository name: core
List of nodes for core repository: /pbdata/export/rdumps/

```

| Node Group   | Node Identifier                      | Num | Model       | Usage |
|--------------|--------------------------------------|-----|-------------|-------|
| DG-0         | BCF7208D-E44F-E011-802F-4171BAAC781D | 0   | qfx3100     | OM    |
| FM-0         | 73747cd8-0710-11e1-b6a4-00e081c5297e | 0   | fx-jvre     | OM    |
| DRE-0        | 77116f18-0710-11e1-a2a0-00e081c5297e | 0   | fx-jvre     | OM    |
| NW-NG-0      | BBAK0394                             | 0   | qfx3500     | OM    |
| NW-NG-0      | cd78871a-0710-11e1-878e-00e081c5297e | 0   | fx-jvre     | OM    |
| NW-NG-0      | d0afda1e-0710-11e1-a1d0-00e081c5297e | 0   | fx-jvre     | OM    |
| FC-0         | d31ab7a6-0710-11e1-ad1b-00e081c5297e | 0   | fx-jvre     | OM    |
| FC-1         | d4d0f254-0710-11e1-90c3-00e081c5297e | 0   | fx-jvre     | OM    |
| IC-WS001     | WS001                                | 0   | -           | -     |
| IC-WS001     | WS001/YW3803                         | 0   | qfxc08-3008 | OM    |
| IC-WS001     | WS001/YN5999                         | 0   | qfxc08-3008 | OM    |
| node-device1 | BBAK0372                             | 0   | qfx3500     | OM    |
| node-device1 | EE3093                               | 0   | qfx3500     | OM    |

Total usage of core repository: 0M of 70000M (0.0%)

### show system core-dumps repository log (QFabric Systems)

```

user@switch> show system core-dumps repository log

Repository scope: shared
Repository head: /pbdata/export
Repository name: log
List of nodes for log repository: /pbdata/export/rlogs/

```

| Node Group | Node Identifier                      | Num | Model   | Usage |
|------------|--------------------------------------|-----|---------|-------|
| DG-0       | BCF7208D-E44F-E011-802F-4171BAAC781D | 0   | qfx3100 | OM    |
| FM-0       | 73747cd8-0710-11e1-b6a4-00e081c5297e | 1   | fx-jvre | OM    |
| DRE-0      | 77116f18-0710-11e1-a2a0-00e081c5297e | 1   | fx-jvre | OM    |
| NW-NG-0    | BBAK0394                             | 1   | qfx3500 | OM    |
| NW-NG-0    | cd78871a-0710-11e1-878e-00e081c5297e | 1   | fx-jvre | OM    |
| NW-NG-0    | d0afda1e-0710-11e1-a1d0-00e081c5297e | 3   | fx-jvre | OM    |
| FC-0       | d31ab7a6-0710-11e1-ad1b-00e081c5297e | 1   | fx-jvre | OM    |

|   |                                      |   |             |    |
|---|--------------------------------------|---|-------------|----|
| FC-1  | d4d0f254-0710-11e1-90c3-00e081c5297e | 1 | fx-jvre     | 0M |
| IC-WS001  | WS001                                | 0 | -           | -  |
| IC-WS001  | WS001/YN5999                         | 1 | qfxc08-3008 | 0M |
| IC-WS001  | WS001/YW3803                         | 1 | qfxc08-3008 | 0M |
| node-device1                                      | BBAK0372                             | 1 | qfx3500     | 0M |
| node-device1                                      | EE3093                               | 1 | qfx3500     | 0M |
| Total usage of log repository:0M of 70000M (0.0%) |                                      |   |             |    |

## show system storage satellite

**Syntax** `show system storage satellite`  
`<fpc-slot>`  
`device-alias <device-alias>`

**Release Information** Command introduced in Junos OS Release 17.1R1.

**Description** Displays the storage usage of satellite devices in Junos Fusion.

**Options** **none**—Display the storage usage for all listed satellite devices.

**detail**—(Optional) Display detail output.

**fpc-slot**—(Optional) Display satellite device connection information for the satellite device using the specified FPC slot number only.

**device-alias device-alias**—(Optional) Display satellite device connection information for the satellite device using the specified device alias only.

**Required Privilege Level** view

**List of Sample Output** [show system storage satellite on page 578](#)

**Output Fields** [Table 32 on page 577](#) describes the output fields for the **show system storage** command. Output fields are listed in the approximate order in which they appear.

*Table 32: show system storage Output Fields*

| Field Name        | Field Description                                      |
|-------------------|--|
| <b>Filesystem</b> | Name of the filesystem.                                |
| <b>Size</b>       | Size of the filesystem.                                |
| <b>Used</b>       | Amount of space used in the filesystem.                |
| <b>Avail</b>      | Amount of space available in the filesystem.           |
| <b>Use %</b>      | Percentage of the filesystem space that is being used. |
| <b>Mounted on</b> | Directory in which the filesystem is mounted.          |

## Sample Output

### show system storage satellite

```
user@host> show system storage satellite
```

```
Slot-ID: 125
```

| Filesystem | Size | Used | Avail | Use% | Mounted on                      |
|------------|------|------|-------|------|---------------------------------|
| rootfs     | 665M | 287M | 330M  | 47%  | /                               |
| udev       | 896M | 24K  | 896M  | 1%   | /dev                            |
| none       | 896M | 24K  | 896M  | 1%   | /dev                            |
| tmpfs      | 936M | 812K | 935M  | 1%   | /run                            |
| /dev/sda3  | 665M | 287M | 330M  | 47%  | /                               |
| /dev/sda5  | 327M | 99M  | 207M  | 33%  | /var                            |
| tmpfs      | 936M | 812K | 935M  | 1%   | /run                            |
| tmpfs      | 936M | 14M  | 923M  | 2%   | /var/volatile                   |
| /dev/sda1  | 481M | 254M | 228M  | 53%  | /boot                           |
| /dev/sda2  | 259M | 2.1M | 240M  | 1%   | /app_disk                       |
| tmpfs      | 936M | 812K | 935M  | 1%   | /run/named-chroot/var/run/named |
| tmpfs      | 936M | 812K | 935M  | 1%   | /run/named-chroot/var/run/bind  |
| none       | 896M | 24K  | 896M  | 1%   | /run/named-chroot/dev/random    |
| none       | 896M | 24K  | 896M  | 1%   | /run/named-chroot/dev/zero      |
| none       | 896M | 24K  | 896M  | 1%   | /run/named-chroot/dev/null      |

```
Slot-ID: 134
```

| Filesystem | Size | Used | Avail | Use% | Mounted on                      |
|------------|------|------|-------|------|---------------------------------|
| rootfs     | 665M | 287M | 330M  | 47%  | /                               |
| udev       | 896M | 24K  | 896M  | 1%   | /dev                            |
| none       | 896M | 24K  | 896M  | 1%   | /dev                            |
| tmpfs      | 936M | 812K | 935M  | 1%   | /run                            |
| /dev/sda3  | 665M | 287M | 330M  | 47%  | /                               |
| /dev/sda5  | 327M | 97M  | 209M  | 32%  | /var                            |
| tmpfs      | 936M | 812K | 935M  | 1%   | /run                            |
| tmpfs      | 936M | 13M  | 924M  | 2%   | /var/volatile                   |
| /dev/sda1  | 481M | 254M | 228M  | 53%  | /boot                           |
| /dev/sda2  | 259M | 2.1M | 240M  | 1%   | /app_disk                       |
| tmpfs      | 936M | 812K | 935M  | 1%   | /run/named-chroot/var/run/named |
| tmpfs      | 936M | 812K | 935M  | 1%   | /run/named-chroot/var/run/bind  |
| none       | 896M | 24K  | 896M  | 1%   | /run/named-chroot/dev/random    |
| none       | 896M | 24K  | 896M  | 1%   | /run/named-chroot/dev/zero      |
| none       | 896M | 24K  | 896M  | 1%   | /run/named-chroot/dev/null      |

## CHAPTER 6

# Power over Ethernet, LLDP, and LLDP-MED on a Junos Fusion Provider Edge

- [Understanding Power over Ethernet in a Junos Fusion on page 579](#)
- [Understanding LLDP and LLDP-MED on a Junos Fusion on page 582](#)
- [Configuring Power over Ethernet in a Junos Fusion on page 583](#)
- [Verifying PoE Configuration and Status for a Junos Fusion \(CLI Procedure\) on page 587](#)

## Understanding Power over Ethernet in a Junos Fusion

---

This topic describes Power over Ethernet (PoE) in a Junos Fusion.

This topic covers:

- [Power over Ethernet in a Junos Fusion Overview on page 579](#)
- [Understanding the Role of the Aggregation Devices for PoE Support in a Junos Fusion on page 580](#)
- [Understanding the Role of the Satellite Devices for PoE Support in a Junos Fusion on page 580](#)
- [Understanding PoE Configuration in a Junos Fusion on page 580](#)
- [Understanding PoE Support Standards for Extended Ports in a Junos Fusion on page 581](#)
- [Understanding Maximum PoE Power Budgets in a Junos Fusion on page 581](#)
- [Understanding PoE Controller Software in a Junos Fusion on page 581](#)
- [Understanding PoE Power Allocation Configuration Options in a Junos Fusion on page 582](#)

## Power over Ethernet in a Junos Fusion Overview

Power over Ethernet (PoE) enables electric power, along with data, to be passed over a copper Ethernet LAN cable. Powered devices—such as VoIP telephones, wireless access points, video cameras, and point-of-sale devices—that support PoE can receive power safely from the same access ports that are used to connect personal computers to the network. This reduces the amount of wiring in a network, and it also eliminates the need to position a powered device near an AC power outlet, making network design more flexible and efficient.

In a Junos Fusion, PoE is used to carry electric power from an extended port on a satellite device to a connected device. An extended port is any network-facing port on a satellite device in a Junos Fusion.

Many PoE concepts for standalone switches also apply to PoE on Junos Fusion. See *Understanding PoE on EX Series Switches* for a detailed overview of PoE on standalone EX Series switches.

## Understanding the Role of the Aggregation Devices for PoE Support in a Junos Fusion

An aggregation device is responsible for configuring, monitoring, and maintaining all configurations for all extended ports in a Junos Fusion, including PoE. Therefore, all commands used to configure, monitor, and maintain PoE in a Junos Fusion are entered from the aggregation device.

An extended port on the satellite device must support PoE to enable PoE in a Junos Fusion. No hardware limitations for PoE support are introduced by the aggregation device in a Junos Fusion.



**NOTE:** PoE is supported in a Junos Fusion Provide Edge and a Junos Fusion Enterprise despite not being supported in MX series routers or standalone EX9200 switches. All MX series routers and EX9200 switch models, when configured into the aggregation device role in a Junos Fusion, can enable PoE Junos Fusion because the PoE hardware support is supported on the satellite devices.

## Understanding the Role of the Satellite Devices for PoE Support in a Junos Fusion

A satellite device in a Junos Fusion provides PoE hardware support in a Junos Fusion. Each satellite device in a Junos Fusion that supports PoE has its own PoE controller. The PoE controller keeps track of the PoE power consumption on the satellite device and allocates power to PoE extended ports. The maximum PoE power consumption for a satellite device—the total amount of power available for the satellite device's PoE controller to allocate to all of the satellite device's PoE interfaces—is determined individually by the switch model of the satellite devices and by the power supply or supplies installed in that satellite device.

In allocating power, the satellite device's PoE controller cannot exceed the satellite device's maximum PoE power availability.

The maximum PoE power consumption varies by satellite device in a Junos Fusion, because the hardware specifications of the satellite devices determine the maximum PoE power availability.

See *Understanding PoE on EX Series Switches* for a listing of the PoE power consumption limit for each EX Series switch model and power supply configuration.

## Understanding PoE Configuration in a Junos Fusion

Like all features in a Junos Fusion, PoE is configured from the aggregation devices.



In dual aggregation device topologies, the PoE configurations should match identically on both aggregation devices.

PoE in a Junos Fusion works by periodically checking the PoE configuration on each aggregation device, and updating the configuration when a PoE change is identified. If the aggregation devices have different PoE configurations, the PoE configurations for the Junos Fusion will continually change because the Junos Fusion always uses the PoE configuration of the last aggregation device that was checked.

## Understanding PoE Support Standards for Extended Ports in a Junos Fusion

The extended port hardware—specifically, the extended port hardware interface on the satellite device in the Junos Fusion —must support PoE to enable PoE in a Junos Fusion.

All extended ports that support PoE on satellite devices in a Junos Fusion support the IEEE 802.3at PoE+ standard. The IEEE 802.3at PoE+ standard allows an extended port that supports PoE to provide up to 30 W of power to a connected device.

## Understanding Maximum PoE Power Budgets in a Junos Fusion

The maximum PoE power budgets are determined for each individual satellite device in a Junos Fusion.

Maximum PoE power budgets for a satellite device vary by the switch model and power supply configuration of the satellite device.

To learn the maximum PoE power supply budget for a satellite device:

- See *Understanding PoE on EX Series Switches* for a table of maximum power supply budgets by switch device model.
- Enter the **show poe controller** command from your aggregation device and view the Maximum Power output.

## Understanding PoE Controller Software in a Junos Fusion

All switches that support PoE have a PoE controller that runs PoE controller software, including switches acting as satellite devices in a Junos Fusion.

PoE controller software is bundled with Junos OS. PoE controller software should be updated before installing a switch as a satellite device in a Junos Fusion.

For information on PoE controller software requirements in a Junos Fusion Enterprise, see *Understanding Junos Fusion Enterprise Software and Hardware Requirements*.

For information on PoE controller software requirements in a Junos Fusion Provider Edge, see [“Understanding Junos Fusion Provider Edge Software and Hardware Requirements” on page 21](#)

For information on checking or upgrading the PoE controller software version, see *Upgrading the PoE Controller Software*.

## Understanding PoE Power Allocation Configuration Options in a Junos Fusion

Junos Fusion supports several optional features that help manage PoE power allocation on the satellite devices.

The PoE power allocation options are discussed in greater detail in *Understanding PoE on EX Series Switches*.

### Related Documentation

- [Configuring Power over Ethernet in a Junos Fusion on page 583](#)
- [Verifying PoE Configuration and Status for a Junos Fusion \(CLI Procedure\) on page 587](#)

---

## Understanding LLDP and LLDP-MED on a Junos Fusion

This topic describes Link Layer Discovery Protocol (LLDP) and Link Layer Discovery Protocol–Media Endpoint Discovery (LLDP-MED) in a Junos Fusion.

This topic covers:

- [LLDP and LLDP-MED in a Junos Fusion Overview on page 582](#)
- [Understanding LLDP and LLDP-MED Configuration and Traffic Handling in a Junos Fusion on page 583](#)

### LLDP and LLDP-MED in a Junos Fusion Overview

LLDP and LLDP-MED are used to learn and distribute device information on network links. The information enables the switch to quickly identify a variety of devices, resulting in a LAN that interoperates smoothly and efficiently.

LLDP-capable devices transmit information in type, length, and value (TLV) messages to neighbor devices. Device information can include information such as chassis and port identification and system name and system capabilities. The TLVs leverage this information from parameters that have already been configured in the Junos operating system (Junos OS).

Many LLDP and LLDP-MED concepts for standalone EX Series switches that support the features also apply to LLDP and LLDP-MED on Junos Fusion. See *Understanding LLDP and LLDP-MED on EX Series Switches* for a detailed overview of LLDP and LLDP-MED on standalone EX Series switches.



**NOTE:** LLDP-MED goes one step further than LLDP, exchanging IP-telephony messages between the switch and the IP telephone. LLDP-MED is an important access layer switch feature that is supported in a Junos Fusion despite not being supported on a standalone EX9200 switch.

---

## Understanding LLDP and LLDP-MED Configuration and Traffic Handling in a Junos Fusion

LLDP and LLDP-MED traffic is generally handled the same in a Junos Fusion or a standalone series switch. LLDP and LLDP-MED configuration on an extended port in a Junos Fusion is identical for a standalone EX Series switch. See *Configuring LLDP (CLI Procedure)* or *Configuring LLDP-MED (CLI Procedure)*.

The following specifications apply to the device information transmitted by LLDP and LLDP-MED in a Junos Fusion topology with two or more aggregation devices:

- Management address TLVs are merged into a single packet in such a way that the packet contains two or more management address TLVs.
- The SNMP index used as the port ID TLV is derived so that all aggregation devices receive the same index value for port IDs of extended ports.
- The system name for extended ports is the configured redundancy group name. A redundancy group has to be configured in order to enable a topology with two or more aggregation devices.
- The chassis ID is the same for all aggregation devices. If a system MAC address is defined for the redundancy group, is it used as the chassis ID. The system MAC address is configured using the **set chassis satellite-management redundancy-groups *redundancy-group-name* system-mac-address *system-mac-address*** command. If the system MAC is not configured, the chassis ID is the default MAC address, which is 00:00:00:00:00:01.



**BEST PRACTICE:** We recommend specifying a system MAC address if you are running LLDP or LLCP-MED traffic in your Junos Fusion topology.

- Related Documentation**
- [Configuring LLDP \(CLI Procedure\)](#)
  - [Configuring LLDP-MED \(CLI Procedure\)](#)

## Configuring Power over Ethernet in a Junos Fusion

- [PoE Configurable Options on page 584](#)
- [Enabling PoE on page 584](#)
- [Disabling PoE on page 585](#)
- [Setting the Power Management Mode on page 585](#)
- [Setting the Maximum Power That Can Be Delivered from a PoE Interface on page 586](#)
- [Setting the Guard Band on page 586](#)
- [Setting the PoE Interface Priority on page 586](#)

## PoE Configurable Options

Table 33 on page 584 shows the configurable PoE options and their default settings in a Junos Fusion.

Some PoE options can be configured globally and per interface. In cases where a PoE interface setting is different from a global PoE setting, the PoE interface setting is configured on the interface.

**Table 33: Configurable PoE Options and Default Settings**

| Option   | Default   | Description  |
|--|---|--|
| <a href="#">disable (Power over Ethernet)</a>  | Not included in default configuration.<br><br><b>NOTE:</b> PoE ports are disabled by default in a Junos Fusion. | Disables PoE on the interface if PoE was enabled. The interface maintains network connectivity but no longer supplies power to a connected powered device. Power is not allocated to the interface.  |
| <a href="#">guard-band</a>                     | <b>0 W</b>  | Reserves a specified amount of power from the PoE power budget for possible spikes in PoE power consumption.<br><br>In a Junos Fusion, the guard band can be 0 to 19 W.  |
| <a href="#">management</a>                     | <b>class</b>  | Sets the PoE power management mode for the extended port. The power management mode determines how power to a PoE extended port is allocated: <ul style="list-style-type: none"> <li>• <b>class</b>—In this mode, the power allocated to a PoE extended port is determined by the class of the connected powered device. If there is no powered device connected, standard 15.4W power is allocated on the interface.</li> <li>• <b>static</b>—The maximum power delivered by an interface is statically configured and is independent of the class of the connected powered device. The maximum power is allocated to the interface even if a powered device is not connected.</li> </ul> |
| <a href="#">maximum-power (Interface)</a>      | <b>30.0 W</b> (PoE+, IEEE 802.3at)  | Sets the maximum power that can be delivered by a PoE interface when the power management mode is <b>static</b> .<br><br>In a Junos Fusion, all extended ports support PoE+ so the maximum power is up to 30 W.<br><br>This setting is ignored if the power management mode is <b>class</b> .  |
| <a href="#">priority (Power over Ethernet)</a> | <b>low</b>  | 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.   |

## Enabling PoE

PoE is disabled by default for all extended ports in a Junos Fusion.

To enable PoE on all PoE-supported interfaces:

```
[edit]
user@aggregation-device# set poe interface all-extended
```

To enable PoE on a specific PoE-supported interface:

```
[edit]
user@aggregation-device# set poe interface interface-name
```

For instance, to enable PoE on extended port interface ge-100/0/24:

```
[edit]
user@aggregation-device# set poe interface ge-100/0/24
```

## Disabling PoE

PoE is disabled by default in a Junos Fusion. Use this procedure to disable PoE in a Junos Fusion that has PoE previously enabled.

If PoE is enabled globally but disabled on a specific interface, PoE is disabled on the specified interface. This procedure can, therefore, be used to individually disable ports in cases where PoE is globally enabled.

If you want to disable PoE on all extended port interfaces in a Junos Fusion:

```
[edit]
user@aggregation-device# set poe interface all-extended disable
```

If you want to disable PoE on one extended port interface:

```
[edit]
user@aggregation-device# set poe interface interface-name disable
```

For instance, to disable PoE on extended port 101/0/1 in a Junos Fusion:

```
[edit]
user@aggregation-device# set poe interface 101/0/1 disable
```

If you want to enable PoE on all PoE-supported extended ports in a Junos Fusion except 101/0/10, enter the following commands:

```
[edit]
user@aggregation-device# set poe interface all-extended
user@aggregation-device# set poe interface 101/0/10 disable
```

## Setting the Power Management Mode

The power management mode in a Junos Fusion is set for all extended ports in a Junos Fusion .

The default power management mode is class.

To set the power management mode to static for all PoE extended ports:

```
[edit]
user@aggregation-device# set poe management static
```

To set the power management mode back to class for all PoE extended ports:

```
[edit]
user@aggregation-device# set poe management class
```

## Setting the Maximum Power That Can Be Delivered from a PoE Interface

To set the maximum power that can be delivered to a connected device using PoE when the power management mode is set to static:

```
[edit]
user@aggregation-device# set poe interface interface-name maximum-power watts
```

To configure all extended port interfaces to the same maximum power, enter **all-extended** as the *interface-name*.

For instance, to change the maximum power for all PoE extended ports configured in static power management mode to 25 watts:

```
[edit]
user@aggregation-device# set poe interface all-extended maximum-power 25
```

To change the maximum power for interface 101/0/1 to 25 watts:

```
[edit]
user@aggregation-device# set poe interface 101/0/1 maximum-power 25
```

## Setting the Guard Band

One guard band is configured for all extended ports in a Junos Fusion.

To set the guard band for all extended ports in a Junos Fusion:

```
[edit]
user@aggregation-device# set poe guard-band watts
```

For instance, to set the guard-band to 19 watts for all PoE extended ports:

```
[edit]
user@aggregation-device# set poe guard-band 19
```

## Setting the PoE Interface Priority

To set a PoE interface priority to high:

```
[edit]
user@aggregation-device# set poe interface interface-name priority high
```

For instance, to assign a high priority to interface 101/0/1:

```
[edit]
```

```
user@aggregation-device# set poe interface 101/0/1 priority high
```

To set a PoE interface priority to low:

```
[edit]
user@aggregation-device# set poe interface interface-name priority low
```

For instance, to assign a low priority to interface 102/0/1:

```
[edit]
user@aggregation-device# set poe interface 102/0/1 priority low
```

- Related Documentation**
- [Verifying PoE Configuration and Status for a Junos Fusion \(CLI Procedure\) on page 587](#)
  - [Understanding Power over Ethernet in a Junos Fusion on page 579](#)

## Verifying PoE Configuration and Status for a Junos Fusion (CLI Procedure)

You can verify the Power over Ethernet (PoE) configuration and status on Junos Fusion.

This topic describes how to verify:

- [PoE Power Budgets, Consumption, and Mode on Satellite Devices on page 587](#)
- [PoE Interface Configuration and Status on page 588](#)

### PoE Power Budgets, Consumption, and Mode on Satellite Devices

**Purpose** Verify the PoE configuration and status, such as the PoE power budget, total PoE power consumption, power management mode, and the supported PoE standard.

**Action** Enter the following command:

```
user@aggregation-device> show poe controller
```

| Controller index | Maximum power | Power consumption | Guard band | Management | Status  | Lldp Priority |
|------------------|---------------|-------------------|------------|------------|---------|---------------|
| 100              | 925.00W       | 0.00W             | 19W        | Class      | AT_MODE | Disabled      |
| 120              | 125.00W       | 6.08W             | 19W        | Class      | AT_MODE | Disabled      |

- Meaning**
- Satellite device 100 has a PoE power budget of 925 W, of which 0 W were being used by the PoE extended ports at the time the command was executed. The Guard band field shows that 19 W of power is reserved out of the PoE power budget to protect against spikes in power demand. The power management mode is class. The PoE ports on the switch support PoE+ (IEEE 802.3at).
  - Satellite device 120 has a PoE power budget of 125 W, of which 6.08 W were being used by the PoE extended ports at the time the command was executed. The Guard band field shows that 19 W of power is reserved out of the PoE power budget to protect

against spikes in power demand. The power management mode is class. The PoE ports on the switch support PoE+ (IEEE 802.3at).

## PoE Interface Configuration and Status

**Purpose** Verify that PoE interfaces are enabled and set to the correct maximum power and priority settings. Also verify current operational status and power consumption.

**Action** To view configuration and status for all PoE interfaces, enter:

```
user@switch> show poe interface
```

| Interface      | Admin status | Oper status | Max power | Priority | Power consumption | Class |
|----------------|--------------|-------------|-----------|----------|-------------------|-------|
| ge-100/0/0     | Enabled      | OFF         | 16.0W     | Low      | 0.0W              |       |
| not-applicable |              |             |           |          |                   |       |
| ge-100/0/1     | Enabled      | OFF         | 16.0W     | Low      | 0.0W              |       |
| not-applicable |              |             |           |          |                   |       |
| ge-100/0/2     | Enabled      | OFF         | 16.0W     | Low      | 0.0W              |       |
| not-applicable |              |             |           |          |                   |       |
| ge-100/0/3     | Enabled      | OFF         | 16.0W     | Low      | 0.0W              |       |
| not-applicable |              |             |           |          |                   |       |
| ge-100/0/4     | Enabled      | OFF         | 16.0W     | Low      | 0.0W              |       |
| not-applicable |              |             |           |          |                   |       |
| ge-100/0/5     | Enabled      | OFF         | 16.0W     | Low      | 0.0W              |       |
| not-applicable |              |             |           |          |                   |       |
| ge-100/0/6     | Enabled      | OFF         | 16.0W     | Low      | 0.0W              |       |
| not-applicable |              |             |           |          |                   |       |
| ge-100/0/7     | Enabled      | OFF         | 16.0W     | Low      | 0.0W              |       |
| not-applicable |              |             |           |          |                   |       |
| ge-100/0/8     | Enabled      | OFF         | 16.0W     | Low      | 0.0W              |       |
| not-applicable |              |             |           |          |                   |       |
| ge-100/0/9     | Enabled      | OFF         | 16.0W     | Low      | 0.0W              |       |
| not-applicable |              |             |           |          |                   |       |
| ge-100/0/10    | Enabled      | OFF         | 16.0W     | Low      | 0.0W              |       |
| not-applicable |              |             |           |          |                   |       |
| ge-100/0/11    | Enabled      | OFF         | 16.0W     | Low      | 0.0W              |       |
| not-applicable |              |             |           |          |                   |       |
| ge-100/0/12    | Enabled      | OFF         | 16.0W     | Low      | 0.0W              |       |
| not-applicable |              |             |           |          |                   |       |
| ge-100/0/13    | Enabled      | OFF         | 16.0W     | Low      | 0.0W              |       |
| not-applicable |              |             |           |          |                   |       |
| ge-100/0/14    | Enabled      | OFF         | 16.0W     | Low      | 0.0W              |       |
| not-applicable |              |             |           |          |                   |       |
| ge-100/0/15    | Enabled      | OFF         | 16.0W     | Low      | 0.0W              |       |
| not-applicable |              |             |           |          |                   |       |
| ge-100/0/16    | Enabled      | OFF         | 16.0W     | Low      | 0.0W              |       |
| not-applicable |              |             |           |          |                   |       |
| ge-100/0/17    | Enabled      | OFF         | 16.0W     | Low      | 0.0W              |       |
| not-applicable |              |             |           |          |                   |       |
| ge-100/0/18    | Enabled      | OFF         | 16.0W     | Low      | 0.0W              |       |
| not-applicable |              |             |           |          |                   |       |
| ge-100/0/19    | Enabled      | OFF         | 16.0W     | Low      | 0.0W              |       |
| not-applicable |              |             |           |          |                   |       |
| ge-100/0/20    | Enabled      | OFF         | 16.0W     | Low      | 0.0W              |       |
| not-applicable |              |             |           |          |                   |       |
| ge-100/0/21    | Enabled      | OFF         | 16.0W     | Low      | 0.0W              |       |
| not-applicable |              |             |           |          |                   |       |



|                |         |     |       |     |      |   |
|----------------|---------|-----|-------|-----|------|---|
| ge-100/0/22    | Enabled | OFF | 16.0W | Low | 0.0W | 2 |
| not-applicable |         |     |       |     |      |   |
| ge-100/0/23    | Enabled | OFF | 16.0W | Low | 0.0W | 2 |
| not-applicable |         |     |       |     |      |   |
| ge-100/0/24    | Enabled | ON  | 16.0W | Low | 3.7W | 2 |
| ge-100/0/25    | Enabled | OFF | 16.0W | Low | 0.0W |   |
| not-applicable |         |     |       |     |      | 2 |
| ge-100/0/26    | Enabled | OFF | 16.0W | Low | 0.0W |   |
| not-applicable |         |     |       |     |      | 2 |
| ge-100/0/27    | Enabled | OFF | 16.0W | Low | 0.0W |   |
| not-applicable |         |     |       |     |      | 2 |
| ge-100/0/28    | Enabled | OFF | 16.0W | Low | 0.0W |   |
| not-applicable |         |     |       |     |      | 2 |
| ge-100/0/29    | Enabled | OFF | 16.0W | Low | 0.0W |   |
| not-applicable |         |     |       |     |      | 2 |
| ge-100/0/30    | Enabled | OFF | 16.0W | Low | 0.0W |   |
| not-applicable |         |     |       |     |      | 2 |
| ge-100/0/31    | Enabled | OFF | 16.0W | Low | 0.0W |   |
| not-applicable |         |     |       |     |      | 2 |
| ge-100/0/32    | Enabled | OFF | 16.0W | Low | 0.0W |   |
| not-applicable |         |     |       |     |      | 2 |
| ge-100/0/33    | Enabled | OFF | 16.0W | Low | 0.0W |   |
| not-applicable |         |     |       |     |      | 2 |
| ge-100/0/34    | Enabled | OFF | 16.0W | Low | 0.0W |   |
| not-applicable |         |     |       |     |      | 2 |
| ge-100/0/35    | Enabled | OFF | 16.0W | Low | 0.0W |   |
| not-applicable |         |     |       |     |      | 2 |
| ge-100/0/36    | Enabled | OFF | 16.0W | Low | 0.0W |   |
| not-applicable |         |     |       |     |      | 2 |
| ge-100/0/37    | Enabled | ON  | 16.0W | Low | 2.0W |   |
| ge-100/0/38    | Enabled | OFF | 16.0W | Low | 0.0W | 0 |
| not-applicable |         |     |       |     |      |   |
| ge-100/0/39    | Enabled | OFF | 16.0W | Low | 0.0W | 0 |
| not-applicable |         |     |       |     |      |   |
| ge-100/0/40    | Enabled | OFF | 16.0W | Low | 0.0W | 0 |
| not-applicable |         |     |       |     |      |   |
| ge-100/0/41    | Enabled | OFF | 16.0W | Low | 0.0W | 0 |
| not-applicable |         |     |       |     |      |   |
| ge-100/0/42    | Enabled | OFF | 16.0W | Low | 0.0W | 0 |
| not-applicable |         |     |       |     |      |   |
| ge-100/0/43    | Enabled | OFF | 16.0W | Low | 0.0W | 0 |
| not-applicable |         |     |       |     |      |   |
| ge-100/0/44    | Enabled | OFF | 16.0W | Low | 0.0W | 0 |
| not-applicable |         |     |       |     |      |   |
| ge-100/0/45    | Enabled | OFF | 16.0W | Low | 0.0W | 0 |
| not-applicable |         |     |       |     |      |   |
| ge-100/0/46    | Enabled | OFF | 16.0W | Low | 0.0W | 0 |
| not-applicable |         |     |       |     |      |   |
| ge-100/0/47    | Enabled | OFF | 16.0W | Low | 0.0W | 0 |
| not-applicable |         |     |       |     |      |   |
| ge-120/0/0     | Enabled | ON  | 16.0W | Low | 3.9W | 2 |
| ge-120/0/1     | Enabled | OFF | 16.0W | Low | 0.0W |   |
| not-applicable |         |     |       |     |      | 2 |
| ge-120/0/2     | Enabled | OFF | 16.0W | Low | 2.0W |   |
| not-applicable |         |     |       |     |      | 2 |
| ge-120/0/3     | Enabled | OFF | 16.0W | Low | 0.0W |   |
| not-applicable |         |     |       |     |      | 2 |
| ge-120/0/4     | Enabled | OFF | 16.0W | Low | 0.0W |   |
| not-applicable |         |     |       |     |      | 2 |
| ge-120/0/5     | Enabled | OFF | 16.0W | Low | 0.0W |   |

```

not-applicable
ge-120/0/6   Enabled    ON    16.0W    Low      0.0W      4
ge-120/0/7   Enabled    OFF    0.0W    Low      0.0W
not-applicable
ge-120/0/8   Enabled    OFF    0.0W    Low      0.0W
not-applicable
ge-120/0/9   Enabled    OFF    0.0W    Low      0.0W
not-applicable
ge-120/0/10  Enabled    OFF    0.0W    Low      0.0W
not-applicable
ge-120/0/11  Enabled    OFF    0.0W    Low      0.0W
not-applicable
<additional output removed for brevity>

```

To view configuration and status for a single PoE interface, enter:

```

user@switch> show poe interface ge-120/0/0

PoE interface status:
PoE interface           : ge-120/0/0
Administrative status   : Enabled
Operational status      : ON
Power limit on the interface : 7.0W
Priority                 : Low
Power consumed          : 3.9W
Class of power device    : 2
PoE Mode                : 802.3at

```

**Meaning** The command output shows the status and configuration of interfaces. For example, the interface 120/0/0 is administratively enabled. Its operational status is **ON**; that is, the interface is currently delivering power to a connected powered device. The maximum power allocated to the interface is 7.0 W. The interface has a low PoE power priority. At the time the command was executed, the powered device was consuming 3.9 W. The class of the powered device is class 2. If the PoE power management mode is class, the class of the powered device determines the maximum power allocated to the interface, which is 7 W in the case of class 2 devices.

The PoE Mode field indicates that the interface supports IEEE 802.3at (PoE+).

- Related Documentation**
- [Configuring Power over Ethernet in a Junos Fusion on page 583](#)
  - [Understanding Power over Ethernet in a Junos Fusion on page 579](#)

## CHAPTER 7

# Configuration Statements for Power over Ethernet and Power Supply Management on a Junos Fusion Provider Edge

- [disable \(Power over Ethernet\) on page 592](#)
- [guard-band on page 593](#)
- [interface \(Power over Ethernet\) on page 594](#)
- [management on page 595](#)
- [maximum-power \(Interface\) on page 596](#)
- [n-plus-n \(satellite-management\) on page 598](#)
- [poe on page 599](#)
- [priority \(Power over Ethernet\) on page 601](#)
- [psu \(satellite-management\) on page 602](#)
- [redundancy \(satellite-management\) on page 603](#)

## disable (Power over Ethernet)

|                          |  |
|--------------------------|--|
| Syntax                   | disable;   |
| Hierarchy Level          | [edit <a href="#">po</a> e interface (all   all-extended   <i>interface-name</i> )],<br>[edit <a href="#">po</a> e interface (all   all-extended   <i>interface-name</i> ) <i>telemetries</i> ],<br>[edit <a href="#">po</a> e notification-control fpc <i>slot-number</i> ]   |
| Release Information      | Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for ACX2000 Universal Metro Routers.<br><b>all-extended</b> option introduced in Junos OS Release 16.1R1.<br>Statement introduced in Junos OS Release 17.2R1 for a Junos Fusion Provider Edge.   |
| Description              | <p>Disable a PoE interface, disable the collection of power consumption data for a PoE interface, or disable the generation of the PoE SNMP traps. The action of the <b>disable</b> statement depends on which statement it is used with:</p> <ul style="list-style-type: none"> <li>When used with <b>interface</b>—Disable the PoE capability of this interface. The interface operates as a standard network access interface, and power is no longer allocated to it from the PoE power budget. Although the PoE capability is disabled, the PoE configuration for the interface is retained. To reen able the PoE capability of this interface, delete the <b>disable</b> statement from the <b>interface</b> entry in the configuration.</li> <li>When used with <b>telemetries</b>—Disable the collection of PoE power consumption records for this interface. Any previously collected records are deleted. However, the <b>telemetries</b> configuration is retained, including the values for <b>interval</b> and <b>duration</b>. To reen able record collection, delete the <b>disable</b> statement from the <b>telemetries</b> entry in the configuration.</li> <li>When used with <b>notification-control</b>—Disable the generation of PoE SNMP traps. To reen able PoE traps, delete the <b>disable</b> statement from the <b>notification-control</b> entry in the configuration.</li> </ul> |
| Required Privilege Level | system—To view this statement in the configuration.<br>system-control—To add this statement to the configuration.  |
| Related Documentation    | <ul style="list-style-type: none"> <li><i>Example: Configuring PoE Interfaces with Different Priorities on an EX Series Switch</i></li> <li><i>Configuring PoE on EX Series Switches (CLI Procedure)</i></li> <li><a href="#">Configuring Power over Ethernet in a Junos Fusion on page 583</a></li> </ul>   |

## guard-band

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>guard-band watts;</code>  |
| <b>Hierarchy Level</b>          | <code>[edit poe],</code><br><code>[edit poe (all   fpc slot-number)]</code>   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for ACX2000 Universal Metro Routers.<br>Statement introduced in Junos OS Release 17.2R1 for a Junos Fusion Provider Edge.   |
| <b>Description</b>              | Reserve a specified amount of power from the PoE power budget for the switch, line card, or satellite device in case of a spike in PoE consumption.   |
| <b>Options</b>                  | <b>watts</b> —Amount of power to be reserved in case of a spike in PoE consumption.<br><b>Range:</b> 0 through 19 for all switches except EX6200 and EX8200 switches. 0 through 19 for ACX2000 routers. 0 through 15 for EX6200 and EX8200 switches. 0 through 19 for satellite devices in a Junos Fusion.<br><b>Default:</b> 0 |
| <b>Required Privilege Level</b> | <b>system</b> —To view this statement in the configuration.<br><b>system-control</b> —To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><a href="#">Configuring PoE on EX Series Switches (CLI Procedure)</a></li> <li><a href="#">Configuring Power over Ethernet in a Junos Fusion on page 583</a></li> </ul>  |

## interface (Power over Ethernet)

|                          |  |
|--------------------------|--|
| Syntax                   | <pre>interface (all   all-extended   <i>interface-name</i>) {   af-mode;   disable;   maximum-power <i>watts</i>;   priority (high   low);   telemetries {     disable;     duration <i>hours</i>;     interval <i>minutes</i>;   } }</pre>  |
| Hierarchy Level          | [edit <a href="#">poe</a> ]  |
| Release Information      | <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 17.2R1 for a Junos Fusion Provider Edge.</p>   |
| Description              | Specify a PoE interface to be configured.  |
| Options                  | <p><b>all</b>—All PoE interfaces on the switch that have not been individually configured for PoE. If a PoE interface has been individually configured, that configuration overrides any settings specified with <b>all</b>.</p> <p><b>all-extended</b>—(Junos Fusion only) All PoE extended port interfaces in a Junos Fusion that have not been individually configured for PoE. If a PoE interface has been individually configured, that configuration overrides any settings specified with <b>all-extended</b>.</p> <p><b><i>interface-name</i></b>—Name of the specific interface being configured.</p> <p>If you use the <b>interface</b> statement without any substatements, default values are used for the remaining statements.</p> <p>The remaining statements are explained separately. See <a href="#">CLI Explorer</a>.</p> |
| Required Privilege Level | <p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>   |
| Related Documentation    | <ul style="list-style-type: none"> <li>• <i>Example: Configuring PoE Interfaces with Different Priorities on an EX Series Switch</i></li> <li>• <i>Configuring PoE on EX Series Switches (CLI Procedure)</i></li> <li>• <a href="#">Configuring Power over Ethernet in a Junos Fusion on page 583</a></li> </ul>   |

## management

|                          |   |
|--------------------------|---|
| Syntax                   | <code>management (class   static   high-power);</code>  |
| Hierarchy Level          | <code>[edit poe],</code><br><code>[edit poe (all   fpc slot-number)]</code>   |
| Release Information      | Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for ACX2000 Universal Metro Routers.<br>Statement introduced in Junos OS Release 17.2R1 for a Junos Fusion Provider Edge.   |
| Description              | Designate how the PoE controller allocates power to the PoE interfaces.   |
| Default                  | class   |
| Options                  | <ul style="list-style-type: none"> <li><b>class</b>—The amount of power allocated to the interface is determined by the class of the connected powered device. If no powered device is connected, standard 15.4 W power is allocated to the interface. See <i>Understanding PoE on EX Series Switches</i> for more information about classes of powered devices.</li> <li><b>static</b>—The amount of power allocated to the interface is determined by the value of the <code>maximum-power</code> statement, not the class of the connected powered device. This amount is allocated even when a powered device is not connected to the interface, ensuring that power is available when needed.</li> <li><b>high-power</b>—(ACX2000 routers only) ACX2000 PoE interfaces support power delivery of up to 65 W per port using all four pairs of Ethernet RJ45 cables. Traditional PoE ports use only two pairs of Ethernet cable for power delivery. According to the IEEE 802.3af standard, each port can deliver a maximum power of up to 32 W. With <b>high-power</b> mode of power delivery over all four pairs, the power sourcing equipment (PSE) has an option to deliver up to 65 W per port, provided the powered devices request this high power over all four pairs of the Ethernet cable. By default, <b>high-power</b> mode is not enabled and has to be explicitly enabled. When the PoE controller is configured for <b>high-power</b> mode, the PoE controller does not deliver power to normal powered devices that request power over two pairs.</li> </ul> |
| Required Privilege Level | system—To view this statement in the configuration.<br>system-control—To add this statement to the configuration.   |
| Related Documentation    | <ul style="list-style-type: none"> <li><i>Configuring PoE on EX Series Switches (CLI Procedure)</i></li> <li><a href="#">Configuring Power over Ethernet in a Junos Fusion on page 583</a></li> <li><i>Understanding PoE on EX Series Switches</i></li> </ul>   |

## maximum-power (Interface)

|                            |   |
|----------------------------|---|
| <b>Syntax</b>              | <code>maximum-power watts;</code>   |
| <b>Hierarchy Level</b>     | [edit <code>poe interface</code> (all   all-extended   <i>interface-name</i> )]   |
| <b>Release Information</b> | Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for ACX2000 routers.<br>Statement introduced in Junos OS Release 17.2R1 for a Junos Fusion Provider Edge. |
| <b>Description</b>         | Set the maximum amount of power that the switch can supply to the PoE port.   |



**NOTE:** Although you can set this value when PoE power management is in class mode, it does not establish the maximum power for the port. Instead, the IEEE 802.3af (PoE) or IEEE 802.3at (PoE+) class of the connected device determines the maximum power for the port.

A standalone switch's default setting and range for maximum power does not change if the switch is configured as a satellite device in a Junos Fusion. For instance, an EX4300 switch has a 30W default and a range of 0.0 through 30.0 W when configured as a standalone switch and when it is configured into a satellite device in a Junos Fusion.

|                |   |
|----------------|---|
| <b>Options</b> | <b>watts</b> —The maximum power in watts that can be supplied to the ports..  |
|                | For EX2200, EX3300, EX4200, EX4300, EX4600, EX6200, and EX8200 switches:<br><b>Range:</b> 0.0 through 30.0<br><b>Default:</b> 15.4 W for ports that support IEEE 802.3af and 30 W for ports that support IEEE 802.3at |
|                | For EX3200 switches:<br><b>Range:</b> 0.0 through 18.6<br><b>Default:</b> 15.4 W  |



**NOTE:** EX4600 switches support PoE only when operating in a mixed Virtual Chassis with EX4300 switches.

For ACX2000 routers:  
**Range:** 1 through 65 W  
**Default:** 32 W





**NOTE:** The maximum-power setting permitted by the CLI might be greater than the maximum power a given PoE port can deliver. For example, the CLI permits you to set any PoE port on an EX8200 line card to 30 W; however, only ports 0 through 11 support 30 W. Similarly, the CLI permits you to set any PoE port on an EX4200 switch to 30 W, but some models of EX4200 switch support only 18.6 W per port. If you configure a maximum-power value that is greater than the maximum power supported by a port, the power allocated to the port will be the maximum supported.

If you use the all option to set maximum-power to a value greater than 15.4 W on all interfaces on an EX8200 line card, the maximum power allocated to all ports is 15.4 W.



**NOTE:** Support for a maximum of 18.6 W per port instead of 15.4 W per port on EX3200 switches and P and T models of EX4200 switch requires Junos OS Release 11.1 or later. In addition to requiring an upgrade of Junos OS to Release 11.1 or later, switches that are running an earlier release of Junos OS release require the PoE controller software be upgraded as described in *Upgrading the PoE Controller Software*. If the controller software is not upgraded and you set maximum-power to a value greater than 15.4 W, the configuration is accepted when you commit it, but the actual power allocated to the port will be 15.4 W.



**NOTE:** On ACX2000 routers, the power sourcing equipment (PSE) delivers up to 65 W per port, provided the management mode is set to high-power mode, by using the high-power option at the [edit poe management] hierarchy level. By default, the management mode is set to static. In the static mode, the PSE can deliver power up to 32 W.

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

**Related Documentation**

- [Configuring PoE on EX Series Switches \(CLI Procedure\)](#)
- [Configuring Power over Ethernet in a Junos Fusion on page 583](#)
- [management on page 595](#)

## n-plus-n (satellite-management)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | n-plus-n  |
| <b>Hierarchy Level</b>          | [edit chassis <a href="#">satellite-management</a> <a href="#">psu redundancy</a> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.<br>Statement introduced in Junos OS Release 17.2R1 for a Junos Fusion Provider Edge. |
| <b>Description</b>              | Configure <i>N+N</i> power supply redundancy for the satellite devices in a Junos Fusion.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Understanding Power over Ethernet in a Junos Fusion on page 579</a></li></ul>                                 |

## poe

**Syntax** For switches other than EX6200 and EX8200 switches:

```
poe {
  guard-band watts;
  interface (all | interface-name) {
    disable;
    maximum-power watts;
    priority (high | low);
    telemetry {
      disable;
      duration hours;
      interval minutes;
    }
  }
  lldp-priority;
  management (class | static);
  notification-control {
    fpc slot-number {
      disable;
    }
  }
}
```

For a Junos Fusion:

```
poe {
  guard-band watts;
  interface (all-extended | interface-name) {
    disable;
    maximum-power watts;
    priority (high | low);
  }
  management (class | static);
}
```

For EX6200 and EX8200 switches:

```
poe {
  fpc (all | slot-number) {
    guard-band watts;
    lldp-priority;
    management (class | static);
    maximum-power watts;
  }
  interface (all | interface-name) {
    af-mode;
    disable;
    maximum-power watts;
    priority (high | low);
    telemetry {
      disable;
    }
  }
}
```

```

        duration hours;
        interval minutes;
    }
}
notification-control {
    fpc slot-number {
        disable;
    }
}
}

```

Hierarchy Level [\[edit\]](#)

|                                 |   |
|---------------------------------|---|
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 17.2R1 for a Junos Fusion Provider Edge.   |
| <b>Description</b>              | <p>Configure PoE options. PoE ports on Juniper network switches provide power to PoE-enabled devices only when straight-through cables are used. Power is not provided when crossover cables are used.</p> <p>The remaining statements are explained separately. See <a href="#">CLI Explorer</a>.</p>  |
| <b>Required Privilege Level</b> | <p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Example: Configuring PoE Interfaces with Different Priorities on an EX Series Switch</i></li> <li>• <i>Example: Configuring PoE on an EX6200 or EX8200 Switch</i></li> <li>• <i>Configuring PoE on EX Series Switches (CLI Procedure)</i></li> <li>• <a href="#">Configuring Power over Ethernet in a Junos Fusion on page 583</a></li> </ul> |

## priority (Power over Ethernet)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>priority (low   high);</code>   |
| <b>Hierarchy Level</b>          | <code>[edit <a href="#">poe interface</a> (<i>interface-name</i>   all   all-extended)]</code>  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 17.2R1 for a Junos Fusion Provider Edge.   |
| <b>Description</b>              | Set the power priority for individual interfaces when there is insufficient power for all PoE interfaces. If the switch needs to shut down powered devices because PoE demand exceeds the PoE budget, low-priority devices are shut down before high-priority devices. Among interfaces that have the same assigned priority, priority is determined by port number, with lower-numbered ports having higher priority.  |
| <b>Default</b>                  | <b>low</b>  |
| <b>Options</b>                  | <p><b>high</b>—Specifies that this interface is to be treated as high-priority in terms of power allocation. If the switch needs to shut down powered devices because PoE demand exceeds the PoE budget, power is not shut down on this interface until it has been shut down on all the low-priority interfaces.</p> <p><b>low</b>—Specifies that this interface is to be treated as low-priority in terms of power allocation. If the switch needs to shut down powered devices because PoE demand exceeds the PoE budget, power is shut down on this interface before it is shut down on high-priority interfaces.</p> |
| <b>Required Privilege Level</b> | <p><b>system</b>—To view this statement in the configuration.</p> <p><b>system-control</b>—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Example: Configuring PoE Interfaces with Different Priorities on an EX Series Switch</i></li> <li>• <i>Configuring PoE on EX Series Switches (CLI Procedure)</i></li> <li>• <a href="#">Configuring Power over Ethernet in a Junos Fusion on page 583</a></li> </ul>  |

## psu (satellite-management)

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>psu {<br/>  redundancy {<br/>    n-plus-n;<br/>  }<br/>}</pre>   |
| <b>Hierarchy Level</b>          | [edit chassis <a href="#">satellite-management</a> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 16.1R1 for a Junos Fusion Enterprise.<br>Statement introduced in Junos OS Release 17.2R1 for a Junos Fusion Provider Edge.               |
| <b>Description</b>              | Configure $N+N$ power supply redundancy for the satellite devices in a Junos Fusion.<br><br>The remaining statements are explained separately. See <a href="#">CLI Explorer</a> . |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Understanding Power over Ethernet in a Junos Fusion on page 579</a></li></ul>   |

## redundancy (satellite-management)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>redundancy {   n-plus-n; }</pre>   |
| <b>Hierarchy Level</b>          | [edit chassis <b>satellite-management</b> <b>psu</b> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 16.1R1 for a Junos Fusion Enterprise.<br>Statement introduced in Junos OS Release 17.2R1 for a Junos Fusion Provider Edge.             |
| <b>Description</b>              | Configure $N+N$ power supply redundancy for the satellite devices in a Junos Fusion.<br><br>The remaining statement is explained separately. See <a href="#">CLI Explorer</a> . |
| <b>Default</b>                  | $N+1$ power supply redundancy is configured on each satellite device by default.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Understanding Power over Ethernet in a Junos Fusion on page 579</a></li> </ul>   |





## CHAPTER 8

# Operational Commands for Power over Ethernet and Power Supply Management on Junos Fusion Provider Edge

- `show chassis satellite power-budget-statistics`
- `show poe controller`
- `show poe interface`

## show chassis satellite power-budget-statistics

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <b>show chassis satellite power-budget-statistics</b><br><b>&lt;slot-id slot-id-number&gt;</b>   |
| <b>Release Information</b>      | Command introduced in Junos OS Release 16.1R1 for a Junos Fusion Enterprise.<br>Statement introduced in Junos OS Release 17.2R1 for a Junos Fusion Provider Edge.  |
| <b>Description</b>              | Display the power budget statistics of a satellite device or devices in a Junos Fusion.  |
| <b>Options</b>                  | <b>none</b> —Display power budget statistics for all satellite devices in the Junos Fusion.<br><br><b>slot-id slot-id-number</b> —Display power budget statistics for the specified satellite device only. The <i>slot-id-number</i> and the FPC ID are the same number in a Junos Fusion. |
| <b>Required Privilege Level</b> | view   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Understanding Power over Ethernet in a Junos Fusion on page 579</a></li> </ul>  |
| <b>List of Sample Output</b>    | <a href="#">show chassis satellite power-budget-statistics on page 607</a>   |
| <b>Output Fields</b>            | <a href="#">Table 34 on page 606</a> lists the output fields for the <b>show chassis satellite-management power-budget-statistics</b> command. Output fields are listed in the approximate order in which they appear.   |

*Table 34: show chassis satellite-management power-budget-statistics Output Fields*

| Field Name                              | Field Description  |
|---|--|
| FPC <i>n</i>                            | The FPC slot ID number in the Junos Fusion, where <i>n</i> is the FPC slot ID. The FPC slot ID and the satellite device number are the same thing in a Junos Fusion.                             |
| PSU <i>n</i> (supply type)              | Capacity rating of the power supply and whether the power supply is currently operating ( <b>Online</b> ) or not ( <b>Offline</b> ). If a power supply is offline, the capacity is shown as 0 W. |
| Total Power supplied by all Online PSUs | Total number of watts supplied by all currently operating power supplies for the satellite device.   |
| Power Redundancy Configuration          | Configured power redundancy setting, either <i>N+1</i> or <i>N+N</i> .   |
| Base power reserved                     | Total number of watts reserved for the satellite device.   |
| Non-PoE power being consumed            | The amount of power, in W, currently being consumed for functions other than PoE by the satellite device.  |

Table 34: show chassis satellite-management power-budget-statistics Output Fields (continued)

| Field Name                    | Field Description   |
|-------------------------------|---|
| Total Power allocated for PoE | The total of the PoE power budgets allocated to the satellite device.                     |
| Total PoE power consumed      | The amount of power that has been consumed by PoE by the satellite device.                |
| Total PoE power remaining     | The amount of available power remaining that can be used for PoE on the satellite device. |

## Sample Output

### show chassis satellite power-budget-statistics

```

user@aggregation-device> show chassis satellite power-budget-statistics
fpc 100:
-----
PSU 0 (JPSU-550-DC-AFI ) : 550 W Online
PSU 1 (JPSU-550-DC-AFO ) : 550 W Online
Power redundancy configuration : N+N
Total power supplied by all online PSUs : 522 W
Base power reserved : 175 W
Non-PoE power being consumed : 82 W
Total power allocated for PoE : 347 W
Total PoE power consumed : 0 W
Total PoE power remaining : 347 W
fpc 120:
-----
Power redundancy configuration : N+N
Total power supplied by all online PSUs : 170 W
Base power reserved : 0 W
Non-PoE power being consumed : 0 W
fpc 128:
-----
Power redundancy configuration : N+N
Total power supplied by all online PSUs : 0 W
Base power reserved : 0 W
Non-PoE power being consumed : 0 W
fpc 133:
-----
PSU 0 ) : 0 W Offline
PSU 1 (JPSU-1100-AC-AFO ) : 1100 W Online
Power redundancy configuration : N+N
Total power supplied by all online PSUs : 1100 W
Base power reserved : 175 W
Non-PoE power being consumed : 74 W
Total power allocated for PoE : 925 W
Total PoE power consumed : 0 W
Total PoE power remaining : 925 W
fpc 240:
-----
Power redundancy configuration : N+N
Total power supplied by all online PSUs : 0 W

```

|                              |   |     |
|------------------------------|---|-----|
| Base power reserved          | : | 0 W |
| Non-PoE power being consumed | : | 0 W |

## show poe controller

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>show poe controller</code>  |
| <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.<br>Statement introduced in Junos OS Release 17.2R1 for a Junos Fusion Provider Edge.   |
| <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>• <a href="#">show poe interface on page 612</a></li> <li>• <i>request system firmware upgrade poe</i></li> <li>• <i>Verifying PoE Configuration and Status (CLI Procedure)</i></li> <li>• <a href="#">Verifying PoE Configuration and Status for a Junos Fusion (CLI Procedure) on page 587</a></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 610</a><br><a href="#">show poe controller (EX8200 Switch) on page 610</a><br><a href="#">show poe controller (Controller Software Upgrade in Progress) on page 611</a><br><a href="#">show poe controller (ACX2000 Router) on page 611</a>   |
| <b>Output Fields</b>            | <a href="#">Table 35 on page 609</a> 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 35: 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, 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 maximum PoE power consumption for the switch or line card. This is the total amount of power available to the PoE controller to allocate to the PoE ports.   |

Table 35: show poe controller Output Fields (continued)

| Field Name               | Field Description  |
|--------------------------|--|
| <b>Power consumption</b> | Total amount of power being consumed by the PoE ports at the time the command is executed. This value, which represents actual power consumption, cannot exceed the value for <b>Maximum power</b> .   |
| <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.   |
| <b>Management</b>        | Power management mode: <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.   |
| <b>Status</b>            | 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> |
| <b>Lldp Priority</b>     | Link Layer Discovery Protocol (LLDP) priority operating state. The state can be <b>Enabled</b> or <b>Disabled</b> .<br><br>LLDP priority enables 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 index | Maximum power | Power consumption | Guard band | Management | Status     | Lldp Priority |
|------------------|---------------|-------------------|------------|------------|------------|---------------|
| 0                | 130.00W       | 81.20W            | 10W        | Static     | AF_ENHANCE | Disabled      |

### show poe controller (EX8200 Switch)

```
user@switch> show poe controller
```

| Controller index | Maximum power | Power consumption | Guard band | Management | Status      | Lldp 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 index | Maximum power | Power consumption | Guard band | Management | Status           | Lldp 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 index | Maximum power | Power consumption | Guard band | Management | Status | Lldp Priority |
|------------------|---------------|-------------------|------------|------------|--------|---------------|
| 0                | 130.0 W       | 14.2 W            | 0 W        | high-power | UP     |               |

## show poe interface

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>show poe interface</code><br><code>&lt;fpc-slot number&gt;</code><br><code>&lt;interface-name&gt;</code>  |
| <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.<br>Statement introduced in Junos OS Release 17.2R1 for a Junos Fusion Provider Edge.   |
| <b>Description</b>              | Display the status of PoE interfaces.   |
| <b>Options</b>                  | <p>none—Display status of all PoE interfaces on the switch or router.</p> <p><b>fpc-slot number</b>—(Optional) (EX6200 or EX8200 switches only) Display the status of the PoE interfaces on the specified line card.</p> <p><b>interface-name</b>—(Optional) Display the status of a specific PoE interface on the switch.</p>  |
| <b>Required Privilege Level</b> | view  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">show poe controller on page 609</a></li> <li>• <i>Verifying PoE Configuration and Status (CLI Procedure)</i></li> <li>• <i>Monitoring PoE Power Consumption (CLI Procedure)</i></li> <li>• <i>Troubleshooting PoE Interfaces</i></li> </ul>  |
| <b>List of Sample Output</b>    | <a href="#">show poe interface on page 614</a><br><a href="#">show poe interface (EX2300 and EX3400) on page 614</a><br><a href="#">show poe interface (with LLDP Negotiation) on page 614</a><br><a href="#">show poe interface (Specific Interface) on page 614</a><br><a href="#">show poe interface (Specific FPC Slot) on page 615</a><br><a href="#">show poe interface (Specific Interface on ACX2000 Universal Metro Routers) on page 615</a> |
| <b>Output Fields</b>            | <a href="#">Table 36 on page 612</a> lists the output fields for the <b>show poe interface</b> command. Output fields are listed in the approximate order in which they appear.   |

Table 36: show poe interface Output Fields

| Field Name (All Interfaces Output) | Field Name (Single Interface Output) | Field Description |
|------------------------------------|--------------------------------------|-------------------|
| Interface                          | PoE Interface                        | Interface name.   |



Table 36: show poe interface Output Fields (continued)

| Field Name (All Interfaces Output) | Field Name (Single Interface Output) | Field Description  |
|------------------------------------|--------------------------------------|--|
| <b>Admin status</b>                | <b>Administrative status</b>         | Administrative state of the PoE interface: <b>Enabled</b> or <b>Disabled</b> . If the PoE interface is disabled, it can provide network connectivity, but it cannot provide power to connected devices.  |
| <b>Oper status</b>                 | <b>Operational status</b>            | Operational state of the PoE interface: <ul style="list-style-type: none"> <li>• <b>ON</b>—The interface is currently supplying power to a powered device.</li> <li>• <b>OFF</b>—PoE is enabled on the interface, but the interface is not currently supplying power to a powered device.</li> <li>• <b>FAULT</b>—PoE interface is in the <b>OFF</b> state due to a fault condition.</li> <li>• <b>Disabled</b>—PoE is disabled on the interface.</li> </ul>                                     |
|                                    | <b>Operational status detail</b>     | Additional information for troubleshooting the operational state of the PoE interface: <ul style="list-style-type: none"> <li>• <b>Admin up but disabled on hardware</b>—The interface is disabled due to power budget unavailability.</li> <li>• <b>Overload</b>—Interface is in the fault condition.</li> <li>• <b>IEEE PD Detected</b>—The interface is providing power to the powered device.</li> <li>• <b>Detection In Progress</b>—Detection of the powered device is ongoing.</li> </ul> |
|                                    | <b>FourPair status</b>               | Status of high-power mode of power delivery over all four pairs of the Ethernet cable: <ul style="list-style-type: none"> <li>• <b>Enabled</b>—High power mode is enabled.</li> <li>• <b>Disabled</b>—High power mode is disabled.</li> </ul>  |
| <b>Pair/Mode status</b>            |                                      | Shows the mode of power delivery configured on the interface. <ul style="list-style-type: none"> <li>• <b>4P/AT</b>—Interface is configured for high power mode.</li> <li>• <b>4P/POH</b>—Interface is configured for ultra-high power mode.</li> </ul>  |
| <b>Max power</b>                   | <b>Power limit on the interface</b>  | Maximum power that can be provided by the interface.<br><br>An (L) next to the value indicates that the value on the port was negotiated by LLDP.  |
| <b>Priority</b>                    | <b>Priority</b>                      | Interface power priority: either <b>High</b> or <b>Low</b> .<br><br>An (L) next to the value indicates that the value on the port was negotiated by LLDP.  |
| <b>Power consumption</b>           | <b>Power consumed</b>                | Amount of power being used by the interface at the time the command is executed.   |
| <b>Class</b>                       | <b>Class of power device</b>         | IEEE 802.3af (PoE) or IEEE 802.3at (PoE+) class of the powered device. <b>Class 0</b> is the default class and is used when the class of the powered device is unknown. If no powered device is connected, this field contains <b>not applicable</b> .   |
|                                    | <b>PoE Mode</b>                      | IEEE PoE standard supported by the interface—either <b>802.3af</b> , or <b>802.3at</b> , or <b>ultra-poe</b> .   |

## Sample Output

### show poe interface

```
user@switch> show poe interface
```

| Interface | Admin<br>status | Oper<br>status | Max<br>power | Priority | Power<br>consumption | Class |
|-----------|-----------------|----------------|--------------|----------|----------------------|-------|
| ge-0/0/0  | Enabled         | ON             | 15.4W        | Low      | 7.9W                 | 0     |
| ge-0/0/1  | Enabled         | ON             | 15.4W        | Low      | 3.2W                 | 2     |
| ge-0/0/2  | Enabled         | ON             | 15.4W        | Low      | 3.2W                 | 2     |
| ge-0/0/3  | Enabled         | ON             | 15.4W        | Low      | 3.2W                 | 2     |
| ge-0/0/4  | Enabled         | ON             | 15.4W        | Low      | 3.2W                 | 2     |
| ge-0/0/5  | Enabled         | ON             | 15.4W        | Low      | 3.2W                 | 2     |
| ge-0/0/6  | Enabled         | ON             | 15.4W        | Low      | 3.2W                 | 2     |
| ge-0/0/7  | Enabled         | ON             | 15.4W        | Low      | 3.2W                 | 2     |

### show poe interface (EX2300 and EX3400)

```
user@switch> show poe interface
```

| Interface | Admin<br>status | Oper<br>status | Pair/Mode | Max<br>power | Priority | Power<br>consumption | Class |
|-----------|-----------------|----------------|-----------|--------------|----------|----------------------|-------|
| ge-0/0/0  | Enabled         | OFF            | 4P/AT     | 60.0W        | Low      | 4.5W                 | 2     |
| ge-0/0/1  | Enabled         | OFF            | 4P/AT     | 60.0W        | Low      | 4.5W                 | 2     |
| ge-0/0/2  | Enabled         | OFF            | 4P/AT     | 60.0W        | Low      | 4.5W                 | 2     |
| ge-0/0/3  | Enabled         | OFF            | 4P/AT     | 60.0W        | Low      | 4.5W                 | 2     |
| ge-0/0/4  | Enabled         | OFF            | 4P/AT     | 60.0W        | Low      | 4.5W                 | 2     |

### show poe interface (with LLDP Negotiation)

```
user@switch> show poe interface
```

| Interface | Admin<br>status | Oper<br>status | Max<br>power | Priority | Power<br>consumption | Class |
|-----------|-----------------|----------------|--------------|----------|----------------------|-------|
| ge-0/0/0  | Enabled         | ON             | 17.5W(L)     | Low(L)   | 16.2W                | 4     |
| ge-0/0/1  | Enabled         | ON             | 17.5W(L)     | Low(L)   | 16.0W                | 4     |
| ge-0/0/2  | Enabled         | ON             | 17.5W(L)     | High(L)  | 16.0W                | 4     |
| ge-0/0/3  | Enabled         | ON             | 17.5W(L)     | Low(L)   | 16.0W                | 4     |
| ge-0/0/4  | Enabled         | ON             | 10.1W(L)     | Low(L)   | 10.0W                | 3     |
| ge-0/0/5  | Enabled         | ON             | 3.5W(L)      | High(L)  | 3.0W                 | 2     |

(L) LLDP-negotiated value on the port.

### show poe interface (Specific Interface)

```
user@switch> show poe interface ge-0/0/3
```

```
PoE interface status:
PoE interface          : ge-0/0/3
Administrative status  : Enabled
Operational status     : ON
Operational status detail : IEEE PD Detected
Power limit on the interface : 7.0W
Priority                : Low
Power consumed         : 5.3W
Class of power device   : 2
PoE Mode               : 802.3af
```

**show poe interface (Specific FPC Slot)**

```
user@switch> show poe interface fpc-slot 3
```

| Interface | Admin status | Oper status | Max power | Priority | Power consumption | Class |
|-----------|--------------|-------------|-----------|----------|-------------------|-------|
| ge-3/0/0  | Enabled      | ON          | 30.0W     | Low      | 20.3W             | 4     |
| ge-3/0/1  | Enabled      | ON          | 30.0W     | Low      | 17.8W             | 4     |
| ge-3/0/2  | Enabled      | ON          | 30.0W     | High     | 16.3W             | 4     |
| ge-3/0/3  | Enabled      | ON          | 30.0W     | High     | 16.2W             | 4     |
| ge-3/0/4  | Enabled      | ON          | 30.0W     | Low      | 25.9W             | 4     |
| ge-3/0/5  | Enabled      | ON          | 30.0W     | Low      | 10.1W             | 4     |
| ge-3/0/6  | Enabled      | ON          | 30.0W     | Low      | 16.2W             | 4     |
| ge-3/0/7  | Enabled      | ON          | 30.0W     | Low      | 6.4W              | 4     |
| ge-3/0/8  | Enabled      | ON          | 30.0W     | Low      | 5.2W              | 4     |
| ge-3/0/9  | Enabled      | ON          | 30.0W     | Low      | 5.2W              | 4     |
| ge-3/0/10 | Enabled      | ON          | 30.0W     | Low      | 21.5W             | 4     |
| ge-3/0/11 | Enabled      | ON          | 30.0W     | Low      | 21.7W             | 4     |
| ge-3/0/12 | Enabled      | ON          | 15.4W     | Low      | 9.4W              | 0     |
| ge-3/0/13 | Enabled      | ON          | 15.4W     | Low      | 9.4W              | 0     |
| ge-3/0/14 | Enabled      | ON          | 15.4W     | Low      | 9.4W              | 0     |
| ge-3/0/15 | Enabled      | ON          | 15.4W     | Low      | 9.4W              | 0     |
| ge-3/0/16 | Enabled      | ON          | 15.4W     | Low      | 9.4W              | 0     |
| ge-3/0/17 | Enabled      | ON          | 15.4W     | Low      | 9.4W              | 0     |
| ge-3/0/18 | Enabled      | ON          | 15.4W     | Low      | 9.4W              | 0     |
| ge-3/0/19 | Enabled      | ON          | 15.4W     | Low      | 9.4W              | 0     |
| ge-3/0/20 | Enabled      | ON          | 15.4W     | Low      | 9.4W              | 0     |
| ge-3/0/21 | Enabled      | ON          | 15.4W     | Low      | 9.4W              | 0     |
| ge-3/0/22 | Enabled      | ON          | 15.4W     | Low      | 9.4W              | 0     |
| ge-3/0/23 | Enabled      | ON          | 15.4W     | Low      | 9.4W              | 0     |
| ge-3/0/24 | Enabled      | ON          | 15.4W     | Low      | 9.4W              | 0     |
| ge-3/0/25 | Enabled      | ON          | 15.4W     | Low      | 9.4W              | 0     |
| ge-3/0/26 | Enabled      | ON          | 15.4W     | Low      | 9.4W              | 0     |
| ge-3/0/27 | Enabled      | ON          | 15.4W     | Low      | 9.4W              | 0     |
| ge-3/0/28 | Enabled      | ON          | 15.4W     | Low      | 7.0W              | 0     |
| ge-3/0/29 | Enabled      | ON          | 15.4W     | Low      | 2.2W              | 1     |
| ge-3/0/30 | Enabled      | ON          | 15.4W     | Low      | 2.2W              | 1     |
| ge-3/0/31 | Enabled      | ON          | 15.4W     | Low      | 2.2W              | 1     |
| ge-3/0/32 | Enabled      | ON          | 15.4W     | Low      | 2.0W              | 1     |
| ge-3/0/33 | Enabled      | ON          | 15.4W     | Low      | 2.0W              | 1     |
| ge-3/0/34 | Enabled      | ON          | 15.4W     | Low      | 2.2W              | 1     |
| ge-3/0/35 | Enabled      | ON          | 15.4W     | Low      | 2.2W              | 1     |
| ge-3/0/36 | Enabled      | ON          | 15.4W     | Low      | 2.2W              | 1     |
| ge-3/0/37 | Enabled      | ON          | 15.4W     | Low      | 2.2W              | 1     |
| ge-3/0/38 | Enabled      | ON          | 15.4W     | Low      | 2.2W              | 1     |
| ge-3/0/39 | Enabled      | ON          | 15.4W     | Low      | 2.2W              | 1     |

**show poe interface (Specific Interface on ACX2000 Universal Metro Routers)**

```
user@host> show poe interface ge-0/1/7
```

```
PoE interface status:
PoE interface          : ge-0/1/7
Administrative status  : Enabled
Operational status     : Powered-up
Power limit on the interface : 9.0 W
Priority                : Low
Power consumed         : 14.2 W
Class of power device   : 4
```



## CHAPTER 9

# Monitoring Junos Fusion Provider Edge

- [Connectivity Fault Management in Junos Fusion on page 617](#)

### Connectivity Fault Management in Junos Fusion

---

Connectivity fault management (CFM) allows the Ethernet network to be monitored according to IEEE 802.1AG and ITU-T Y.1731 standards. A CFM session monitors the maintenance endpoints (MEPs) in a maintenance association (MA). MEPS use continuity check messages (CCMs) to determine the connectivity status between MEPs in the MA.

Junos Fusion Provider Edge supports CFM sessions on the extended ports of the satellite devices via the cascade port on the aggregation device. The aggregation device handles and processes the transmission and reception of the CFM messages. From a CFM perspective, the satellite devices operate in a transparent mode.

CFM selects the cascade port that is associated with a satellite device as the anchor for the CFM sessions that are configured on the extended ports of the satellite device and it processes the sessions in the PFE that is associated with the cascade port. When a satellite device is connected to multiple cascade ports on the aggregation device, CFM selects the first available cascade port as the anchor. If the anchor cascade port fails, the next available cascade port is selected as anchor and the CFM sessions processing is moved to the PFE of newly selected anchor. The CFM sessions can flap when the sessions are re-anchored. During the switchover, the measurement interval in the CFM session restarts.

Junos Fusion Provider Edge supports the following CFM feature:

- Distributed and inline CFM sessions.
- CCM status for down MEPs and multiple up MEPs
- Support for link trace (LT) and loopback (LB).
- Delay measurement (DM) and synthetic loss measurement (SLM) as defined in ITU-T Y-1731 standard.

For more information on configuring CFM, see *IEEE 802.1ag OAM Connectivity Fault Management Overview*



NOTE: Junos Fusion Provider Edge only supports enhanced CFM mode.

## CHAPTER 10

# SNMP MIB Support on Junos Fusion Provider Edge

- [Chassis MIB Support \(Junos Fusion\) on page 619](#)

## Chassis MIB Support (Junos Fusion)

The Chassis MIB has been enhanced to enable satellite devices to be represented in the chassis MIB. Satellite devices are represented as FPCs/slots (100, 101, 102,...) in the aggregation device. The support is enabled using a separate range of container indices (CIDX), which allows the SNMP process to redirect relevant SNMP requests to the satellite device management process.

The CIDX for representing satellite device hardware components in Junos Fusion are offset by 100 from indices for hardware components on Junos devices; for example a regular CIDX 2 (Power Supply) is 102 for the power supply of the satellite device. Using these indices you can distinguish the satellite device hardware from the aggregate device. The L1 index for satellite device entries refers to their FPC slot identifiers. As per the chassis MIB convention, identifiers are 1-based. For example, satellite device 100 will have an L1 index of 101, satellite device 101 will have an L1 index of 102, and so on.

[Table 37 on page 619](#) shows the CIDXs used for satellite devices.

**Table 37: CIDX's for Satellite Devices**

| CIDX | Component Type |
|------|----------------|
| 102  | Power Supply   |
| 104  | Fan            |
| 107  | FPC            |
| 108  | PIC            |

The following tables have been enhanced to include object IDs for satellite devices:

- `jnxContainersTable`
- `jnxContentsTable`

- jnxFilledTable
- jnxOperatingTable
- jnxFRUTable

Examples of new object IDs in the jnxContainersTable:

```
jnxContainersType.102 = jnxSatelliteDeviceSlotPower.0
jnxContainersType.104 = jnxSatelliteDeviceSlotFan.0
jnxContainersType.107 = jnxSatelliteDeviceSlotFPC.0
jnxContainersType.108 = jnxSatelliteDeviceMediaCardSpacePIC.0
...
jnxContainersDescr.102 = SD PEM slot
jnxContainersDescr.104 = SD FAN slot
jnxContainersDescr.107 = SD FPC slot
jnxContainersDescr.108 = SD PIC slot
```

Examples of new object IDs in the jnxContentsTable:

```
jnxContentsType.102.102.1.0 = jnxSatelliteDeviceSlotPower
jnxContentsType.102.102.2.0 = jnxSatelliteDeviceSlotPower
jnxContentsType.104.102.1.0 = jnxSatelliteDeviceSlotFan
jnxContentsType.104.102.2.0 = jnxSatelliteDeviceSlotFan
jnxContentsType.104.102.3.0 = jnxSatelliteDeviceSlotFan
jnxContentsType.104.102.4.0 = jnxSatelliteDeviceSlotFan
jnxContentsType.104.102.5.0 = jnxSatelliteDeviceSlotFan
jnxContentsType.107.102.0.0 = jnxSatelliteDeviceSlotFPC
jnxContentsType.108.102.1.0 = jnxSatelliteDeviceMediaCardSpacePIC
...
jnxContentsDescr.102.102.1.0 = SD101 PEM 0
jnxContentsDescr.102.102.2.0 = SD101 PEM 1
jnxContentsDescr.104.102.1.0 = SD101 Fan Tray 0
jnxContentsDescr.104.102.2.0 = SD101 Fan Tray 1
jnxContentsDescr.104.102.3.0 = SD101 Fan Tray 2
jnxContentsDescr.104.102.4.0 = SD101 Fan Tray 3
jnxContentsDescr.104.102.5.0 = SD101 Fan Tray 4
jnxContentsDescr.107.102.0.0 = SD101 FPC: QFX5100-48S-6Q @ 101/*/*
jnxContentsDescr.108.102.1.0 = SD101 PIC: 48x10G-6x40G @ 101/0/*
```

The following SNMP traps are generated for Satellite Devices, which are also logged as syslog messages:

- Satellite Device (as FPC) add (online) or remove
- Satellite Device Fan add (online) or remove
- Satellite Device PSU add (online) or remove
- Satellite Device PIC add (online) or remove
- Satellite Device FAN failure or status
- Satellite Device PSU failure or status



Table 38 on page 621 shows the SNMP traps that can be generated for satellite devices.

**Table 38: SNMP Traps Generated for Satellite Devices**

| Trap            | Condition   |
|-----------------|---|
| jnxFruRemoval   | Sent when the specified FRU (FAN/PSU) has been removed from the chassis, or the satellite device has been removed from the aggregation device's database  |
| jnxFruInsertion | Sent when the specified FRU (FAN/PSU) has been inserted into the satellite device   |
| jnxFruPowerOff  | Sent when the specified FRU (FAN/PSU) has been powered off in the satellite device  |
| jnxFruPowerOn   | Sent when the specified FRU (FAN/PSU) has been powered on in the satellite device   |
| jnxFruFailed    | Sent when the specified FRU (FAN/PSU) has failed in the satellite device. Typically, this is due to the FRU not powering up or being unable to load software. FRU replacement might be required |
| jnxFruOK        |   |
| jnxFruOffline   | Sent when FPC's new reported state is not online or PSU/FAN/PIC is not present due to satellite device removal  |
| jnxFruOnline    | Sent when specified FRU (FPC,PIC,PSU,FAN) gets added in the aggregation device database   |
| jnxFruCheck     | Sent when the specified FRU (FAN/PSU) has encountered operational errors  |

Given below are examples of the system log messages generated:

```
messages:Apr 15 21:28:36 card spmd[6706]: SPMD_SNMP_TRAP10: SNMP trap generated:
Fru Offline (jnxFruContentsIndex 102, jnxFruL1Index 109, jnxFruL2Index 1,
jnxFruL3Index 0, jnxFruName SD108 PEM 0, jnxFruType 7, jnxFruSlot 0,
jnxFruOfflineReason 1, jnxFruLastPowerOff 0, jnxFruLastPowerOn 0)
```

```
messages:Apr 15 21:28:36 card spmd[6706]: SPMD_SNMP_TRAP10: SNMP trap generated:
Fru Offline (jnxFruContentsIndex 104, jnxFruL1Index 109, jnxFruL2Index 1,
jnxFruL3Index 1, jnxFruName SD108 Fan Tray 0, jnxFruType 13, jnxFruSlot 0,
jnxFruOfflineReason 1, jnxFruLastPowerOff 0, jnxFruLastPowerOn 0)
```

```
messages:Apr 15 21:28:57 card spmd[8847]: SPMD_SNMP_TRAP7: SNMP trap generated:
Fru Online (jnxFruContentsIndex 107, jnxFruL1Index 103, jnxFruL2Index 0,
jnxFruL3Index 0, jnxFruName SD102 FPC: @ 102/*/*, jnxFruType 3, jnxFruSlot 102)
```

```
messages:Apr 15 21:28:36 card spmd[6706]: SPMD_SNMP_TRAP10: SNMP trap generated:
Fru Offline (jnxFruContentsIndex 108, jnxFruL1Index 109, jnxFruL2Index 1,
jnxFruL3Index 0, jnxFruName SD108 PIC: 48x 10/100/1000 Base-T @ 108/0/*, jnxFruType
11, jnxFruSlot 0, jnxFruOfflineReason 1, jnxFruLastPowerOff 0, jnxFruLastPowerOn
0)
```



## CHAPTER 11

# Link Aggregation and Link Aggregation Control Protocol on Junos Fusion Provider Edge

- [Understanding Link Aggregation and Link Aggregation Control Protocol in a Junos Fusion on page 623](#)
- [Configuring an Aggregated Ethernet Interface on page 625](#)
- [Configuring Junos OS for Supporting Aggregated Devices on page 627](#)

## Understanding Link Aggregation and Link Aggregation Control Protocol in a Junos Fusion

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- [Link Aggregation in Junos Fusion on page 623](#)
- [Link Aggregation Control Protocol in Junos Fusion on page 623](#)
- [Configuring Link Aggregation and LACP in Junos Fusion on page 624](#)
- [Software and Hardware Guidelines when Configuring Link Aggregation and LACP in Junos Fusion on page 625](#)

### Link Aggregation in Junos Fusion

Link aggregation is used to aggregate Ethernet interfaces between two devices. The aggregated Ethernet interfaces that participate in a *link aggregation group (LAG)* are called *member links*. Because a LAG is composed of multiple member links, even if one member link fails, the LAG continues to carry traffic over the remaining links.

### Link Aggregation Control Protocol in Junos Fusion

Link Aggregation Control Protocol (LACP) is one method of bundling several physical interfaces to form one logical aggregated Ethernet interface. LACP is a subcomponent of the IEEE 802.3ad standard and is used as a discovery protocol. The LACP mode can be active or passive. The transmitting link is known as the *actor*, and the receiving link is known as the *partner*. If the actor and partner are both in passive mode, they do not exchange LACP packets, and the aggregated Ethernet links do not come up. If either the actor or partner is active, they do exchange LACP packets. By default, LACP is in passive mode on aggregated Ethernet interfaces. To initiate transmission of LACP packets and response to LACP packets, you must enable LACP active mode. You can configure

Ethernet links to actively transmit protocol data units (PDUs), or you can configure the links to passively transmit them, sending out LACP PDUs only when they receive them from another link. You can configure both VLAN-tagged and untagged aggregated Ethernet interfaces without LACP enabled. LACP is defined in IEEE 802.3ad, *Aggregation of Multiple Link Segments*.

LACP was designed to achieve the following:

- Automatic addition and deletion of individual links to the LAG without user intervention.
- Link monitoring to check whether both ends of the bundle are connected to the correct group.

The satellite devices provide network interfaces that send and receive network traffic and process the periodic transmission of LACP packets. You can include extended ports (physical interface on a satellite device that provides a connection to servers or endpoints) or local ports in LAGs and MC-LAGs, but not both.

When a dual-homed end device is deployed with Junos Fusion, the network interface cards form a LAG with the Junos Fusion. During a Junos Fusion upgrade, the end device may not be able to exchange LACP PDUs. In such a situation you can configure an interface to be in the **up** state even if no PDUs are exchanged. Use the **force-up** statement to configure an interface when the peer has limited LACP capability. The interface selects the associated LAG by default, whether the LACP mode is active or passive. When there are no received PDUs, the partner is considered to be working in the passive mode. Therefore, LACP PDU transmissions are controlled by the transmitting link.

In Junos Fusion with EVPN, all aggregation devices have knowledge of any extended ports in a LAG because each LAG is assigned a unique Ethernet Segment Identifier (ESI). The ESI is based on the redundancy group configuration and global LAG interface ID.

## Configuring Link Aggregation and LACP in Junos Fusion

1. Create a logical aggregated Ethernet interface.
2. Define the parameters associated with the logical aggregated Ethernet interface, such as a logical unit, interface properties, and Link Aggregation Control Protocol (LACP).
3. Define the member links to be contained within the aggregated Ethernet interface—for example, two local 10-Gigabit Ethernet interfaces on the aggregation device or two extended ports on the aggregation device.
  - LAGs and MC-LAGs cannot include a mix of extended ports and local ports on the aggregation device.
  - LAGs can span across multiple satellite devices in Junos Fusion Provider Edge and Junos Fusion Data Center.
  - LAGs cannot contain both single-homed and multihomed members.
  - Existing restrictions that apply to LAGs and MC-LAGs also apply to LAGs and MC-LAGs that include extended ports.
4. Configure LACP for link detection.

## Software and Hardware Guidelines when Configuring Link Aggregation and LACP in Junos Fusion

Keep in mind these hardware and software guidelines:

- Up to 1750 LAGs are supported in Junos Fusion Provider Edge, Junos Fusion Enterprise, and Junos Fusion Data Center, and the LAGs are numbered from ae0 through ae4091.
- Up to 16 members are supported in a LAG in Junos Fusion Provider Edge, Junos Fusion Enterprise, and Junos Fusion Data Center.
- Configure the LAG on both sides of the link.
- The interfaces on either side of the link must be set to the same speed and be in full-duplex mode.
- Configure LACP for dual-homed extended ports identically on both of the aggregation devices; otherwise LACP will not be in a forwarding state.

### Related Documentation

- [Junos Fusion Provider Edge Overview on page 3](#)
- [Understanding Junos Fusion Ports on page 13](#)
- [Configuring Junos OS for Supporting Aggregated Devices on page 627](#)

## Configuring an Aggregated Ethernet Interface

On Fast Ethernet, Tri-Rate Ethernet copper, Gigabit Ethernet, and 10-Gigabit Ethernet interfaces on M Series and T Series routers, you can associate a physical interface with an aggregated Ethernet interface.



**NOTE:** On a Junos Fusion, you can include extended ports (physical interface on a satellite device that provides a connection to servers or endpoints) or local ports in link aggregation groups (LAGs) and MC-LAGs, but not both. For information on extended ports, see “[Understanding Junos Fusion Ports](#)” on [page 13](#).

To configure an aggregated Ethernet interface:

1. Specify that you want to configure the link aggregation group interface.

```
user@host# edit interfaces interface-name
```

2. Configure the aggregated Ethernet interface.

```
[edit interfaces interface-name]  
user@host# set (fastether-options | gigether-options) 802.3ad aex
```

You specify the interface instance number *x* to complete the link association; *x* can be from 0 through 127, for a total of 128 aggregated interfaces on M Series and T Series routers and can be from 1 through 480, for a total of 480 aggregated interfaces on MX Series routers. For MX Series routers running Junos release 14.2R3 and later you can configure a maximum of 1000 aggregated interfaces. Aggregated interfaces are numbered from **ae0** through **ae4092**.



**NOTE:** On MX2010 and MX2020 routers you can configure a maximum of 800 aggregated interfaces.

You must also include a statement defining **aex** at the **[edit interfaces]** hierarchy level. You can optionally specify other physical properties that apply specifically to the aggregated Ethernet interfaces; for details, see *Ethernet Interfaces Overview*, and for a sample configuration, see *Example: Configuring Aggregated Ethernet Interfaces*.



**NOTE:** In general, aggregated Ethernet bundles support the features available on all supported interfaces that can become a member link within the bundle. As an exception, Gigabit Ethernet IQ features and some newer Gigabit Ethernet features are not supported in aggregated Ethernet bundles.

Gigabit Ethernet IQ and SFP interfaces can be member links, but IQ- and SFP-specific features are not supported on the aggregated Ethernet bundle even if all the member links individually support those features.

You need to configure the correct link speed for the aggregated Ethernet interface to eliminate any warning message.



**NOTE:** Before you commit an aggregated Ethernet configuration, ensure that link mode is not configured on any member interface of the aggregated Ethernet bundle; otherwise, the configuration commit check fails.

#### Related Documentation

- *Configuring the Number of Aggregated Ethernet Interfaces on the Device*
- *Deleting an Aggregated Ethernet Interface*
- *Aggregated Ethernet Interfaces Overview*
- *Ethernet Interfaces Feature Guide for Routing Devices*

## Configuring Junos OS for Supporting Aggregated Devices

Junos OS supports the aggregation of physical devices into defined virtual links, such as the link aggregation of Ethernet interfaces defined by the IEEE 802.3ad standard.

Tasks for configuring aggregated devices are:

- [Configuring Virtual Links for Aggregated Devices on page 627](#)
- [Configuring LACP Link Protection at the Chassis Level on page 628](#)
- [Enabling LACP Link Protection on page 628](#)
- [Configuring System Priority on page 629](#)
- [Configuring the Maximum Links Limit on page 629](#)
- [Configuring PPM on Junos Fusion on page 630](#)

### Configuring Virtual Links for Aggregated Devices

To define virtual links, you need to specify the associations between physical and logical devices within the **[edit interfaces]** hierarchy, and assign the correct number of logical devices by including the **device-count** statement at the **[edit chassis aggregated-devices ethernet]** and **[edit chassis aggregated-devices sonet]** hierarchy levels:

```
[edit chassis]
aggregated-devices {
  ethernet {
    device-count number;
  }
  sonet {
    device-count number;
  }
}
```

The aggregated interfaces are numbered from **ae0** through **ae4091**. The maximum number of aggregated interfaces supported by different routers is listed below:

- For PTX Series routers, you can configure a maximum of 128 aggregated interfaces.
- For M Series and T Series routers, you can configure a maximum of 128 aggregated interfaces (LAG bundles).
- In Junos release 14.2R2 and earlier, you can configure a maximum of 480 aggregated interfaces on MX Series routers.
- In Junos release 14.2R3 and later, you can configure a maximum of 1000 aggregated interfaces on MX240, MX480, and MX960 routers.
- In Junos release 14.2R3 and later, you can configure a maximum of 800 aggregated interfaces on MX2010 and MX2020 routers.

- In Junos OS 15.1F5 and 15.1F6 releases, you can configure a maximum of 480 aggregated interfaces on MX240, MX480, and MX960 routers.
- In Junos OS 15.1F5 and 15.1F6 releases, you can configure a maximum of 800 aggregated interfaces on MX2010 and MX2020 routers.

For SONET/SDH, starting with Junos OS Release 13.2, the maximum number of logical interfaces is 64, numbered from **as0** through **as63**. In releases before Junos OS Release 13.2, the maximum was 16.

## Configuring LACP Link Protection at the Chassis Level

Link Aggregation Control Protocol (LACP) is one method of bundling several physical interfaces to form one logical interface. You can configure both VLAN-tagged and untagged aggregated Ethernet with or without LACP enabled. LACP exchanges are made between actors and partners. An actor is the local interface in an LACP exchange. A partner is the remote interface in an LACP exchange.

LACP link protection enables you to force active and standby links within an aggregated Ethernet. You configure LACP link protection by using the **link-protection** and **system-priority** statements at either the chassis or interface level and by configuring port priority at the interface level using the **system-priority** statement. Configuring LACP parameters at the chassis level results in all aggregated Ethernet interfaces using the defined values unless overridden by the LACP configuration on a specific interface.

```
[edit chassis]
aggregated-devices {
  ethernet {
    lacp {
      link-protection {
        non-revertive;
      }
      system-priority priority;
    }
  }
}
```



**NOTE:** LACP link protection also uses port priority. You can configure port priority at the Ethernet interface [**gigether-options**] hierarchy level using the **port-priority** statement. If you choose not to configure port priority, LACP link protection uses the default value for port priority (127).

### See Also

## Enabling LACP Link Protection

To enable LACP link protection for aggregated Ethernet interfaces on the chassis, use the **link-protection** statement at the [**edit chassis aggregated-devices ethernet lacp**] hierarchy level:



```
[edit chassis aggregated-devices ethernet lacp]
link-protection {
  non-revertive;
}
```

By default, LACP link protection reverts to a higher-priority (lower-numbered) link when that higher-priority link becomes operational or a link is added to the aggregator that is determined to be higher in priority. However, you can suppress link calculation by adding the **non-revertive** statement to the LACP link protection configuration. In nonrevertive mode, after a link is active and collecting and distributing packets, the subsequent addition of a higher-priority (better) link does not result in a switch, and the current link remains active.



**BEST PRACTICE:** (MX Series) In a highly scaled configuration over aggregated Ethernet, we recommend that you prevent the router from performing such a switch by including the **non-revertive** statement. Failure to do so may result in some traffic loss if a MIC on which a member interface is located reboots. Using the **non-revertive** statement for this purpose is not effective if both the primary and secondary interfaces are on the MIC that reboots.



**CAUTION:** If both ends of an aggregator have LACP link protection enabled, make sure to configure both ends of the aggregator to use the same mode. Mismatching LACP link protection modes can result in lost traffic.

## Configuring System Priority

To configure LACP system priority for aggregated Ethernet interfaces on the chassis, use the **system-priority** statement at the **[edit chassis aggregated-devices ethernet lacp]** hierarchy level:

```
[edit chassis aggregated-devices ethernet lacp]
system-priority priority;
```

The system priority is a 2-octet binary value that is part of the LACP system ID. The LACP system ID consists of the system priority as the two most-significant octets and the interface MAC address as the six least-significant octets. The system with the numerically lower value for system priority has the higher priority. By default, system priority is 127, with a range of 0 through 65,535.

## Configuring the Maximum Links Limit

To configure the maximum links limit, use the **maximum-links** statement at the **[edit chassis aggregated-devices]** hierarchy level:

```
[edit chassis aggregated-devices]
maximum-links maximum-links-limit;
```

## Configuring PPM on Junos Fusion

If you use Junos Fusion with Junos OS Release 14.2R3, you need to ensure that link aggregation (and STP) work properly by configuring timers for the periodic packet management (PPM) daemons on the aggregation and satellite devices. We recommend using the following timer values:

```
[edit routing-options ppm]
  redistribution-timer 120;
  tcp-keepalive-interval 3000;
  tcp-keepalive-idle 3000;
```

Starting in Junos OS Release 14.2R4, the timer values that ensure proper link aggregation and STP functions are configured by default if you use Junos Fusion with Junos OS.

Release History Table

| Release | Description   |
|---------|---|
| 15.1F5  | In Junos OS 15.1F5 and 15.1F6 releases, you can configure a maximum of 480 aggregated interfaces on MX240, MX480, and MX960 routers.  |
| 15.1F5  | In Junos OS 15.1F5 and 15.1F6 releases, you can configure a maximum of 800 aggregated interfaces on MX2010 and MX2020 routers.  |
| 14.2R4  | Starting in Junos OS Release 14.2R4, the timer values that ensure proper link aggregation and STP functions are configured by default if you use Junos Fusion with Junos OS.  |
| 14.2R3  | In Junos release 14.2R3 and later, you can configure a maximum of 1000 aggregated interfaces on MX240, MX480, and MX960 routers.  |
| 14.2R3  | In Junos release 14.2R3 and later, you can configure a maximum of 800 aggregated interfaces on MX2010 and MX2020 routers.   |
| 14.2R3  | If you use Junos Fusion with Junos OS Release 14.2R3, you need to ensure that link aggregation (and STP) work properly by configuring timers for the periodic packet management (PPM) daemons on the aggregation and satellite devices. |
| 14.2R2  | In Junos release 14.2R2 and earlier, you can configure a maximum of 480 aggregated interfaces on MX Series routers.   |
| 13.2    | For SONET/SDH, starting with Junos OS Release 13.2, the maximum number of logical interfaces is 64, numbered from <b>as0</b> through <b>as63</b> .  |

### Related Documentation

- [Configuring an Aggregated Ethernet Interface on page 625](#)
- [Ethernet Interfaces Feature Guide for Routing Devices](#)
- [Configuring Aggregated Ethernet Interfaces on PTX Series Packet Transport Routers](#)
- [Configuring Aggregated SONET/SDH Interfaces](#)

# Uplink Failure Detection on Junos Fusion Provider Edge

- [Overview of Uplink Failure Detection on a Junos Fusion on page 631](#)
- [Configuring Uplink Failure Detection on a Junos Fusion on page 632](#)

## Overview of Uplink Failure Detection on a Junos Fusion

---

The uplink failure detection feature on a Junos Fusion enables satellite devices to detect link failures on the uplink interfaces used to connect to aggregation devices. When uplink failure detection detects uplink failure on a satellite device, all of the device's extended ports (which connect to host devices) are shut down. Shutting down the extended ports allows downstream host devices to more quickly identify and adapt to the outage. For example, when a host device is connected to two satellite devices, and uplink failure detection shuts down the extended ports on one satellite device, the host device can more quickly recognize the uplink failure and redirect traffic through the other, active satellite device.

You can configure uplink failure detection globally, for all satellite devices of a Junos Fusion, and for individual satellite devices. Uplink failure detection configuration at the satellite device level overrides the global uplink failure detection configuration.

Uplink failure detection configuration allows you to configure these options:

- The minimum number of active uplink ports a satellite device must have to remain active. The default is one active uplink port. You can use this option to specify more minimum active ports.
- The amount of time uplink failure detection waits to try to re-enable disabled extended ports. This wait time is called a hold-down period. It is intended to avoid port flapping on the extended ports when uplink port connectivity is unstable. The default hold-down period is six seconds.

Uplink failure detection must know which ports on a satellite device can be used as uplink ports. These are called candidate uplink ports. [Table 39 on page 632](#) shows the default set of candidate uplink ports that uplink failure detection selects for failure detection. If you choose not to use the default uplink ports for your satellite devices, you need to specify which uplink ports you want to use for uplink failure detection by creating a

candidate uplink port profile and applying it to the satellite device's uplink failure detection configuration.



**CAUTION:** The physically connected uplink ports on a satellite device must be defined as candidate uplink ports in the Junos Fusion configuration. If the uplink ports on a satellite device are not configured as candidate uplink ports, uplink failure detection cannot be enabled on the device, and a system log message is generated.

**Table 39: UFD Default Uplink Interfaces for Satellite Devices**

| Device Type  | Default Uplink Interfaces                               |
|--|---|
| EX4300-24T (4 ports each on PIC1 and PIC2)                           | 1/0 through 1/3 and 2/0 through 2/3                     |
| EX4300-32F (4 ports on PIC 0, 2 ports on PIC 1 and 8 ports on PIC 2) | 0/32 through 0/35<br>1/0 through 1/1<br>2/0 through 2/7 |
| EX4300-48T (4 ports each on PIC1 and PIC2)                           | 1/0 through 1/3 and 2/0 through 2/3                     |
| EX4300-48T-BF (4 ports each on PIC1 and PIC2)                        | 1/0 through 1/3 and 2/0 through 2/3                     |
| QFX5100-24Q-2P (4 ports on PIC 0)                                    | 0/20 through 0/23                                       |
| QFX5100-48S-6Q (6 QSFP+ ports)                                       | 0/48 through 0/53                                       |
| QFX5100-48T-6Q (6 QSFP+ ports)                                       | 0/48 through 0/53                                       |
| QFX5100-96S-8Q (8 QSFP+ ports)                                       | 0/96 through 0/103                                      |

**Related Documentation**

- [Configuring Uplink Failure Detection on a Junos Fusion on page 632](#)

## Configuring Uplink Failure Detection on a Junos Fusion

The uplink failure detection feature on a Junos Fusion enables satellite devices to detect link failures on the uplink interfaces used to connect to aggregation devices. When uplink failure detection detects uplink failure on a satellite device, all of the device's extended ports (which connect to host devices) are shut down.

The following topics describe how to configure uplink failure detection on a Junos Fusion:

- [Enabling Uplink Failure Detection on a Junos Fusion on page 633](#)
- [Configuring a Candidate Uplink Port Policy on page 634](#)
- [Configuring an Uplink Port Group on page 636](#)

## Enabling Uplink Failure Detection on a Junos Fusion

You can enable uplink failure detection on a Junos Fusion at the following levels in the configuration hierarchy:

- To enable uplink failure detection globally, for all satellite devices in the Junos Fusion, include the uplink failure detection configuration at the **[edit chassis satellite-management]** level.
- To enable uplink failure detection on a specific satellite device, include the uplink failure detection configuration at the **[edit chassis satellite-management fpc slot-id]** level. Uplink failure detection configuration applied to a satellite device overrides the global uplink failure detection configuration.

Uplink failure detection configuration syntax is the same at all hierarchy levels. This topic shows how to configure uplink failure detection at the global level, but you can also apply uplink failure detection configuration at the satellite device level.

To enable uplink failure detection on a Junos Fusion, do the following on the fabric's aggregation device:

1. Enable uplink failure detection with default settings:

```
[edit chassis satellite-management]
user@switch# set uplink-failure-detection
```

The default configuration parameters are described in [Table 40 on page 633](#).

2. (Optional) Apply custom uplink failure detection settings by specifying a candidate uplink port policy:

```
[edit chassis satellite-management uplink-failure-detection]
user@switch# candidate-uplink-policy policy-name
```

For information about configuring candidate uplink policies, see [“Configuring a Candidate Uplink Port Policy” on page 634](#).

**Table 40: Junos Fusion Uplink Failure Detection Default Configuration**

| Configuration Parameter | Description   | Default   |
|-------------------------|---|-----------|
| <b>holddown</b>         | Configures the interval of time uplink failure detection waits before trying to re-enable a satellite device's extended ports after shutting them down due to an uplink port failure.                               | 6 seconds |
| <b>minimum-links</b>    | Configures the minimum number of active uplink ports a satellite device must have. If a satellite device has fewer than this number of active uplink ports, uplink failure detection shuts down its extended ports. | 1 link    |

Table 40: Junos Fusion Uplink Failure Detection Default Configuration (continued)

| Configuration Parameter  | Description   | Default   |
|--------------------------|---|---|
| <b>uplink-port-group</b> | Defines a set of candidate uplink ports to assign to satellite devices. | Each satellite device model has a set of default uplink ports. You only need to assign uplink ports if you do not want to use the default ports. See <a href="#">Table 39 on page 632</a> for the default uplink ports by device. |

## Configuring a Candidate Uplink Port Policy

A candidate uplink port policy contains uplink failure detection uplink port configuration that you can apply to satellite devices to override the default uplink failure detection behavior.

You can enter configuration statements in a candidate uplink port policy at these levels of the hierarchy:

- Enter configuration statements at the level **[edit policy-options satellite-policies candidate-uplink-port-policy policy-name]** to override the default uplink failure detection behavior. Statements configured at this level are applied if the policy is applied to a satellite device that does not match a **product-model** statement in any term in the policy. If the policy contains no terms, the statements at this level are applied to every satellite device to which the policy is applied.
- Create terms within the candidate uplink port policy at the level **[edit policy-options satellite-policies candidate-uplink-port-policy policy-name term term-name]**. Use terms to apply different uplink failure detection configurations to certain satellite devices, based on their product model. Each term contains match criteria that is compared against the model name of each satellite device to which the policy is applied. If the criteria matches the device model, the configuration specified in the term is applied to the device. Terms are evaluated in the order they appear in the configuration. The first term that matches a satellite device is applied to the device.

Configuring a candidate uplink port policy is described in the following sections:

- [Configuring Candidate Uplink Port Policy Default Configuration on page 634](#)
- [Configuring Candidate Uplink Port Policy Terms on page 635](#)

### Configuring Candidate Uplink Port Policy Default Configuration

Uplink failure detection has the following default configuration parameters that apply if you enable uplink failure detection with no additional configuration:

- The default configuration settings are described in [Table 40 on page 633](#).
- The default uplink ports that are assigned to each satellite device type are described in [“Overview of Uplink Failure Detection on a Junos Fusion” on page 631](#).

A candidate uplink port policy can contain configuration statements that override the defaults if the policy is applied to a satellite device that does not match a **product-model** statement in any term in the policy.

To configure a candidate uplink port policy default configuration:

1. (Optional) Specify the interval of time uplink failure detection waits before trying to re-enable a satellite device's extended ports after shutting them down due to an uplink port failure:

```
[edit policy-options satellite-policies candidate-uplink-port-policy
policy-name]
user@switch# set holddown interval
```

2. (Optional) Specify the minimum number of active uplink ports a satellite device must have. If a satellite device has fewer than this number of active uplink ports, uplink failure detection shuts down its extended ports:

```
[edit policy-options satellite-policies candidate-uplink-port-policy
policy-name]
user@switch# set minimum-links link-count
```

3. (Optional) Specify an uplink port group to assign to satellite devices:

```
[edit policy-options satellite-policies candidate-uplink-port-policy
policy-name]
user@switch# set uplink-port-group group-name
```

For information about configuring an uplink port group, see [“Configuring an Uplink Port Group” on page 636](#).

### Configuring Candidate Uplink Port Policy Terms

You can configure terms in a candidate uplink port policy to apply uplink failure detection configuration to certain satellite devices, based on their device model. For example, you can create a term that matches all QFX 5100 Series switches. When the policy is applied to a QFX 5100 Series switch, the other configuration statements in the term are applied to the switch. If the policy is applied to satellite devices that are not QFX 5100 Series switches, the configuration statements in the term are not applied. When a candidate uplink port policy has multiple terms, the terms are evaluated in the order they appear in the configuration. The first term that matches a satellite device is applied to that satellite device.

To configure a candidate uplink port policy term:

1. Specify which device models the term will apply to:

```
[edit policy-options satellite-policies candidate-uplink-port-policy policy-name
term term-name from]
user@switch# set product-model model-name
```

The other configuration statements in the term are only applied to satellite devices whose device model matches the match term *model-name*.

The match term *model-name* can be a complete device model name, to match that device model exactly. You can also use the wildcard character (\*) in the match term to match zero or more of any character.

Some examples of using the wildcard character in the match term:

- To apply the satellite policy to all EX 4300 Series switches in the satellite device role, enter **EX4300\*** as the *model-name*.
  - To apply the satellite policy to all QFX 5100 Series switches in the satellite device role, enter **QFX5100\*** as the *model-name*.
  - To apply the satellite policy to QFX 5100 Series switches with model names that start with QFX5100-96, enter **QFX5100-96\*** as the *model-name*.
2. (Optional) Specify the interval of time uplink failure detection waits to re-enable a satellite device's extended ports after shutting them down due to an uplink port failure:

```
[edit policy-options satellite-policies candidate-uplink-port-policy policy-name
term term-name from]
user@switch# set holddown interval
```

3. (Optional) Specify the minimum number of active uplink ports a satellite device must have. If a satellite device has fewer than this number of active uplink ports, uplink failure detection shuts down its extended ports:

```
[edit policy-options satellite-policies candidate-uplink-port-policy
policy-name]
user@switch# set minimum-links link-count
```

4. (Optional) Specify an uplink port group to assign to satellite devices:

```
[edit policy-options satellite-policies candidate-uplink-port-policy policy-name
term term-name from]
user@switch# set uplink-port-group group-name
```

For information about configuring an uplink port group, see [“Configuring an Uplink Port Group” on page 636](#).

## Configuring an Uplink Port Group

An uplink port group defines a set of candidate uplink ports on a satellite device. Uplink port groups are assigned to candidate uplink port policies, which are assigned to satellite devices. Every satellite device type has default candidate uplink ports, which are described



in [“Overview of Uplink Failure Detection on a Junos Fusion” on page 631](#). You do not need to create uplink ports groups if you want to use the default candidate uplink ports on satellite devices.



**CAUTION:** The physically connected uplink ports on a satellite device must be defined as candidate uplink ports in the Junos Fusion configuration. If the uplink ports on a satellite device are not configured as candidate uplink ports, uplink failure detection cannot be enabled on the device, and a system log message is generated.

To create an uplink port group:

1. Specify the uplink port group name:

```
[edit policy-options satellite-policies]
user@switch# set port-group-alias port-group-alias-name
```

2. Configure the PICs that will contain ports to be identified as candidate uplink ports:

```
[edit policy-options satellite-policies port-group-alias port-group-alias-name]
user@switch# set pic pic-number
```

3. Configure the ports on the PICs that will be identified as candidate uplink ports:

```
[edit policy-options satellite-policies port-group-alias port-group-alias-name
pic pic-number]
user@switch# set port [port-number | port-number-range | all]
```

#### Related Documentation

- [Overview of Uplink Failure Detection on a Junos Fusion on page 631](#)



## CHAPTER 13

# Configuration Statements for Uplink Failure Detection on Junos Fusion Provider Edge

- `candidate-uplink-port-policy` (`satellite-policies`) on page 640
- `holddown` (`candidate-uplink-port-profile`) on page 641
- `minimum-links` (`candidate-uplink-port-profile`) on page 642
- `pic` (`satellite-policies port-group-alias`) on page 643
- `port` (`satellite-policies port-group-alias`) on page 644
- `port-group-alias` (`satellite-policies`) on page 645
- `product-model` (Junos Fusion) on page 646
- `satellite-policies` on page 647
- `term` (`candidate-uplink-policy`) on page 649
- `uplink-failure-detection` (Junos Fusion) on page 650
- `uplink-port-group` (Junos Fusion) on page 651

## candidate-uplink-port-policy (satellite-policies)

|                          |   |
|--------------------------|---|
| Syntax                   | <pre> candidate-uplink-port-policy <i>policy-name</i>{   &lt;holddown&gt;<i>holddown-time</i>&gt;;   &lt;minimum-links&gt;<i>number-of-links</i>&gt;;   &lt;uplink-port-group&gt; <i>uplink-port-group-name</i>&gt;;   term <i>term-name</i> {     from {       product-model <i>model-name</i>;       &lt;holddown&gt; <i>holddown-time</i>&gt;;       &lt;minimum-links&gt; <i>number-of-links</i>&gt;;       &lt;uplink-port-group&gt; <i>uplink-port-group-name</i>&gt;;     }   } } </pre> |
| Hierarchy Level          | [edit policy-options <a href="#">satellite-policies</a> ]   |
| Release Information      | Statement introduced in Junos OS Release 14.2R3.  |
| Description              | Configures a candidate uplink port profile, which contains uplink failure detection feature configuration that can be applied to satellite devices in a Junos Fusion.   |
| Default                  | There is no configured candidate uplink port profile, by default.   |
| Options                  | <p><b><i>policy-name</i></b>—User-defined name for the policy.</p> <p>The remaining statements are explained separately.</p>  |
| Required Privilege Level | <p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>  |
| Related Documentation    | <ul style="list-style-type: none"> <li><a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li> <li><a href="#">Configuring or Expanding a Junos Fusion Enterprise</a></li> </ul>   |

## holddown (candidate-uplink-port-profile)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>holddown <i>interval</i>;</code>   |
| <b>Hierarchy Level</b>          | <code>[edit policy-options satellite-policies <b>candidate-uplink-port-profile</b> <i>profile-name</i>]</code><br><code>[edit policy-options satellite-policies candidate-uplink-port-profile <i>profile-name</i> <b>term</b> <i>term-name</i> from]</code>                                      |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 14.2R3.   |
| <b>Description</b>              | Configures the interval of time uplink failure detection waits before trying to try re-enable a satellite device's extended ports after shutting them down due to an uplink port failure. It is intended to avoid port flapping on the extended ports when uplink port connectivity is unstable. |
| <b>Default</b>                  | The default holddown interval is 6 seconds.  |
| <b>Options</b>                  | <i>interval</i> —The holddown interval, in seconds. Valid values are 1-600 seconds.  |
| <b>Required Privilege Level</b> | admin—To view this statement in the configuration.<br>admin-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li> <li>• <i>Configuring or Expanding a Junos Fusion Enterprise</i></li> </ul>   |

## minimum-links (candidate-uplink-port-profile)

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>minimum-links <i>link-count</i>;</code>   |
| <b>Hierarchy Level</b>          | <code>[edit policy-options satellite-policies <a href="#">candidate-uplink-port-profile</a> <i>profile-name</i>]</code><br><code>[edit policy-options satellite-policies candidate-uplink-port-profile <i>profile-name</i> <a href="#">term</a> <i>term-name</i> from]</code> |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 14.2R3.  |
| <b>Description</b>              | Configures the minimum number of active uplink ports a satellite device must have. If a satellite device has fewer than this number of active uplink ports, uplink failure detection shuts down its extended ports.   |
| <b>Default</b>                  | The default number of minimum links is 1.   |
| <b>Options</b>                  | <i>link-count</i> —Specifies the minimum number of active uplink ports a satellite device must have. Valid values are 1-32 links.   |
| <b>Required Privilege Level</b> | <code>admin</code> —To view this statement in the configuration.<br><code>admin-control</code> —To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li><li>• <i>Configuring or Expanding a Junos Fusion Enterprise</i></li></ul>   |

## pic (satellite-policies port-group-alias)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>pic <i>pic-number</i> {   port [<i>port-number</i>   <i>port-number-range</i>   all]; }</pre>   |
| <b>Hierarchy Level</b>          | [edit policy-options satellite-policies <b>port-group-alias</b> <i>port-group-alias-name</i> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 14.2R3.   |
| <b>Description</b>              | <p>Specify the PIC number to apply a port group alias for satellite policies in a Junos Fusion.</p> <p>You must also specify the ports on the PIC when you use this statement.</p>         |
| <b>Options</b>                  | <p><b>pic-number</b>—The PIC number on the satellite device.</p> <p>The remaining statements are explained separately.</p>   |
| <b>Required Privilege Level</b> | <p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li> <li>• <i>Configuring or Expanding a Junos Fusion Enterprise</i></li> </ul> |


## port (satellite-policies port-group-alias)

---

|                          |   |
|--------------------------|---|
| Syntax                   | port [ <i>port-number</i>   <i>port-number-range</i>   all];  |
| Hierarchy Level          | [edit policy-options satellite-policies port-group-alias <i>port-group-alias-name</i> <b>pic</b> <i>pic-number</i> ]  |
| Release Information      | Statement introduced in Junos OS Release 14.2R3.  |
| Description              | <p>Specify the port or ports to apply a port group alias for satellite policies in a Junos Fusion.</p> <p>You must also specify the PIC when you use this statement.</p>                                |
| Options                  | <p><b><i>port-number</i></b>—The port number on the PIC on the satellite device.</p> <p><b><i>port-number-range</i></b>—A range of port numbers on the PIC.</p> <p><b>all</b>—All ports on the PIC.</p> |
| Required Privilege Level | <p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>  |
| Related Documentation    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li><li>• <i>Configuring or Expanding a Junos Fusion Enterprise</i></li></ul>                 |



## port-group-alias (satellite-policies)

|                          |  |
|--------------------------|--|
| Syntax                   | <pre>port-group-alias <i>port-group-alias-name</i> {   pic <i>pic-number</i> {     port [<i>port-number</i>   <i>port-number-range</i>   all];   } }</pre>   |
| Hierarchy Level          | [edit policy-options <a href="#">satellite-policies</a> ]  |
| Release Information      | Statement introduced in Junos OS Release 14.2R3.   |
| Description              | <p>Configure a port group alias for satellite policies in a Junos Fusion.</p> <p>A port group alias is used to define the candidate uplink ports on satellite devices that use the satellite policy.</p> <div style="border: 1px solid #ccc; padding: 10px; margin: 10px 0;">  <p><b>CAUTION:</b> The physically connected uplink ports on a satellite device must be defined as candidate uplink ports in the Junos Fusion configuration. If the uplink ports on a satellite device are not configured as candidate uplink ports, uplink failure detection cannot be enabled on the device, and a system log message is generated.</p> </div> <p>A port group alias is associated with a satellite policy using the <b>set uplink-port-group uplink-port-group-name</b> statement in the [edit policy-options satellite-policies candidate-uplink-policy <i>policy-name</i>] hierarchy.</p> |
| Default                  | Each satellite device model has a set of default uplink ports (see <a href="#">“Overview of Uplink Failure Detection on a Junos Fusion” on page 631</a> ). You only need to assign an uplink port group to a satellite device if you do not want to use the default uplink ports.  |
| Options                  | <p><b>port-group-alias-name</b>—The user-defined name of the port group alias.</p> <p>The remaining statements are explained separately.</p>   |
| Required Privilege Level | <p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>   |
| Related Documentation    | <ul style="list-style-type: none"> <li><a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li> <li><a href="#">Configuring or Expanding a Junos Fusion Enterprise</a></li> </ul>  |

## product-model (Junos Fusion)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>product-model <i>model-name</i>;</code>  |
| <b>Hierarchy Level</b>          | <p>[edit policy-options satellite-policies candidate-uplink-port-policy <i>policy-name</i> <b>term</b> <i>term-name</i> from]</p> <p>[edit policy-options satellite-policies candidate-uplink-port-policy <i>policy-name</i> <b>term</b> <i>term-name</i> from]</p> <p>[edit policy-options satellite-policies forwarding-policy <i>policy-name</i> <b>term</b> <i>term-name</i> from]</p>   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 14.2R3.   |
| <b>Description</b>              | <p>Define the satellite device product models that will use the candidate uplink port policy defined in the <b>from</b> statement.</p> <p>The other statements in the same <b>from</b> statement are applied to satellite devices that match the <b>product-model</b> <i>model-name</i> definition. Those configuration statements are not applied to satellite devices that do not match the definition.</p>  |
| <b>Options</b>                  | <p><b>model-name</b>—Defines the satellite device product models that will use the candidate uplink port policy. It can be a complete device model name, to match that device model exactly. You can also use the wildcard character (*) in the match term to match zero or more of any character.</p> <p>Some examples of using the wildcard character in the match term:</p> <ul style="list-style-type: none"> <li>To apply the satellite policy to all EX4300 switches in the satellite device role, enter <b>EX4300*</b> as the <i>model-name</i>.</li> <li>To apply the satellite policy to all QFX5100 switches in the satellite device role, enter <b>QFX5100*</b> as the <i>model-name</i>.</li> <li>To apply the satellite policy to QFX5100 switches with model names that start with QFX5100-96, enter <b>QFX5100-96*</b> as the <i>model-name</i>.</li> </ul> |
| <b>Required Privilege Level</b> | <p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li> <li><a href="#">Configuring or Expanding a Junos Fusion Enterprise</a></li> </ul>  |

## satellite-policies

```
Syntax satellite-policies {
  <candidate-uplink-port-profile policy-name> {
    <holddown holddown-time>;
    <minimum-links number-of-links>;
    <uplink-port-group uplink-port-group-name>;
    term term-name {
      from {
        product-model model-name;
        <holddown holddown-time>;
        <minimum-links number-of-links>;
        <uplink-port-group uplink-port-group-name>;
      }
    }
  }
  environment-monitoring-policy policy-name {
    <alarm <linkdown>
    term term-name {
      from {
        product-model model-name;
      }
    }
  }
  forwarding-policy {
    policy-name {
      port-group-extended name;
      filter filter-name;
      mirror-egress port-group-mirror port-group-mirror;
      mirror-ingress port-group-mirror port-group-mirror;
      port-group-uplink port-group-uplink-name
        holddowntime;
      minimum-links number;
      term term-name {
        from {
          port-group-extended name;
          filter filter-name;
          mirror-egress port-group-mirror port-group-mirror;
          mirror-ingress port-group-mirror port-group-mirror;
          port-group-uplink port-group-uplink-name
            holddowntime;
          minimum-links number;
          product-model model-name;
          port-group-extended port-group-alias-name {
            port-group-uplink port-group-alias-name;
          }
        }
      }
    }
  }
  port-group-alias port-group-alias-name {
    pic pic-number {
      port [port-number | port-number-range | all];
    }
  }
}
```

```
}  
}
```

**Hierarchy Level** [edit policy-options]

**Release Information** Statement introduced in Junos OS Release 14.2R3 for Junos Fusion.

**Description** Configure satellite policies for a Junos Fusion.

**Options** The remaining statements are explained separately.

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

**Related Documentation**

- [Configuring Junos Fusion Provider Edge on page 41](#)
- *Configuring or Expanding a Junos Fusion Enterprise*


## term (candidate-uplink-policy)

|                          |   |
|--------------------------|---|
| Syntax                   | <pre> term <i>term-name</i>{   from {     <b>product-model</b> <i>model-name</i>;     &lt;<b>holddown</b> <i>holddown-time</i>&gt;;     &lt;<b>minimum-links</b> <i>number-of-links</i>&gt;;     &lt;<b>uplink-port-group</b> <i>uplink-port-group-name</i>&gt;;   } } </pre>   |
| Hierarchy Level          | [edit policy-options satellite-policies <b>candidate-uplink-port-profile</b> <i>policy-name</i> ]   |
| Release Information      | Statement introduced in Junos OS Release 14.2R3.  |
| Description              | <p>Create and configure a term in a candidate uplink satellite policy within a Junos Fusion.</p> <p>A term in a candidate uplink port policy in a Junos Fusion is used to apply an uplink failure detection configuration to certain satellite devices, based on their product model only. The more complex options that are available for other policies in Junos OS—such as the terms available for routing policies—are not available for candidate uplink port policies.</p>  |
| Options                  | <p><b>term-name</b>—The user-defined name of the term.</p> <p>A <i>term</i> is a named structure in which match conditions and configuration statements are defined. A candidate uplink policy can contain multiple terms. The terms are evaluated in the order they appear in the configuration. The first term that matches a satellite device is applied to that satellite device.</p> <p><b>from</b>—The statements under the <b>from</b> statement define the satellite device model match criteria and uplink failure detection configuration for the term. Each term can contain only one <b>from</b> statement.</p> <p>The remaining statements are explained separately.</p> |
| Required Privilege Level | <p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>  |
| Related Documentation    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li> <li>• <a href="#">Configuring or Expanding a Junos Fusion Enterprise</a></li> </ul>   |

## uplink-failure-detection (Junos Fusion)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>uplink-failure-detection {   &lt;candidate-uplink-policy <i>policy-name</i>&gt;; }</pre>  |
| <b>Hierarchy Level</b>          | <pre>[edit chassis <b>satellite-management</b>] [edit chassis <b>satellite-management fpc slot-id</b>]</pre>   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 14.2R3.   |
| <b>Description</b>              | <p>Enables uplink failure detection in a Junos Fusion.</p> <p>The uplink failure detection feature on a Junos Fusion enables satellite devices to detect link failures on the uplink interfaces used to connect to aggregation devices. When uplink failure detection detects uplink failure on a satellite device, all of the device's extended ports (which connect to host devices) are shut down. Shutting down the extended ports allows downstream host devices to more quickly identify and adapt to the outage. For example, when a host device is connected to two satellite devices, and uplink failure detection shuts down the extended ports on one satellite device, the host device can more quickly recognize the uplink failure and redirect traffic through the other, active satellite device.</p> <p>You can configure uplink failure detection in a Junos Fusion for a single satellite device using the <b>fpc slot-id</b> option. If uplink failure detection is enabled without specifying the <b>fpc slot-id</b> option, uplink failure detection is enabled for all cascade ports on the aggregation device.</p> <p>If you enable uplink failure detection without the <b>candidate-uplink-policy</b> substatement, the default uplink failure detection settings are applied. To configure non-default uplink failure detection settings, include the <b>candidate-uplink-policy</b> substatement. Candidate uplink policies are configured under <b>[edit policy-options satellite-policies candidate-uplink-port-policy]</b>.</p> |
| <b>Default</b>                  | Uplink failure detection is disabled.  |
| <b>Options</b>                  | The remaining statements are explained separately.   |
| <b>Required Privilege Level</b> | admin—To view this statement in the configuration.<br>admin-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li> <li>• <a href="#">Configuring or Expanding a Junos Fusion Enterprise</a></li> </ul>  |

## uplink-port-group (Junos Fusion)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>uplink-port-group <i>group-name</i>;</code>  |
| <b>Hierarchy Level</b>          | <code>[edit policy-options satellite-policies <a href="#">candidate-uplink-port-profile</a> <i>profile-name</i>]</code><br><code>[edit policy-options satellite-policies candidate-uplink-port-profile <i>profile-name</i> <a href="#">term</a> <i>term-name</i> from]</code>  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 14.2R3.   |
| <b>Description</b>              | <p>In Junos Fusion configuration, assign an uplink port group to a candidate uplink port policy.</p> <p>An uplink port group defines a set of candidate uplink ports that are assigned to satellite devices to which the candidate uplink port group is assigned.</p> <div style="border: 1px solid #ccc; padding: 10px; margin: 10px 0;">  <p><b>CAUTION:</b> The physically connected uplink ports on a satellite device must be defined as candidate uplink ports in the Junos Fusion configuration. If the uplink ports on a satellite device are not configured as candidate uplink ports, uplink failure detection cannot be enabled on the device, and a system log message is generated.</p> </div> <p>Uplink port groups are defined under <code>[edit policy-options satellite-policies port-group-alias]</code>.</p> |
| <b>Default</b>                  | Each satellite device model has a set of default uplink ports (see <a href="#">“Overview of Uplink Failure Detection on a Junos Fusion” on page 631</a> ). You only need to assign an uplink port group to a satellite device if you do not want to use the default uplink ports.  |
| <b>Options</b>                  | <b><i>group-name</i></b> —The name of the port group to assign.  |
| <b>Required Privilege Level</b> | <b>admin</b> —To view this statement in the configuration.<br><b>admin-control</b> —To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li> <li><a href="#">Configuring or Expanding a Junos Fusion Enterprise</a></li> </ul>  |





## CHAPTER 14

# Operational Commands for Uplink Failure Detection on Junos Fusion Provider Edge

- `show chassis satellite`

## show chassis satellite

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>show chassis satellite [device-alias <i>device-alias</i>   fpc-slot <i>fpc-slot</i>   cluster <i>cluster-name</i>] [brief   detail   extensive   terse] &lt;since <i>time</i>&gt;</pre>   |
| <b>Release Information</b>      | <p>Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.</p> <p>Command introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.</p> <p>Command introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.</p>  |
| <b>Description</b>              | Display the status of the satellite device connections in a Junos Fusion.  |
| <b>Options</b>                  | <p><b>none</b>—(Same as <b>brief</b>) Display satellite device connection information</p> <p><b>device-alias <i>device-alias</i></b>—(Optional) Display satellite device connection information for the satellite device using the specified device alias only.</p> <p><b>fpc-slot <i>fpc-slot</i></b>—(Optional) Display satellite device connection information for the satellite device using the specified FPC slot number only.</p> <p><b>cluster <i>cluster-name</i></b>—(Optional) Display satellite device connection information for the satellite devices in the specified satellite device cluster only.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>since <i>time</i></b>—(Optional) Display the satellite devices that have been added to the Junos Fusion on or after a certain date or time, in YYYY-MM-DD.HH:MM:SS format.</p> <p>To display all satellite devices added since a specified date, enter the specific date. For instance, to display all satellite devices added on or after December 22nd, 2015, enter <b>2015-12-22</b> as the <i>time</i>.</p> <p>To display all satellite devices added since a specified time, enter the specific date and time. For instance, to display all satellite devices added on or after 11:01AM on December 22nd, 2015, enter <b>2015-12-22.11:01:00</b> as the <i>time</i>.</p> |
| <b>Required Privilege Level</b> | view   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring or Expanding a Junos Fusion Enterprise</a></li> <li>• <a href="#">Configuring Junos Fusion Provider Edge on page 41</a></li> </ul>  |
| <b>List of Sample Output</b>    | <p><a href="#">show chassis satellite on page 660</a></p> <p><a href="#">show chassis satellite device-alias on page 661</a></p> <p><a href="#">show chassis satellite fpc-slot 130 on page 661</a></p> <p><a href="#">show chassis satellite terse on page 661</a></p>  |

[show chassis satellite detail on page 662](#)

**Output Fields** [Table 19 on page 436](#) lists the output fields for the **show chassis satellite** command. Output fields are listed in the approximate order in which they appear.

*Table 41: show chassis satellite Output Fields*

| Field Name                  | Field Description   | Level of Output            |
|-----------------------------|---|----------------------------|
| <b>Fields for Interface</b> |   |                            |
| <b>Alias</b>                | The satellite device's alias.   | brief                      |
|                             | The satellite device's alias is configured using the <b>set chassis satellite-management fpc slot-id alias alias</b> statement. | extensive<br>none          |
| <b>Slot</b>                 | The slot number of the satellite device.  | brief                      |
|                             | The slot number can be configured using the <b>set chassis satellite-management fpc slot-id</b> statement..                     | terse<br>extensive<br>none |

Table 41: show chassis satellite Output Fields (continued)

| Field Name           | Field Description   | Level of Output                               |
|----------------------|---|---|
| <b>Device State</b>  | <p>The state of the satellite device within the Junos Fusion.</p> <p>The most common device states:</p> <ul style="list-style-type: none"> <li>• <b>Online</b>—the satellite device is online and active. This is the satellite device state during normal operating procedure.</li> <li>• <b>Offline</b>—the satellite device is offline and not detected. This state is typically seen when the satellite device has been disconnected from the aggregation device, or when all cascade or uplink ports connecting the satellite device to the aggregation device are down.</li> <li>• <b>Present</b>—the satellite device is recognized by the aggregation device, but is not online. This state is typically seen before a satellite device goes online, or while satellite device configuration is in progress or finalizing.</li> <li>• <b>Rebooting</b>—the satellite device is rebooting.</li> <li>• <b>Disable</b>—the satellite device has been disabled.</li> <li>• <b>Misconfig</b>—the satellite device is not properly configured. This state is typically seen when the system ID, cascade port, or FPC slot ID defined for the satellite device has a misconfiguration.</li> <li>• <b>Miswire</b>—the satellite device is miswired. This state is typically seen when a satellite device is wired to two aggregation devices but is not configured for multihoming. Use <b>show chassis satellite detail</b> to gather more information on the issue when the device state is <b>Miswire</b>.</li> </ul> <p>Other less common device states include:</p> <ul style="list-style-type: none"> <li>• <b>ModeChanging</b>—the device is converting from a standalone device to a satellite device, or from a satellite device to a standalone device.</li> <li>• <b>ModeChangeFail</b>—the mode change operation failed.</li> <li>• <b>MinorUpgradeOn</b>—A minor satellite software upgrade is in progress.</li> <li>• <b>MajorUpgradeOn</b>—A major satellite software upgrade is in progress.</li> <li>• <b>Upgrade-pending</b>—the satellite device is waiting for a satellite software upgrade.</li> <li>• <b>ProvSessionDn</b>—the provisioning session is down.</li> <li>• <b>ReconcileState</b>—the satellite provisioning daemon has restarted and is reconciling the satellite device state.</li> </ul> | <p>brief<br/>terse<br/>extensive<br/>none</p> |
| <b>Cascade Ports</b> | <p>The cascade port or ports.</p> <p>A cascade port is a port on the aggregation device that connects to a satellite device in a Junos Fusion.</p>  | <p>brief<br/>extensive<br/>none</p>           |

Table 41: *show chassis satellite Output Fields (continued)*

| Field Name                  | Field Description   | Level of Output                           |
|-----------------------------|---|---|
| <b>Port State</b>           | <p>The state of the cascade port on the aggregation device.</p> <p>Port states include:</p> <ul style="list-style-type: none"> <li>• <b>online</b>—the cascade port is online and active. This is the port state during normal operating procedure.</li> <li>• <b>txUpRxDn</b>—Tx or Rx forwarding is disabled on the cascade port. This state is often seen when a second aggregation device is added to a Junos Fusion topology, and the devices in the Junos Fusion are synchronizing to the new topology.</li> <li>• <b>miswire</b>—the cascade port is miswired. This state is typically seen when a satellite device is interconnected to two aggregation devices but multihoming is not configured. Use <b>show chassis satellite detail</b> to gather more information on the issue when the device state is <b>Miswire</b>.</li> <li>• <b>present</b>—The cascade port recognized the satellite device and is up.</li> <li>• <b>misconfig</b>—the cascade port is assigned, but this interface is not working correctly due to a misconfiguration.</li> <li>• <b>down</b>—the cascade port is down.</li> <li>• <b>offline</b>—the satellite device was previously recognized from this interface, but is no longer present.</li> <li>• <b>absent</b>—the cascade port is configured but no satellite device is detected on the interface.</li> </ul> | <p>brief</p> <p>extensive</p> <p>none</p> |
| <b>Extended Ports Total</b> | <p>The total number of extended ports on the satellite device.</p> <p>An extended port is a network-facing port on the satellite device that sends and receives network traffic for the Junos Fusion.</p>   | <p>brief</p> <p>none</p> <p>terse</p>     |
| <b>Extended Ports Up</b>    | The number of active extended ports.  | <p>brief</p> <p>none</p> <p>terse</p>     |
| <b>Model</b>                | The hardware model of the satellite device.   | terse                                     |
| <b>Version</b>              | The version of satellite device software running on the satellite device.   | terse                                     |
| <b>Satellite Alias</b>      | <p>The satellite device's alias.</p> <p>The satellite device's alias is configured using the <b>set chassis satellite-management fpc slot-id alias alias</b> statement.</p>   | detail                                    |
| <b>FPC slot</b>             | <p>The FPC slot number of the satellite device.</p> <p>The slot number can be configured using the <b>set chassis satellite-management fpc slot-id</b> statement.</p>   | detail                                    |

Table 41: show chassis satellite Output Fields (continued)

| Field Name                       | Field Description  | Level of Output |
|----------------------------------|--|-----------------|
| <b>Operational State</b>         | <p>The operational state of the satellite device.</p> <p>The state UFDDown indicates that uplink failure detection disabled the satellite device's extended ports due to an uplink port failure.</p>   | detail          |
| <b>Product Model</b>             | The hardware model of the satellite device.  | detail          |
| <b>Product Family</b>            | The product family of the satellite device.  | detail          |
| <b>Serial number</b>             | The serial number of the satellite device.   | detail          |
| <b>System ID</b>                 | The system ID of the satellite device. The system ID is also the satellite device's MAC address.   | detail          |
| <b>Software package version</b>  | The satellite software version running on the satellite device.  | detail          |
| <b>Host software version</b>     | The host operating system software version running on the satellite device.  | detail          |
| <b>Management Address</b>        | <p>The management IP address of the satellite device.</p> <p>This management IP address belongs to an internal routing instance. This management address is assigned by the control plane internally based on FPC slot ID and is used for the control plane traffic between the aggregation device and satellite device.</p> <p>All management in a Junos Fusion should be done through the aggregation device. The management IP address of the satellite device is useful for debugging purposes by expert users only.</p> | detail          |
| <b>UFD config state</b>          | Uplink failure detection configuration state.  | detail          |
| <b>Minimum link</b>              | Uplink failure detection minimum active uplink port setting.   | detail          |
| <b>Holdddown timer (seconds)</b> | Uplink failure detection holdddown timer setting, in seconds.  | detail          |
| <b>UFD operational state</b>     | Uplink failure detection operational state.  | detail          |

Table 41: show chassis satellite Output Fields (continued)

| Field Name   | Field Description   | Level of Output |
|--|---|-----------------|
| <b>Candidate uplink interfaces (pic/port)</b>            | Uplink failure detection candidate uplink interfaces.   | detail          |
| <b>Extended Ports</b>                                    | The number of extended ports for the satellite device. The number on the left is the total number of extended ports, and the number on the right is the total number of extended ports currently in the up state. | extensive       |
| <b>When</b>  | The date and time of the event.   | extensive       |
| <b>Event</b>   | The event.  | extensive       |
| <b>Action</b>  | The actions that resulted from the event.   | extensive       |
| <b>Fields for Cascade interfaces</b>                     |   |                 |
| <b>Interface Name</b>                                    | The name of the cascade interface on the aggregation device.  | detail          |
| <b>State</b>   | The state of the cascade interface.   | detail          |
| <b>Uplink Interface</b>                                  | The name of the uplink interface on the satellite device.   | detail          |
| <b>Adjacency state</b>                                   | The adjacency state of the cascade to uplink interface link.  | detail          |
| <b>Last transition</b>                                   | The amount of time that has passed since the last transition of the cascade to uplink interface link.   | detail          |
| <b>Adjacency down count (Interface Name)</b>             | The number of times the cascade to uplink interface link has gone into the down state.  | detail          |
| <b>RX Packet</b>   | The number of packets received on the cascade interface.  | detail          |
| <b>Last received packet</b>                              | The amount of time that has passed since the last packet was received on the cascade interface.   | detail          |
| <b>Peer adjacency information</b>                        | The amount of time that has passed since the last peer adjacency transition.  | detail          |
| <b>Adjacency down count (Peer adjacency information)</b> | The number of times the cascade to uplink interface link has gone into the down state.  | detail          |

Table 41: show chassis satellite Output Fields (continued)

| Field Name                            | Field Description   | Level of Output |
|---------------------------------------|---|-----------------|
| <b>Last down cause</b>                | The cause of the last adjacency failure.                                      | detail          |
| <b>SDPD restart detected</b>          | The number of times that the satellite device protocol process has restarted. | detail          |
| <b>Fields for Process information</b> |   |                 |
| <b>Process Name</b>                   | The name of the process.  | detail          |
| <b>PID</b>                            | The process identification number of the process.                             | detail          |
| <b>State</b>                          | The current state of the process.   | detail          |
| <b>Number of restart detected</b>     | The number of times the process has restarted.                                | detail          |
| <b>Uptime</b>                         | The amount of time that the process has been running.                         | detail          |

## Sample Output

### show chassis satellite

```
user@aggregation-device> show chassis satellite
```

| Alias          | Slot | Device State | Cascade Ports        | Port State       | Extended Ports Total/Up |
|----------------|------|--------------|----------------------|------------------|-------------------------|
| qfx5100-24q-01 | 100  | Online       | xe-0/0/1<br>xe-0/3/0 | online<br>online | 9/2                     |
| qfx5100-24q-02 | 101  | Online       | xe-0/0/2<br>xe-0/3/1 | online<br>online | 20/12                   |
| qfx5100-24q-03 | 102  | Online       | xe-0/0/3<br>xe-0/3/2 | online<br>online | 16/6                    |
| qfx5100-24q-04 | 103  | Online       | xe-0/0/4<br>xe-0/3/3 | online<br>online | 16/4                    |
| qfx5100-24q-05 | 104  | Online       | xe-0/0/5<br>xe-0/3/4 | online<br>online | 13/3                    |
| qfx5100-24q-06 | 105  | Online       | xe-0/0/6<br>xe-0/3/5 | online<br>online | 24/15                   |
| qfx5100-24q-07 | 106  | Online       | xe-0/0/7<br>xe-0/3/6 | online<br>online | 24/15                   |
| qfx5100-24q-08 | 107  | Online       | xe-0/0/8<br>xe-0/3/7 | online<br>online | 21/12                   |
| ex4300-01      | 109  | Online       | xe-1/0/1             | online           | 49/2                    |
| ex4300-02      | 110  | Online       | xe-1/0/2             | online           | 49/2                    |
| ex4300-03      | 111  | Online       | xe-1/0/3             | online           | 49/2                    |
| ex4300-04      | 112  | Online       | xe-1/0/4             | online           | 49/11                   |
| ex4300-05      | 113  | Online       | xe-1/0/5             | online           | 49/11                   |
| ex4300-06      | 114  | Online       | xe-1/0/6             | online           | 49/11                   |
| ex4300-07      | 115  | Online       | xe-1/0/7             | online           | 49/11                   |
| ex4300-08      | 116  | Online       | xe-1/1/0             | online           | 49/11                   |
| ex4300-09      | 117  | Online       | xe-1/1/1             | online           | 49/11                   |



|           |     |        |          |        |       |
|-----------|-----|--------|----------|--------|-------|
| ex4300-10 | 118 | Online | xe-1/1/2 | online | 49/11 |
| ex4300-11 | 119 | Online | xe-1/1/3 | online | 49/11 |
| ex4300-12 | 120 | Online | xe-1/1/4 | online | 49/11 |
| ex4300-13 | 121 | Online | xe-1/1/5 | online | 49/11 |
| ex4300-14 | 122 | Online | xe-1/1/6 | online | 49/11 |
| ex4300-15 | 123 | Online | xe-1/1/7 | online | 49/11 |
| ex4300-16 | 124 | Online | xe-1/2/1 | online | 49/11 |
| ex4300-17 | 125 | Online | xe-1/2/2 | online | 49/11 |
| ex4300-18 | 126 | Online | xe-1/2/3 | online | 49/2  |
| ex4300-19 | 127 | Online | xe-1/2/4 | online | 49/1  |
| ex4300-20 | 128 | Online | xe-1/2/5 | online | 49/1  |
| ex4300-21 | 129 | Online | xe-1/2/6 | online | 49/1  |
| ex4300-22 | 130 | Online | xe-1/2/7 | online | 49/1  |

## Sample Output

show chassis satellite device-alias

```
user@aggregation-device> show chassis satellite device-alias ex4300-22
```

| Alias     | Slot | Device State | Cascade Ports | Port State | Extended Ports Total/Up |
|-----------|------|--------------|---------------|------------|-------------------------|
| ex4300-22 | 130  | Online       | xe-0/2/7      | online     | 49/1                    |

## Sample Output

show chassis satellite fpc-slot 130

```
user@aggregation-device> show chassis satellite fpc-slot 130
```

| Alias     | Slot | Device State | Cascade Ports        | Port State       | Extended Ports Total/Up |
|-----------|------|--------------|----------------------|------------------|-------------------------|
| ex4300-22 | 101  | Online       | xe-0/0/2<br>xe-0/3/1 | online<br>online | 20/12                   |

## Sample Output

show chassis satellite terse

```
user@aggregation-device> show chassis satellite terse
```

| Slot | Device State | Model          | Extended Ports Total/Up | Version |
|------|--------------|----------------|-------------------------|---------|
| 101  | Online       | QFX5100-48S-6Q | 7/7                     | 3.0R1.1 |
| 102  | Online       | QFX5100-48S-6Q | 7/7                     | 3.0R1.1 |
| 103  | Online       | QFX5100-48S-6Q | 6/5                     | 3.0R1.1 |
| 104  | Online       | QFX5100-48S-6Q | 14/14                   | 3.0R1.1 |
| 105  | Online       | QFX5100-48S-6Q | 18/18                   | 3.0R1.1 |
| 106  | Online       | QFX5100-48S-6Q | 17/16                   | 3.0R1.1 |
| 107  | Online       | EX4300-48T     | 52/6                    | 3.0R1.1 |
| 108  | Online       | EX4300-48T     | 52/15                   | 3.0R1.1 |
| 109  | Online       | EX4300-48T     | 51/14                   | 3.0R1.1 |
| 110  | Online       | EX4300-48T     | 51/14                   | 3.0R1.1 |
| 111  | Online       | EX4300-48T     | 51/13                   | 3.0R1.1 |
| 112  | Online       | EX4300-48T     | 51/12                   | 3.0R1.1 |
| 113  | Online       | EX4300-48T     | 51/13                   | 3.0R1.1 |
| 114  | Online       | QFX5100-24Q-2P | 17/13                   | 3.0R1.1 |

**show chassis satellite detail**

```
user@aggregation-device> show chassis satellite detail

Satellite Alias: qfx5100-48s-02
FPC Slot: 101
Operational State: Online
Product Model: QFX5100-48S-6Q
Product Family: i386
Serial number: ABC123DEF456
System id: 00:11:22:aa:bb:cc
Software package version: 3.0R1.1
Host software version: 1.0.0
Management Address: 172.16.0.101/32
Cascade interfaces:
  Interface Name: xe-0/0/2 State: online
    Uplink Interface: xe-001/0/48:0
    Adjacency state: Two-Way
    Last transition: 00:10:22
    Adjacency down count: 0
    Rx Packet: 65 Last received packet: 00:00:02
    Peer adjacency information: 00:10:22
      Adjacency down count: 3
      Last down cause: Interface Down
      SDPD restart detected: 3
  Interface Name: xe-0/2/1 State: online
    Uplink Interface: xe-001/0/48:1
    Adjacency state: Two-Way
    Last transition: 00:10:22
    Adjacency down count: 0
    Rx Packet: 64 Last received packet: 00:00:02
    Peer adjacency information: 00:10:22
      Adjacency down count: 3
      Last down cause: Interface Down
      SDPD restart detected: 3
  Interface Name: xe-2/0/0 State: online
    Uplink Interface: xe-001/0/48:2
    Adjacency state: Two-Way
    Last transition: 00:10:22
    Adjacency down count: 0
    Rx Packet: 65 Last received packet: 00:00:02
    Peer adjacency information: 00:10:22
      Adjacency down count: 3
      Last down cause: Interface Down
      SDPD restart detected: 3
  Interface Name: xe-2/1/6 State: online
    Uplink Interface: xe-001/0/48:3
    Adjacency state: Two-Way
    Last transition: 00:10:22
    Adjacency down count: 0
    Rx Packet: 65 Last received packet: 00:00:02
    Peer adjacency information: 00:10:22
      Adjacency down count: 3
      Last down cause: Hold timer expire
      SDPD restart detected: 3
Process information:
  Process Name: Provisioning PID: 6716 State: Running
    Number of restart detected: 0
    Uptime: 00:10:22
  Process Name: PFE PID: 3194 State: Running
```

```

        Number of restart detected: 0
        Uptime: 00:10:22
    UFD config state: Enable (persist), Minimum link: 1,
    Holdddown timer (seconds): 6
    UFD operational state: Enable
    Candidate uplink interfaces (pic/port):
        1/0
        1/1
        1/2
        1/3
        2/0
        2/1
        2/2
        2/3

    Satellite Alias: qfx5100-48s-03
    FPC Slot: 102
    Operational State: Online
    Product Model: QFX5100-48S-6Q
    Product Family: i386
    Serial number: ABCDEFG12345
    System id: 00:11:22:aa:ba:cc
    Software package version: 3.0R1.1
    Host software version: 1.0.0
    Management Address: 172.16.0.102/32
    Cascade interfaces:
        Interface Name: xe-0/0/3 State: online
        Uplink Interface: xe-002/0/48:0
        Adjacency state: Two-Way
        Last transition: 00:10:22
        Adjacency down count: 0
        Rx Packet: 65 Last received packet: 00:00:02
        Peer adjacency information: 00:10:22
            Adjacency down count: 3
            Last down cause: Interface Down
            SDPD restart detected: 3
        Interface Name: xe-0/2/2 State: online
        Uplink Interface: xe-002/0/48:1
        Adjacency state: Two-Way
        Last transition: 00:10:22
        Adjacency down count: 0
        Rx Packet: 65 Last received packet: 00:00:02
        Peer adjacency information: 00:10:22
            Adjacency down count: 3
            Last down cause: Interface Down
            SDPD restart detected: 3
        Interface Name: xe-2/0/1 State: online
        Uplink Interface: xe-002/0/48:2
        Adjacency state: Two-Way
        Last transition: 00:10:22
        Adjacency down count: 0
        Rx Packet: 65 Last received packet: 00:00:02
        Peer adjacency information: 00:10:22
            Adjacency down count: 3
            Last down cause: Interface Down
            SDPD restart detected: 3
        Interface Name: xe-2/1/7 State: online
        Uplink Interface: xe-002/0/48:3
        Adjacency state: Two-Way
        Last transition: 00:10:22

```

```
Adjacency down count: 0
Rx Packet: 65 Last received packet: 00:00:02
Peer adjacency information: 00:10:22
  Adjacency down count: 3
  Last down cause: Interface Down
  SDPD restart detected: 3
Process information:
  Process Name: Provisioning PID: 6667 State: Running
  Number of restart detected: 0
  Uptime: 00:10:22
  Process Name: PFE PID: 3155 State: Running
  Number of restart detected: 0
  Uptime: 00:10:22
<additional output removed for brevity>
```

# Multicast Replication on Junos Fusion Provider Edge

- [Understanding Multicast Replication in a Junos Fusion on page 665](#)
- [Ingress Replication at the Aggregation Device to Satellite Devices on page 671](#)
- [Egress \(Local\) Replication on the Satellite Devices on page 674](#)
- [Configuring Egress \(Local\) Replication on a Junos Fusion on page 680](#)

## Understanding Multicast Replication in a Junos Fusion

This topic introduces how multicast packets are replicated in a Junos Fusion and forwarded to multicast subscribers on satellite device extended ports.

- [Junos Fusion Multicast Replication Overview on page 665](#)
- [ECIDs for Multicast Traffic on page 669](#)
- [Multicast Replication Limitations in a Junos Fusion on page 670](#)

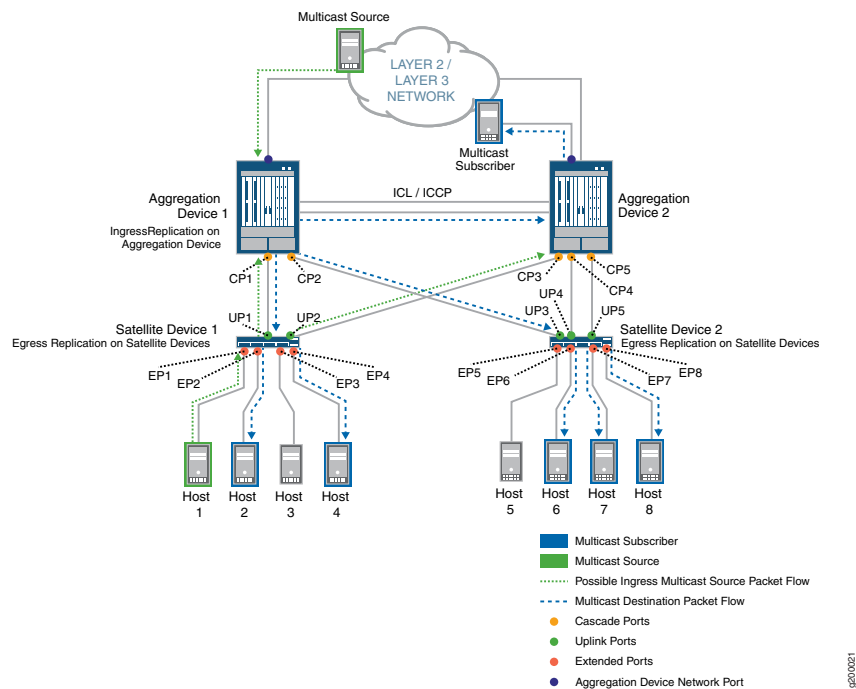
### Junos Fusion Multicast Replication Overview

Aggregation devices and satellite devices work together to manage the traffic flow from multicast sources to multicast destination ports in a Junos Fusion, resolving a source packet forwarding path to multiple destination ports.

Multicast source packets might be received through a network port on the aggregation device or an extended port on a satellite device. When a multicast source packet ingresses at a satellite device, the satellite device sends the source packet on an uplink port to the aggregation device in one of the following ways:

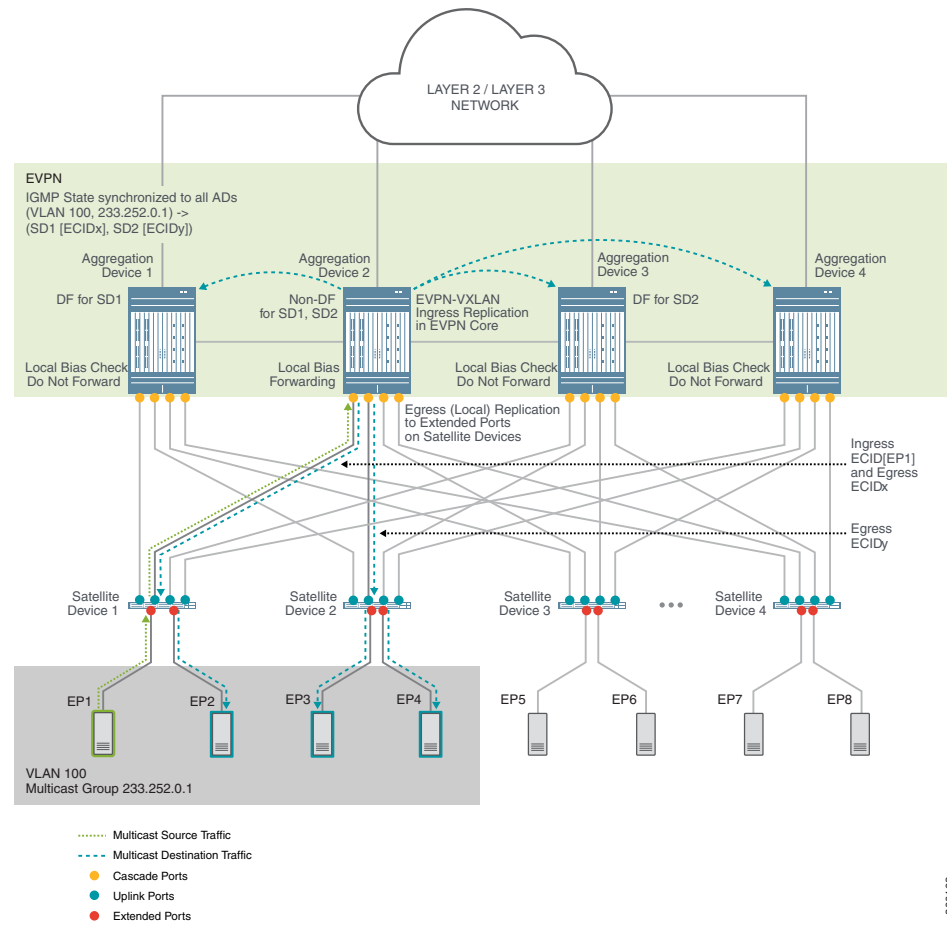
- In a Junos Fusion Provider Edge architecture, the satellite device load-balances forwarded source traffic over the available uplink ports to the aggregation device.
- In a Junos Fusion Data Center with MC-LAG, the satellite device load-balances source traffic over the available uplink ports to either of the two available aggregation devices. For example, see [Figure 10 on page 666](#), where the source traffic from Host 1 on Satellite Device 1 is load-balanced between Aggregation Device 1 and Aggregation Device 2.

Figure 10: Multicast Replication in a Junos Fusion Data Center with MC-LAG



- In a Junos Fusion Data Center with EVPN, extended ports on the satellite devices are multihomed to all aggregation devices, and each is modeled as an EVPN Ethernet Segment (ES). One aggregation device is elected as the designated forwarder (DF) for each ES. A satellite device receiving multicast source traffic hashes among the uplink ports and forwards the traffic to one of its available aggregation devices. For example, see [Figure 11 on page 667](#), where Satellite Device 1 is multihomed to four aggregation devices, and the source traffic from Host 1 on Satellite Device 1 is hashed to Aggregation Device 2.

Figure 11: Multicast Replication in a Junos Fusion Data Center with EVPN



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The aggregation device that initially receives the source traffic to be forwarded is referred to as the *ingress aggregation device*. All multicast destination resolution is done on the aggregation devices. In Junos Fusion architectures with multiple aggregation devices, the ingress aggregation device also forwards the multicast traffic to the other aggregation device or devices to reach multicast subscribers that are only accessible through those other devices, or to support the forwarding behavior of a particular Junos Fusion architecture.

- For Junos Fusion Data Center with MC-LAG, traffic is forwarded between aggregation devices using the inter-chassis link (ICL).
- For Junos Fusion Data Center with EVPN, the traffic is flooded in the EVPN core to the other aggregation devices to reach destinations that might only be available through those devices.



**NOTE:** For more efficient forwarding, as shown in [Figure 11 on page 667](#), an aggregation device in a Junos Fusion Data Center with EVPN employs local bias behavior and forwards the traffic to locally-reachable destination ESs even if it is not the EVPN multihoming DF for that ES. To avoid duplicate packet flows, the other aggregation devices that might be DFs for a destination ES check to see if the ES is currently reachable by the ingress aggregation device (called a *local bias check*), and do not forward the traffic in that case. See *Multicast Forwarding at Layer 2 in a Junos Fusion Data Center with EVPN* for details.

To forward multicast traffic to destinations on satellite device extended ports, the aggregation device uses E-channel Identifier (ECID) mappings to determine the forwarding paths to the destination extended ports, including which cascade ports link to the corresponding satellite devices. (See [“ECIDs for Multicast Traffic” on page 669](#).) Multicast traffic flowing from the aggregation device to destination satellite devices is load-balanced over the available cascade ports to each destination satellite device. Satellite devices use the ECID in the multicast packets from the aggregation device to determine which local port or ports should receive the multicast traffic.



**NOTE:** This behavior applies similarly to flooding unknown unicast traffic within a VLAN in a Junos Fusion.

By default, the ingress aggregation device replicates multicast and broadcast packets to forward to each destination extended port. This behavior is referred to as *ingress multicast replication*. The aggregation device sends multiple copies of the packet to each satellite device, one copy for each destination extended port on that satellite device, identified by the extended port's unicast ECID. See [“Ingress Replication at the Aggregation Device to Satellite Devices” on page 671](#) for more information.

Starting in Junos OS Release 16.1, Junos Fusion supports enabling *egress multicast replication*, also referred to as *local replication*, where satellite devices replicate the multicast and broadcast packets destined for their local ports. Starting in Junos OS Release 17.2R1, local replication is supported in Junos Fusion Data Center with MC-LAG architectures. In Junos OS Release 18.1R2-S2, local replication is supported in Junos Fusion Data Center with EVPN architectures. Egress or local replication uses special multicast ECIDs corresponding to one or more extended ports to which a satellite device should forward the traffic. (See [“ECIDs for Multicast Traffic” on page 669](#).) Local replication helps to distribute most of the replication load from aggregation devices to the satellite devices where the traffic egresses, and reduces traffic on cascade ports. When enabled, local replication applies to all satellite devices in the Junos Fusion; you cannot enable it only for individual satellite devices.

Local replication behavior differs slightly for different types of multicast and broadcast traffic, and for different Junos Fusion architectures. See [“Egress \(Local\) Replication on the Satellite Devices” on page 674](#) for details.



To avoid creating loops and broadcast storms, for both ingress and egress multicast replication, both the aggregation devices and satellite devices maintain split-horizon next-hop information to prevent resending multicast or broadcast packets back out of the ingress port.

## ECIDs for Multicast Traffic

Traffic sent between aggregation devices and satellite devices is sent over a logical path, called an *e-channel*. The packets sent between the aggregation device and satellite device include the IEEE 802.1BR E-channel tag (ETAG) header with an E-channel identifier (ECID). The ECID identifies the path that will be used in forwarding traffic packets. Each extended port is identified by a unique ECID value. Junos Fusion reserves ECID values 1 through 4095 for unicast data packets. ECID values from 4096 through 16382, also called *multicast ECIDs*, are reserved for multicast, VLAN flooding, and broadcast data packets. Multicast ECIDs correspond to one or more destination extended ports on a satellite device.

The aggregation device automatically creates virtual interfaces named **sd-fpc-id/0/0** (where *fpc-id* is the satellite device ID) to represent satellite devices, and uses these virtual interfaces as the next-hop interface when forwarding traffic to a satellite device.

When local replication is disabled, similar to unicast packet flow (see [“Understanding the Flow of Data Packets in a Junos Fusion Topology” on page 26](#)), the aggregation device assigns a unicast ECID value for each destination extended port on a satellite device for both unicast traffic and multicast traffic. The aggregation device replicates multicast packets, tags them with the assigned ECID for the destination, and sends a copy to each destination extended port by way of the corresponding satellite device interface.

When local replication is enabled, Junos Fusion uses ECID values greater than 4095 to identify multicast traffic and associate one or more extended ports on a satellite device as the multicast destination. Junos Fusion dynamically assigns multicast ECID values. When the aggregation device requires a new multicast ECID value for a group of ports or if it needs to add a port to an existing ECID, the process is as follows:

1. The aggregation device sends a request to the satellite device to assign an ECID value (or update an existing ECID mapping when multicast group or VLAN membership changes).
2. The satellite device assigns an ECID value and adds an entry to its ECID table to map the ECID value to the corresponding extended ports.
3. The satellite device sends a message back to the aggregation device with the ECID value that satisfies the request for the corresponding extended ports.
4. The aggregation device adds this information to its ECID table. It uses the **sd** virtual interface as the next-hop interface to send multicast traffic for those extended ports on the satellite device.

When the satellite device receives a data packet from the aggregation device with a multicast ECID value, the satellite device begins to replicate and forward packets to the extended ports associated with that ECID. Satellite devices do not do multicast lookups; they only maintain ECID tables to determine the port or ports corresponding to an ECID

in a packet received from the aggregation device. The aggregation devices perform all multicast route maintenance and forwarding path resolution.



**NOTE:** In Junos Fusion Data Center with EVPN, if multicast source traffic ingresses on a link aggregation group (LAG) of extended ports that spans satellite devices, the 802.1BR header carries the source (ingress) extended port LAG ECID. The ingress aggregation device includes this header when forwarding the traffic to other aggregation devices in the EVPN core. The ingress aggregation device and any other DF aggregation devices that must forward traffic to destination ESs include the source extended port LAG ECID when sending the traffic to the satellite devices, so the satellite devices with extended ports in the LAG can make spit-horizon decisions.

An ECID value is only unique locally on the satellite device. Another satellite device can use the same ECID value for its own extended ports. The aggregation device maintains a composite mapping of ECID values to the different satellite devices and the corresponding extended ports on those satellite devices.

## Multicast Replication Limitations in a Junos Fusion

Junos Fusion strives to optimize data replication on satellite devices when local replication is enabled. However, for the following features, although local replication might be enabled, Junos Fusion does not trigger egress replication optimization, and instead defaults to using ingress replication:

- Multicast traffic on pure Layer 3 extended ports
- Multicast Listener Discovery (MLD) snooping on an IPv6 network

You might choose not to enable local replication because egress multicast replication is incompatible with some Junos OS protocol and traffic management features programmed on individual extended ports. The following features do not work when egress multicast replication is enabled; if you want to use these features, you cannot take advantage of egress replication optimizations:

- VLAN tag manipulations, such as VLAN tag translations, VLAN tag stacking, and VLAN per-port policies. Using egress multicast replication with this feature can cause dropped packets due to unexpected VLAN tags.
- Multicast support for the extended ports on the edge side of Pseudowire connection in a VPLS network.
- Multicast support for the extended ports on the edge side of EVPNs.
- Multicast VPN deployments.
- Features that perform egress actions on individual extended ports, such as egress local-port mirroring (port mirroring on endpoints connected to satellite device extended ports).

Release History Table

| Release   | Description  |
|-----------|--|
| 18.1R2-S2 | In Junos OS Release 18.1R2-S2, local replication is supported in Junos Fusion Data Center with EVPN architectures.   |
| 17.2R1    | Starting in Junos OS Release 17.2R1, local replication is supported in Junos Fusion Data Center with MC-LAG architectures.   |
| 16.1      | Starting in Junos OS Release 16.1, Junos Fusion supports enabling <i>egress multicast replication</i> , also referred to as <i>local replication</i> , where satellite devices replicate the multicast and broadcast packets destined for their local ports. |

#### Related Documentation

- [Ingress Replication at the Aggregation Device to Satellite Devices on page 671](#)
- [Egress \(Local\) Replication on the Satellite Devices on page 674](#)
- [Configuring Egress \(Local\) Replication on a Junos Fusion on page 680](#)
- [Understanding the Flow of Data Packets in a Junos Fusion Topology on page 26](#)
- [Multicast Forwarding at Layer 2 in a Junos Fusion Data Center with EVPN](#)

## Ingress Replication at the Aggregation Device to Satellite Devices

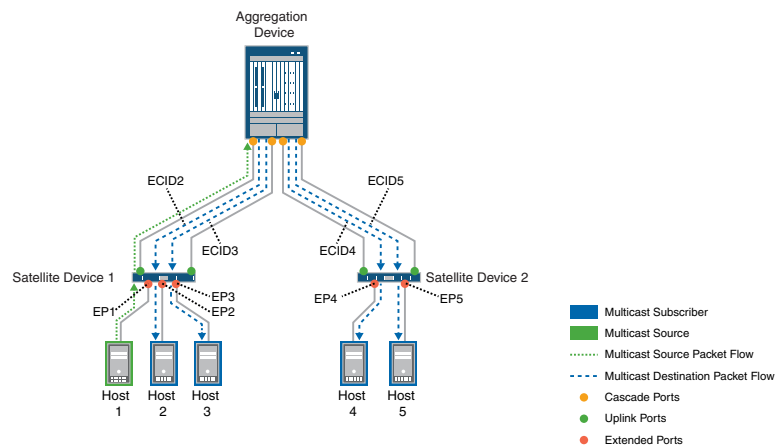
By default, Junos Fusion uses ingress replication on the aggregation devices to replicate and forward copies of packets to multicast destinations.

In ingress replication mode, the ingress aggregation device replicates the multicast packets and forwards them to every destination extended port. The data packet flow is similar to unicast data packet flow from the multicast source to each destination.

[Figure 12 on page 672](#) shows multicast source data packets received from a multicast source on an extended port, EP1, with traffic destined for endpoints connected to extended ports EP2 through EP5. Each extended port has an associated E-channel Identifier (ECID) value that the aggregation device uses to forward the data packet to each destination extended port. The aggregation device replicates the data packets for all multicast destination extended ports on all attached satellite devices, as follows:

- Two copies for satellite device 1 (for EP2 and EP3)
- Two copies for satellite device 2 (for EP4 and EP5)

Figure 12: Ingress Replication at the Aggregation Device



The aggregation device sends each packet on the respective cascade ports to the satellite devices with destination extended ports. Multicast traffic destined for EP2 is tagged with ECID2, traffic destined for EP3 is tagged with ECID3, and so on for all the destination extended ports on both satellite devices. The satellite devices receive and forward the packets to their respective extended ports.

The aggregation device maintains multicast routing information and next-hop tables, including ECID label mappings to satellite devices and the corresponding extended ports. For a multicast destination on a satellite device, the aggregation device resolves the next-hop path through a corresponding cascade port that reaches the satellite device. When there are multiple cascade port links to a satellite device, the aggregation device load-balances the traffic to choose which cascade port to use.

Each receiving satellite device maintains tables that map the assigned ECIDs to the corresponding extended ports, and simply forwards outgoing multicast packets to the destination extended ports. The satellite devices do not maintain multicast routing information.

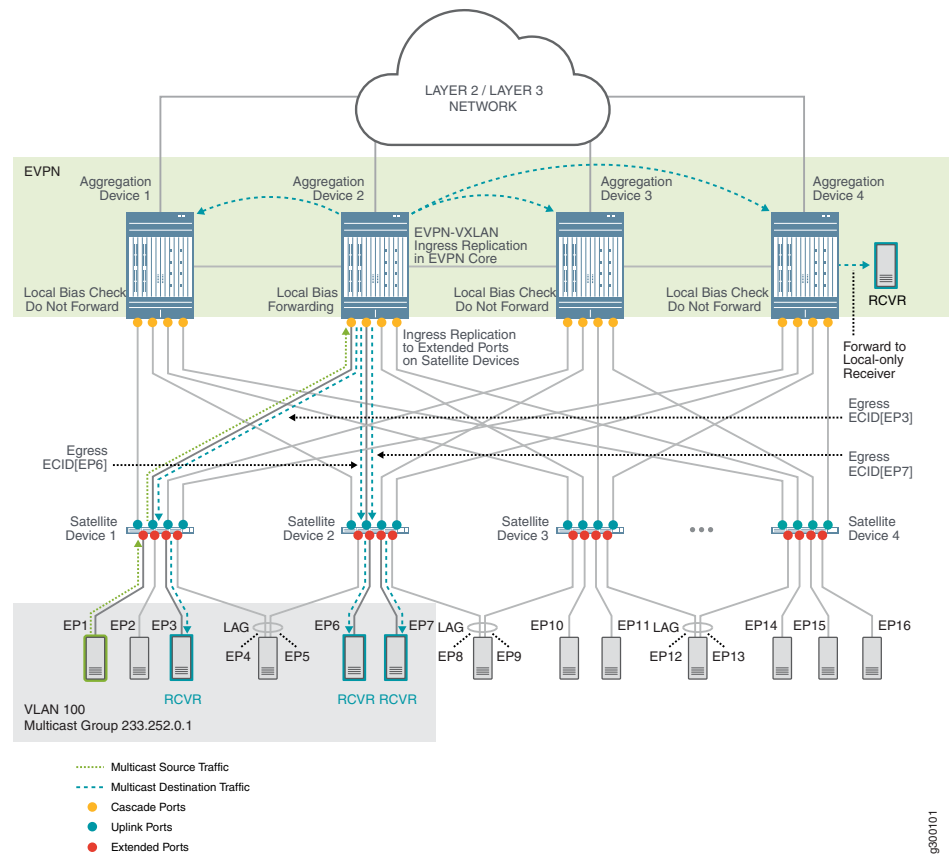
Other multicast destinations might be reached through local ports on the aggregation device, rather than through extended ports. For these destinations, the aggregation device creates and sends copies to those local ports directly.

In Junos Fusion Data Center with MC-LAG topologies, which have dual aggregation devices, for multicast subscribers on ports on the other aggregation device, the ingress aggregation device creates copies for those ports, and sends them over the ICL link to the other aggregation device to forward to its local destination ports.

In a Junos Fusion Data Center with EVPN, the ingress aggregation device floods the traffic in the EVPN core to all other aggregation devices, and uses local bias forwarding whenever possible to send a copy of the multicast stream to all locally-reachable destination extended port Ethernet Segments (ESs). See [Figure 13 on page 673](#). Other aggregation devices that are designated forwarders (DFs) for multihomed destination ESs perform a local bias check, and only forward traffic to their designated ESs that the ingress

aggregation device could not reach. In either the local bias or DF forwarding case with ingress replication, the forwarding aggregation device sends one copy of the multicast stream to every destination ES using the extended port ECID, similar to [Figure 12 on page 672](#).

**Figure 13: Ingress Replication to the Satellite Devices in a Junos Fusion with EVPN**



Multicast support using ingress replication does not scale well for a large number of multicast destinations or higher bandwidth multicast traffic. Ingress replication increases aggregation device Packet Forwarding Engine processing load and consumes bandwidth on the links between cascade ports and uplink ports, potentially resulting in link oversubscription and latency among multicast recipients.

You can alternatively enable *egress multicast replication*, also referred to as *local replication*. Local replication optimizes multicast replication by distributing the replication load between the aggregation devices and the satellite devices that have multicast destination ports. However, local replication requires more control plane processing than ingress replication, which results in a slight increase in multicast group join and leave latency. See [“Egress \(Local\) Replication on the Satellite Devices” on page 674](#) for more information on how local replication works for different types of multicast or broadcast traffic.

- Related Documentation**
- [Understanding Multicast Replication in a Junos Fusion on page 665](#)
  - [Egress \(Local\) Replication on the Satellite Devices on page 674](#)
  - [Understanding the Flow of Data Packets in a Junos Fusion Topology on page 26](#)
  - [Multicast Forwarding at Layer 2 in a Junos Fusion Data Center with EVPN](#)

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## Egress (Local) Replication on the Satellite Devices

Egress multicast replication in a Junos Fusion is referred to as *local replication*. In egress or local replication mode, the aggregation device optimizes replication by off-loading replication whenever possible to satellite devices that have destination extended ports. From the point of view of the aggregation device, replication is supported at an egress port, and from the point of view of the satellite device, replication is managed locally. Local replication alleviates some of the problems associated with ingress replication, reducing the potential for bandwidth oversubscription and replication latency when there are a large number of receivers.

Local replication is performed at Layer 2. Each receiving satellite device maintains tables that map the assigned ECIDs to corresponding destination extended ports, and simply forward outgoing multicast or broadcast packets to local extended ports. For Layer 3 multicast traffic, such as when forwarding packets between VLANs, the aggregation device performs replication to resolve Layer 3 information not maintained by satellite devices.

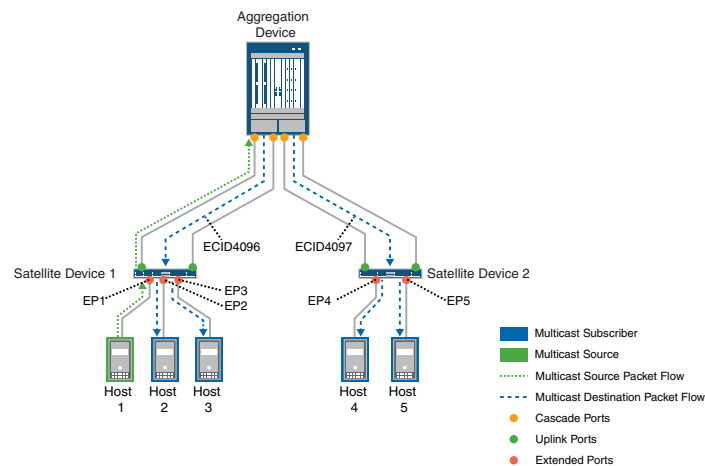
This topic describes local replication behavior for multicast traffic forwarded to the access side both within and across VLANs and when flooding traffic within a VLAN.

- [Local Replication for Layer 2 Multicast Traffic with IGMP Snooping on page 674](#)
- [Local Replication for VLAN Flooding on page 677](#)
- [Local Replication for Layer 3 Multicast Traffic Over IRB Interfaces on page 678](#)

### Local Replication for Layer 2 Multicast Traffic with IGMP Snooping

[Figure 14 on page 675](#) illustrates Layer 2 multicast traffic flow with IGMP snooping when local replication is enabled.

Figure 14: Local Replication with Layer 2 Multicast and IGMP Snooping in Junos Fusion



A data packet is received from a multicast source on an extended port, EP1, with traffic destined for endpoints connected to extended ports EP2 through EP5. The aggregation device acquires *multicast* ECIDs from the satellite devices, which represent a set of multicast destination extended ports on each satellite device. The diagram shows ECID value ECID4096 is assigned to the multicast subscribers behind extended ports EP2 and EP3 on satellite device 1, and ECID4097 is assigned to the multicast subscribers behind extended ports EP4 and EP5 on satellite device 2. The aggregation device creates only one copy of the source packet for each satellite device that has multicast destination extended ports, inserts the corresponding satellite device multicast ECID value in the IEEE 802.1BR ETAG header of each copy, and forwards the copies to those satellite devices.

In this case, the aggregation device creates two copies, forwards one with ECID4096 to satellite device 1, and forwards the other with ECID4097 to satellite device 2. Each satellite device receives its copy and uses the multicast ECID value to determine which of its extended ports should receive the multicast traffic. Satellite device 1 replicates the packet and forwards copies to EP2 and EP3; satellite device 2 replicates the packet and forwards copies to EP4 and EP5.

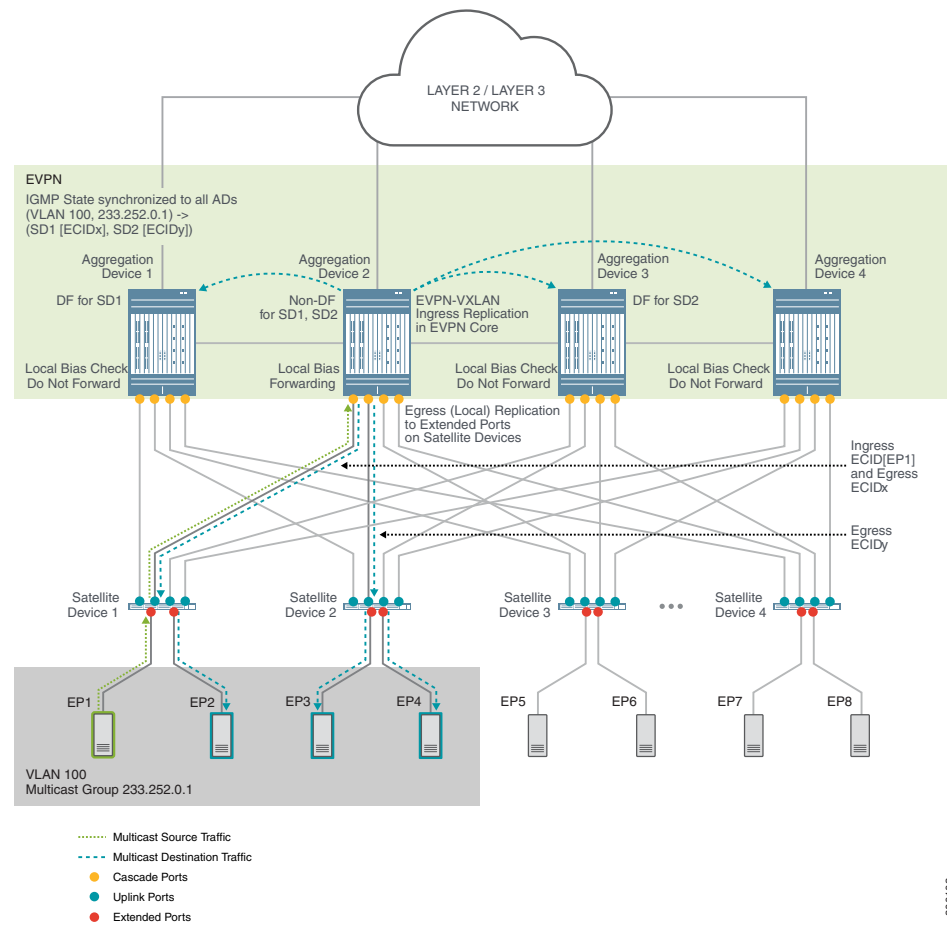
When forwarding replicated multicast packets to satellite devices, the aggregation device resolves the next-hop path through a corresponding cascade port that reaches the satellite device. When there are multiple cascade port links to a satellite device, the aggregation device load-balances the traffic when choosing which cascade port to use.

Other multicast destinations might be reached through ports on the aggregation devices, rather than through extended ports. For these destinations, the aggregation device creates and sends copies to those local ports directly.

In Junos Fusion Data Center with MC-LAG topologies, which have dual aggregation devices, for multicast subscribers behind ports on the other aggregation device, the ingress aggregation device creates copies for those ports, and sends them over the ICL link to the other aggregation device to forward to its local destination ports. This behavior is the same for ingress or egress multicast replication.

In a Junos Fusion Data Center with EVPN, when local replication is enabled, multicast traffic follows the same behavior shown in [Figure 14 on page 675](#) using multicast ECIDs between the forwarding aggregation device and the destination extended ports' satellite devices. See [Figure 15 on page 676](#).

**Figure 15: Local Replication with Layer 2 Multicast and IGMP Snooping in Junos Fusion Data Center with EVPN**



In a Junos Fusion Data Center with EVPN, the forwarding aggregation device might be the ingress aggregation device employing local bias forwarding to any reachable destination extended port Ethernet Segments (ESs), or the designated forwarder (DF) for a destination extended port ES that the ingress aggregation device could not reach. In either the local bias or DF forwarding case, with local replication enabled, the forwarding aggregation device sends only one copy of the multicast stream to each satellite device that has one or more multicast destination extended port ESs. The ingress aggregation device also floods the traffic toward the EVPN core so other aggregation devices can forward the traffic to ESs that the ingress aggregation device cannot reach using local bias forwarding. See *Multicast Forwarding at Layer 2 in a Junos Fusion Data Center with EVPN* for details.

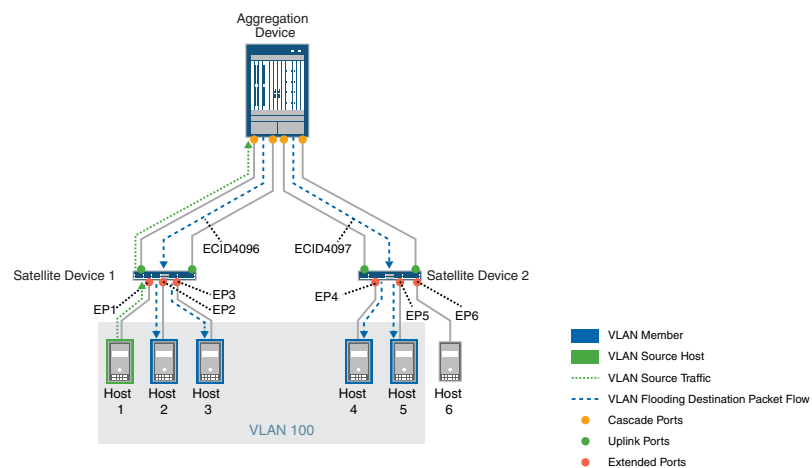


## Local Replication for VLAN Flooding

An aggregation device might initiate VLAN flooding (broadcasting or flooding the packet out to all interfaces in the VLAN) to learn the MAC address for a destination that is not already in its Ethernet switching tables. When local replication is not enabled, the aggregation device uses ingress replication, creating and sending copies to each destination extended port on each satellite device that has destination extended ports in the VLAN. With local replication enabled, the aggregation device requests multicast ECIDs to represent the extended ports in the VLAN on each satellite device. The aggregation device sends a copy of the source packet tagged with each ECID in the IEEE 802.1BR header to the corresponding satellite device. Each receiving satellite device does the replication locally for its extended ports in the VLAN.

Figure 16 on page 677 illustrates the packet flow for VLAN flooding when local replication is enabled.

Figure 16: Local Replication with VLAN Flooding



In this example, a multicast source packet for VLAN 100 ingresses on EP1, and satellite device 1 forwards the packet to the aggregation device. The aggregation device cannot resolve the destination MAC address, and decides to flood the packet to all extended port destinations in VLAN 100.



**NOTE:** When a source packet ingresses at a satellite device with uplink ports to dual aggregation devices, the satellite device load-balances forwarding the ingress traffic among the available uplink ports, so either aggregation device might receive the source packet and manage flooding the packet to destination VLAN members.

Multicast ECID4096 is allocated to represent extended ports on satellite device 1 that are members of VLAN 100—EP1, EP2 and EP3, and multicast ECID4097 represents extended ports on satellite device 2 that are also members of VLAN 100—EP4 and EP5. Host 6 behind extended port EP6 is not a member of VLAN 100 and is not a destination

for the flooded traffic. The aggregation device creates one copy of the packet tagged with ECID4096 and sends it to satellite device 1, and sends one copy tagged with ECID4097 to satellite device 2. Satellite device 1 replicates and forwards the packet for its own destination ports in VLAN 100, EP2 and EP3. (The ingress ECID split-horizon mechanism prevents forwarding traffic to the ingress port, EP1.) Satellite device 2 replicates and forwards the packet for EP4 and EP5, its local destination ports in VLAN 100. The extended port mapping for ECID4097 does not include EP6, so satellite device 2 does not forward the packet to that port.

When there are multiple cascade port links to a satellite device, the aggregation device load-balances the traffic when choosing which cascade port to use.

For destination VLAN members reachable through aggregation device ports (rather than extended ports), the aggregation device creates and sends copies to those local ports directly.

In Junos Fusion Data Center with MC-LAG topologies, which have dual aggregation devices, when there are VLAN members behind ports on the other aggregation device, the ingress aggregation device creates copies for those ports, and sends them over the ICL link to the other aggregation device to forward to its local destination ports. This behavior is the same for ingress or egress multicast replication.

In a Junos Fusion Data Center with EVPN, the aggregation devices handle VLAN flooding in the same way as multicast traffic forwarding. See [Figure 15 on page 676](#). The ingress aggregation device (Aggregation Device 2 in the figure) floods the traffic in the EVPN core to all other aggregation devices, and uses local bias forwarding whenever possible to send a copy of the multicast stream to all locally-reachable extended port Ethernet Segments (ESs) in the VLAN (EP2 on Satellite Device 1 and EP3 and EP4 on Satellite Device 2 in [Figure 15 on page 676](#)). The other aggregation devices that are designated forwarders (DFs) for multihomed ESs in the VLAN perform a local bias check, and only forward traffic to their designated ESs that the ingress aggregation device could not reach. In either the local bias or DF forwarding case with local replication enabled, the forwarding aggregation device sends only one copy of the traffic stream to each satellite device that has one or more extended port ESs in the VLAN. See *Multicast Forwarding at Layer 2 in a Junos Fusion Data Center with EVPN* for details.

## Local Replication for Layer 3 Multicast Traffic Over IRB Interfaces

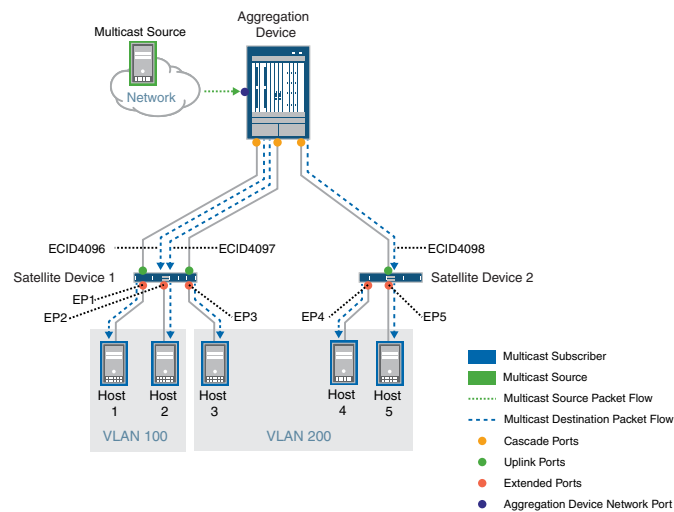
Integrated Routing and Bridging (IRB) provides support for Layer 2 bridging and Layer 3 routing on the same interface, and IRB interfaces are used to route traffic between VLANs. Because satellite devices do not maintain Layer 3 routing information, local replication on the satellite devices only occurs for Layer 2 traffic, and the aggregation device manages the replication of multicast destination packets at Layer 3.

In Junos Fusion Enterprise or Junos Fusion Provider Edge architectures, the aggregation device forwarding the traffic replicates the multicast source packet for each IRB interface in the Layer 3 replication list for a multicast group, and performs a VLAN tag rewrite for each corresponding VLAN. When there are extended ports in multiple VLANs on a satellite device that are receivers in the same multicast group, the aggregation device sends copies to each IRB with its corresponding VLAN ID to that satellite device. If an IRB interface (VLAN membership) spans multiple satellite devices, the aggregation device creates

and sends one copy to each satellite device that has multicast receivers that are members of that VLAN. Each satellite device then replicates and forwards copies of the received packet for its local multicast destination extended ports.

Figure 17 on page 679 shows an example of Layer 3 multicast replication for VLANs over IRB interfaces in a Junos Fusion. In this case, two VLANs with corresponding IRB interfaces are configured on the aggregation device. In this case, multicast source packets ingress on an aggregation device port, and multicast subscribers are connected to extended ports EP1 through EP5, where extended ports EP1 and EP2 are in VLAN 100 and EP3 through EP5 are in VLAN 200.

**Figure 17: Local Replication with Layer 3 Multicast**



When the aggregation device receives a packet from the multicast source, it manages the Layer 3 replication by acquiring multicast ECIDs representing the destination extended ports in each VLAN on each satellite device, and creating, tagging, and forwarding copies on each VLAN's IRB interface to the satellite devices that have destination extended ports. As the figure shows, the aggregation device creates 3 copies of the source packet, as follows:

- Multicast ECID4096 represents EP1 and EP2 in VLAN 100 on satellite device 1. The aggregation device forwards one copy tagged with ECID4096 to satellite device 1 for the VLAN 100 IRB interface.
- Multicast ECID4097 represents EP3 in VLAN 200 on satellite device 1. The aggregation device forwards a second copy tagged with ECID4097 to satellite device 1 for the VLAN 200 IRB interface.
- Multicast ECID4098 represents EP4 and EP5 in VLAN 200 on satellite device 2. The aggregation device forwards a third copy tagged with ECID4098 for the VLAN 200 IRB interface to satellite device 2.

Each satellite device manages the Layer 2 processing by replicating the packets received from the aggregation device for the multicast subscribers behind its extended ports in each VLAN, as follows:

- Satellite device 1 replicates and forwards packets tagged with ECID4096 to extended ports EP1 and EP2, and forwards packets tagged with ECID4097 to EP3.
- Satellite device 2 replicates and forwards the packets tagged with ECID4096 to extended ports EP4 and EP5.

When there are multiple cascade port links to a satellite device, the aggregation device load-balances the traffic when choosing which cascade port to use.

For multicast destination VLAN members reachable through aggregation device ports (rather than extended ports), the aggregation device creates and sends copies to those local ports using the corresponding IRB interfaces.

In a Junos Fusion Data Center with MC-LAG, which has dual aggregation devices, when there are multicast subscribers behind ports on the other aggregation device, the ingress aggregation device creates copies for those ports, and sends them over the ICL link to the other aggregation device to forward to its local destination ports. This behavior is the same for ingress or egress multicast replication.

For details on multicast traffic routing at Layer 3 in a Junos Fusion Data Center with EVPN, which uses an external gateway device to route traffic between VLANs, see *Multicast Forwarding at Layer 3 in a Junos Fusion Data Center with EVPN*.

#### Related Documentation

- [Understanding Multicast Replication in a Junos Fusion on page 665](#)
- [Ingress Replication at the Aggregation Device to Satellite Devices on page 671](#)
- [Configuring Egress \(Local\) Replication on a Junos Fusion on page 680](#)
- *Multicast Forwarding at Layer 3 in a Junos Fusion Data Center with EVPN*

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## Configuring Egress (Local) Replication on a Junos Fusion

---

By default, egress replication (also called *local replication*) for multi-destination traffic is disabled, and Junos Fusion uses ingress replication on the access side. When you enable local replication, the feature is activated for all satellite devices that are connected to the aggregation device. You cannot enable local replication for just a few selected satellite devices, specific bridge domains, or specific route prefixes.

To enable local replication on the satellite devices, configure the [local-replication](#) statement at the `[edit forwarding-options satellite]` hierarchy level.

```
[edit forwarding-options satellite]
user@router1# set local-replication
```

The `show multicast summary satellite` operational command displays **Egress replication: Enabled** when this feature is configured.

See “[Understanding Multicast Replication in a Junos Fusion](#)” on page 665 for an overview of Junos Fusion multicast replication and the limitations to enabling this feature. Some Junos OS protocol and traffic management features are not supported with egress

replication, and you should not plan to configure local replication if you want to use those features.

For full details on how multicast traffic is forwarded in a Junos Fusion Data Center with EVPN, which uses 802.1BR ECIDs in conjunction with multidestination traffic forwarding elements of EVPN networks, see *Multicast Forwarding at Layer 2 in a Junos Fusion Data Center with EVPN*.

**Related  
Documentation**

- [Ingress Replication at the Aggregation Device to Satellite Devices on page 671](#)
- [Egress \(Local\) Replication on the Satellite Devices on page 674](#)
- *Multicast Forwarding at Layer 2 in a Junos Fusion Data Center with EVPN*
- *Monitoring Layer 2 Multicast Forwarding in a Junos Fusion Data Center with EVPN*



## CHAPTER 16

# Configuration Statements and Operational Commands for Multicast Support

- [local-replication on page 684](#)
- [show bridge flood nexthops satellite](#)
- [show bridge flood satellite](#)
- [show bridge satellite device](#)
- [show multicast ecid-mapping satellite](#)
- [show multicast next-hops satellite](#)
- [show multicast snooping next-hops satellite](#)
- [show multicast snooping route satellite](#)
- [show multicast statistics satellite](#)
- [show multicast summary satellite](#)

## local-replication

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | local-replication   |
| <b>Hierarchy Level</b>          | [edit forwarding-options satellite]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 16.1.<br>Statement introduced in Junos OS Release 17.1R1 for Junos Fusion Data Center.   |
| <b>Description</b>              | Enables multicast replication on all the satellite devices that are connected to the aggregation device. You cannot selectively enable local replication for specific satellite devices, bridge domains, or route prefixes. |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Egress (Local) Replication on a Junos Fusion on page 680</a></li></ul>  |



## show bridge flood nexthops satellite

**Syntax** `show bridge flood nexthops satellite`  
`<brief | detail | extensive>`  
`<nexthop-id nexthop-id>`

**Release Information** Command introduced in Junos OS Release 16.1.

**Description** Display bridge domain flood next hop information for satellite device destinations.

You can use this command to:

- View the current list of all flood traffic composite next hops.
- See details about a specified composite next hop.
- Follow aggregation device composite next-hop processing as the aggregation device resolves and updates composite next-hop table entries for extended port destinations.

The aggregation device allocates ECID tags that represent multicast or broadcast destinations behind satellite device extended ports, associates them with the corresponding satellite device virtual interfaces (*sd-fpc-id/0/0*), and updates flood next-hop table entries accordingly. More detailed output from this command shows events that result in next-hop table updates.

**Options** **brief | detail | extensive**—(Optional) Display the specified level of output. The default output level is **brief**.

**nexthop-id *nexthop-id***—Display more detailed bridge flooding next hop information only for the specified next hop.

**Required Privilege Level** view

**Related Documentation**

- [Understanding Multicast Replication in a Junos Fusion on page 665](#)
- [Egress \(Local\) Replication on the Satellite Devices on page 674](#)

**List of Sample Output** [show bridge flood next hops on page 686](#)

**Output Fields** [Table 42 on page 685](#) lists the output fields for the **show bridge flood next-hops satellite** command. Output fields are listed in the approximate order in which they appear.

*Table 42: show bridge flood next-hops satellite Command Output Fields*

| Field Name  | Field Description                               | Level of Output |
|-------------|---|-----------------|
| Next-hop ID | Next-hop ID for each next- hop entry displayed. | All             |

Table 42: *show bridge flood next-hops satellite Command Output Fields (continued)*

| Field Name                    | Field Description   | Level of Output     |
|-------------------------------|---|---------------------|
| <b>Composite function</b>     | Purpose of a composite next-hop entry. Values include: <ul style="list-style-type: none"> <li>FLOOD_ALL—Flood next hop.</li> <li>FLOOD_ALL_SPLIT_HZ—Flood next hop including split-horizon information.</li> </ul>  | All                 |
| <b>Table</b>                  | Name of next-hop routing or forwarding table for the listed entry.  | All                 |
| <b>Flags</b>                  | Flags giving additional information about a next-hop entry. Values include: <ul style="list-style-type: none"> <li>SAT—The entry is a satellite destination composite next hop for an extended port destination that has been resolved and updated with the corresponding satellite device interface, <b>sd-fpc-id/0/0</b>, and the associated ECID shown in the <b>label</b> field.</li> <li>ST—The entry is stale and waiting to be refreshed.</li> <li>RU—The entry is stale, but is marked to be reused.</li> </ul> | All                 |
| <b>aggregation-device</b>     | Next-hop IDs and corresponding interfaces to reach local flood destination ports on the aggregation device.   | detail<br>extensive |
| <b>satellite-device-id id</b> | Satellite device ID with the next-hop IDs and interface names to reach extended ports that are flood destinations on the listed satellite device.<br><br>When an ECID has been assigned to destination extended ports on a satellite device, this field lists the satellite next-hop ID, the corresponding virtual satellite device interface ( <b>sd-fpc-id/0/0</b> ), and the allocated ECID ( <b>label</b> field).   | detail<br>extensive |
| <b>label</b>                  | ECID associated with a group of flood destination extended ports on the satellite device specified in the <b>satellite-device-id</b> field.   | detail<br>extensive |
| <b>When</b>                   | Elapsed time since an event related to a flood next-hop entry change.   | extensive           |
| <b>Event</b>                  | Brief description of the event related to a flood next-hop entry change.  | extensive           |
| <b>Action</b>                 | Brief description of actions that resulted from the event.  | extensive           |

## Sample Output

### show bridge flood next hops

```
user@host> > show bridge flood next-hops satellite nexthop-id 962 detail
```

| Next-hop<br>ID | Composite<br>function    | Table          | Flags |
|----------------|--------------------------|----------------|-------|
| 962            | FLOOD_ALL_SPLIT_HZ       | default-switch |       |
|                | satellite-device-id 100: |                |       |
|                | ->610 xe-100/0/6.0       |                |       |
|                | ->611 xe-100/0/7.0       |                |       |
|                | satellite-device-id 103: |                |       |
|                | ->682 xe-103/0/30.0      |                |       |
|                | ->683 xe-103/0/31.0      |                |       |
|                | ->684 xe-103/0/32.0      |                |       |
|                | ->685 xe-103/0/33.0      |                |       |
|                | ->686 xe-103/0/34.0      |                |       |
|                | ->687 xe-103/0/35.0      |                |       |

## show bridge flood satellite

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>show bridge flood satellite &lt;brief   detail   extensive&gt; &lt;bridge-domain-name <i>bridge-domain-name</i>&gt; &lt;vswitch-name <i>vswitch-name</i>&gt;</pre>  |
| <b>Release Information</b>      | Command introduced in Junos OS Release 16.1.   |
| <b>Description</b>              | <p>Display bridge flood routing information for the satellite devices in Junos Fusion Provider Edge.</p> <p>This command lists flood routes by route prefix for each bridge domain. Each flood route prefix entry lists the ingress replication next-hop ID (<b>NhIndex</b>). When egress (local) replication is enabled and the bridge domain has multiple destination extended ports on a satellite device, the aggregation device:</p> <ul style="list-style-type: none"> <li>Creates a satellite device next-hop chain to reach those destinations through their corresponding satellite devices.</li> <li>Updates the flood route entry with a satellite next-hop chain ID (<b>Satellite-Nh</b>).</li> </ul> <p>When a flood route does not have a satellite next-hop chain, the value <b>0</b> is displayed in the <b>Satellite-Nh</b> column. When the <b>Satellite-Nh</b> value is non-zero, the aggregation device uses the satellite next-hop chain instead of the original ingress replication next-hop (<b>NhIndex</b>). You can see satellite device flood next-hop chain details, including the ECIDs assigned to satellite device flood destination extended ports, using the <b>detail</b> option and the <b>bridge-domain-name</b> option for a specific bridge domain.</p> |
| <b>Options</b>                  | <p><b>brief   detail   extensive</b>—(Optional) Display the specified level of output.</p> <p><b>bridge-domain-name <i>bridge-domain-name</i></b>—Display bridge flooding information for the specified bridge domain.</p> <p><b>vswitch-name <i>vswitch-name</i></b>—Display bridge flood information for the specified virtual satellite device.</p>   |
| <b>Required Privilege Level</b> | view   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><a href="#">Understanding Multicast Replication in a Junos Fusion on page 665</a></li> <li><a href="#">Egress (Local) Replication on the Satellite Devices on page 674</a></li> </ul>   |
| <b>List of Sample Output</b>    | <a href="#">show bridge flood satellite on page 689</a>  |

**Output Fields** Table 43 on page 689 lists the output fields for the **show bridge flood satellite** command. Output fields are listed in the approximate order in which they appear, although the display order varies between the different levels of output.

*Table 43: show bridge flood satellite Command Output Fields*

| Field Name                    | Field Description   | Level of Output     |
|-------------------------------|---|---------------------|
| <b>Bridging domain</b>        | Bridge domain name.   | All                 |
| <b>Flood Routes</b>           | Flood route information listed by route prefix.   | All                 |
| <b>Prefix</b>                 | Flood route prefix.   | All                 |
| <b>Token</b>                  | Internal ID for flood route prefix.   | All                 |
| <b>NhIndex</b>                | The ingress replication next-hop for the flood route.   | All                 |
| <b>Satellite-Nh</b>           | Satellite device next-hop ID when local replication is enabled and there are multiple flood destination extended ports.   | All                 |
| <b>Next-hop information</b>   | Details for each next hop, listed by next-hop or satellite next-hop IID.  | detail<br>extensive |
| <b>aggregation-device</b>     | Next-hop interfaces for ports that are flood destinations on the aggregation device, listed by next-hop ID.               | detail<br>extensive |
| <b>satellite-device-id id</b> | Next-hop interfaces for extended ports that are flood destinations on satellite devices, listed by satellite next-hop ID. | detail<br>extensive |
| <b>label</b>                  | ECID assigned to a satellite device interface.  | detail<br>extensive |
| <b>When</b>                   | Elapsed time since an event related to a flood route entry change.  | extensive           |
| <b>Event</b>                  | Brief description of the event related to a flood route entry change.   | extensive           |
| <b>Action</b>                 | Brief description of actions that resulted from the event.  | extensive           |

## Sample Output

### show bridge flood satellite

```
user@host> show bridge flood satellite
```

Paste router command output hereVSwitch instance: default-switch

```

----- Bridging domain: bd100 -----
Flood Routes:
Prefix                Token          NhIndex      Satellite-Nh
00.02.00.01.60.03.e0/51 0x3001F        797          1186
00.02.ff.fe.60.00.20/51 0x30001        794          1183
----- Bridging domain: bd1000 -----
Flood Routes:
Prefix                Token          NhIndex      Satellite-Nh
00.03.00.01.60.04.00/51 0x30020        806          0
00.03.ff.fe.60.00.40/51 0x30002        803          0
----- Bridging domain: bd1500 -----
Flood Routes:
Prefix                Token          NhIndex      Satellite-Nh
00.08.00.01.60.04.a0/51 0x30025        851          1475
00.08.ff.fe.60.00.e0/51 0x30007        848          1472
----- Bridging domain: bd1600 -----
Flood Routes:
Prefix                Token          NhIndex      Satellite-Nh
00.09.00.01.60.04.c0/51 0x30026        860          1481
00.09.ff.fe.60.01.00/51 0x30008        857          1478
----- Bridging domain: bd1700 -----
Flood Routes:
Prefix                Token          NhIndex      Satellite-Nh
00.0a.00.01.60.04.e0/51 0x30027        869          1487
00.0a.ff.fe.60.01.20/51 0x30009        866          1484
----- Bridging domain: bd1800 -----
Flood Routes:
Prefix                Token          NhIndex      Satellite-Nh
00.0b.00.01.60.05.00/51 0x30028        878          1493
00.0b.ff.fe.60.01.40/51 0x3000A        875          1490
----- Bridging domain: bd1900 -----
Flood Routes:
Prefix                Token          NhIndex      Satellite-Nh
00.0c.00.01.60.05.20/51 0x30029        887          1499
00.0c.ff.fe.60.01.60/51 0x3000B        884          1496
----- Bridging domain: bd2000 -----
Flood Routes:
Prefix                Token          NhIndex      Satellite-Nh
00.0e.00.01.60.05.60/51 0x3002B        905          1511
00.0e.ff.fe.60.01.a0/51 0x3000D        902          1508

```

## show bridge satellite device

**Syntax** `show bridge satellite device`  
`<brief | detail>`  
`< device-id device-id>`

**Release Information** Command introduced in Junos OS Release 16.1.

**Description** Display status and control information for all satellite devices or a specified satellite device.

**Options** **brief | detail**—(Optional) Display the specified level of output. The default output level is **brief**.

**device-id device-id**—(Optional) Display information for the specified satellite device.

**Required Privilege Level** view

**Related Documentation**

- [Understanding Multicast Replication in a Junos Fusion on page 665](#)

**List of Sample Output** [show bridge satellite device on page 692](#)

**Output Fields** [Table 44 on page 691](#) lists the output fields for the **show bridge satellite device** command. Output fields are listed in the approximate order in which they appear, although the display order varies between the different levels of output.

*Table 44: show bridge satellite device Command Output Fields*

| Field Name                                  | Field Description   | Level of Output |
|---|---|-----------------|
| <b>Device ID</b>                            | Satellite device ID.  | All             |
| <b>Device (detail view)</b>                 |   |                 |
| <b>Interface Index</b>                      | Internal ID for the satellite device virtual interface.   | All             |
| <b>Device Interface Index (detail view)</b> |   |                 |
| <b>Interface Name</b>                       | Satellite device virtual interface name ( <b>sd-fpc-id/0/0</b> , where <b>fpc-id</b> is the satellite device ID). | All             |
| <b>Device Interface Name (detail view)</b>  |   |                 |

Table 44: show bridge satellite device Command Output Fields (continued)

| Field Name   | Field Description  | Level of Output |
|--|--|-----------------|
| <b>State</b><br><br><b>Device Interface State</b><br>(detail view)           | State of the satellite device virtual interface. If the interface is created and active, possible values include <b>Up</b> or <b>Down</b> .  | All             |
| <b>Connection State</b><br><br><b>Device connection Status</b> (detail view) | State of the satellite device interface connection to the aggregation device. The connection state is monitored using keep-alive messages between satellite and aggregation device control processes. Possible values include <b>Up</b> or <b>Down</b> . | All             |
| <b>Requests</b>  | Number of request messages sent to the listed satellite device aggregation device to allocate or update ECID mappings.   | All             |
| <b>Responses</b>   | Number of response messages returned from the listed satellite device to the aggregation device for granting ECID requests.  | All             |
| <b>Device connection uptime</b>  | Duration of the connection between the aggregation device and the specified satellite device.  | detail          |
| <b>Device heartbeat status</b>   | Status of keep-alive message exchange between satellite device and aggregation device control processes.   | detail          |
| <b>Echo packets sent</b>   | Number of keep-alive packets sent to the satellite device from the aggregation device.   | detail          |
| <b>Echo packets received</b>   | Number of keep-alive response packets sent to the aggregation device from the satellite device.  | detail          |
| <b>Multicast IPC stats</b>   | Number of inter-process control (IPC) messages sent from the aggregation device to the satellite device related to multicast functions on the satellite device. This value is displayed for active satellite device connections.                         | detail          |
| <b>Bridge IPC stats</b>  | Number of IPC messages sent from the aggregation device to the satellite device related to Layer 2 bridging functions on the satellite device. This value is displayed for active satellite device connections.  | detail          |

## Sample Output

### show bridge satellite device

```
user@host> show bridge satellite device
```



| Device ID | Interface index | Interface Name   | State | Connection |          |           |
|-----------|-----------------|------------------|-------|------------|----------|-----------|
|           |                 |                  |       | State      | Requests | Responses |
| 100       | 370             | sd-100/0/0.32770 | Up    | Up         | 5        | 5         |
| 101       | 342             | sd-101/0/0.32770 | Up    | Up         | 4        | 4         |
| 102       | 365             | sd-102/0/0.32770 | Up    | Up         | 3        | 3         |
| 105       | 364             | sd-105/0/0.32770 | Up    | Up         | 2        | 2         |

## show multicast ecid-mapping satellite

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>show multicast ecid-mapping satellite &lt;brief   detail   extensive&gt; &lt;device-id device-id&gt; &lt;ecid ecid&gt; &lt;reference-id reference-id&gt;</pre>   |
| <b>Release Information</b>      | <p>Command introduced in Junos OS Release 16.1.</p> <p>Command introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.</p>  |
| <b>Description</b>              | <p>Displays entries in the satellite multicast ECID mapping database.</p> <p>ECID database entries map a group of extended ports to an ECID value for the satellite devices in a Junos Fusion. Each entry also records the next hop to reach the corresponding destination extended ports.</p>  |
| <b>Options</b>                  | <p><b>brief   detail   extensive</b>—(Optional) Display the specified level of output.</p> <p><b>device-id device-ID</b>—Display information from the ECID database for a specified satellite device ID.</p> <p><b>ecid ecid</b>—Display information from the ECID database for a specified ECID.</p> <p><b>reference-id reference ID</b>—Display information from the ECID database for a specified internally-assigned reference ID related to the ECID request messages exchanged during ECID allocation (used for troubleshooting issues with ECID allocation).</p> |
| <b>Required Privilege Level</b> | view  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Understanding Multicast Replication in a Junos Fusion on page 665</a></li> <li>• <a href="#">Egress (Local) Replication on the Satellite Devices on page 674</a></li> </ul>  |
| <b>List of Sample Output</b>    | <p><a href="#">show multicast ecid-mapping satellite on page 695</a></p> <p><a href="#">show multicast ecid-mapping satellite (for specified satellite device-id and ECID) on page 696</a></p>  |
| <b>Output Fields</b>            | <p>Table 45 on page 694 lists the output fields for the <b>show multicast ecid-mapping satellite</b> command. Output fields are listed in the approximate order in which they appear.</p>   |

Table 45: show multicast ecid-mapping satellite Command Output Fields

| Field Name          | Field Description    | Level of Output |
|---------------------|----------------------|-----------------|
| Satellite Device ID | Satellite device ID. | All             |

Table 45: show multicast ecid-mapping satellite Command Output Fields (continued)

| Field Name          | Field Description  | Level of Output                                       |
|---------------------|--|---|
| <b>ECID</b>         | ECID assigned to a grouping of extended ports on the satellite device.<br><br>Satellite devices have multiple ECIDs assigned that represent different groups of extended ports.  | All   |
| <b>State</b>        | Status of requesting and allocating the ECID. Values include: <ul style="list-style-type: none"> <li>• Init—An ECID mapping entry for a group of ports has been created.</li> <li>• Request Scheduled—An ECID mapping entry has been queued for an ECID value request.</li> <li>• Request Sent—The ECID request has been sent to the corresponding satellite device.</li> <li>• Response Received—An ECID value has been received from the satellite device.</li> <li>• Sync—An ECID mapping with an ECID value is to be synchronized with a satellite device.</li> <li>• Ready—An ECID next hop has been created and is ready to be referenced for forwarding.</li> </ul> | All   |
| <b>Flags</b>        | Internal flag values for troubleshooting.  | All   |
| <b>nhid</b>         | Satellite device next-hop ID associated with the ECID.   | All   |
| <b>Reference ID</b> | Internal reference ID assigned to an ECID request message, used for troubleshooting ECID communication with satellite devices.   | All (with specified <b>device-id</b> or <b>ecid</b> ) |

## Sample Output

### show multicast ecid-mapping satellite

```
user@host> show multicast ecid-mapping satellite
```

| Satellite Device ID | ECID         | State             | Flags |
|---------------------|--------------|-------------------|-------|
| 100                 | 4129         | Ready [nhid=612]  | 0x0   |
|                     | xe-100/0/6.0 |                   |       |
|                     | xe-100/0/7.0 |                   |       |
| 100                 | 4097         | Ready [nhid=1061] | 0x0   |
|                     | xe-100/0/0.0 |                   |       |
|                     | xe-100/0/1.0 |                   |       |
| 100                 | 4122         | Ready [nhid=1190] | 0x0   |
|                     | xe-100/0/2.0 |                   |       |
|                     | xe-100/0/3.0 |                   |       |
|                     | xe-100/0/4.0 |                   |       |
|                     | xe-100/0/5.0 |                   |       |
| 103                 | 4103         | Ready [nhid=1062] | 0x0   |
|                     | xe-103/0/5.0 |                   |       |
|                     | xe-103/0/6.0 |                   |       |
| 103                 | 4104         | Ready [nhid=1068] | 0x0   |

```

xe-103/0/7.0
xe-103/0/8.0
103      4105      Ready [nhid=1069]      0x0
xe-103/0/10.0
xe-103/0/9.0
103      4106      Ready [nhid=1070]      0x0
xe-103/0/11.0
xe-103/0/12.0
103      4107      Ready [nhid=1071]      0x0
xe-103/0/13.0
xe-103/0/14.0
103      4109      Ready [nhid=1097]      0x0
xe-103/0/15.0
xe-103/0/16.0
103      4110      Ready [nhid=1074]      0x0
xe-103/0/17.0
xe-103/0/18.0
103      4111      Ready [nhid=1075]      0x0
xe-103/0/19.0
xe-103/0/20.0
103      4112      Ready [nhid=1076]      0x0
xe-103/0/21.0
xe-103/0/22.0

```

#### show multicast ecid-mapping satellite (for specified satellite device-id and ECID)

```
user@host> show multicast ecid-mapping satellite device-id 100 ecid 4101
```

| Satellite<br>Device ID | ECID | State             | Reference ID |
|------------------------|------|-------------------|--------------|
| 100                    | 4101 | Ready [nhid=1845] | 14           |

## show multicast next-hops satellite

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | show multicast next-hops satellite  |
| <b>Release Information</b>      | Command introduced in Junos OS Release 16.1.<br>Command introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.   |
| <b>Description</b>              | Display satellite multicast next-hop table information.<br><br>The output lists next-hops for all interfaces in the VPLS address family used in multicast replication.  |
| <b>Options</b>                  | <b>brief   detail</b> —(Optional) Output level is the same when either option or no option is specified.  |
| <b>Required Privilege Level</b> | view  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Understanding Multicast Replication in a Junos Fusion on page 665</a></li> <li>• <a href="#">show multicast snooping next-hops satellite on page 700</a></li> </ul>                                  |
| <b>List of Sample Output</b>    | <a href="#">show multicast next-hops satellite on page 698</a>  |
| <b>Output Fields</b>            | Table 46 on page 697 lists the output fields for the <b>show multicast next-hops satellite</b> command. Output fields are listed in the approximate order in which they appear, although the display order varies between the different levels of output. |

Table 46: show multicast next-hops satellite Command Output Fields

| Field Name             | Field Description   | Level of Output |
|------------------------|---|-----------------|
| <b>Next-hop ID</b>     | Next-hop ID in the database.  | All             |
| <b>Interface Index</b> | Internal ID for a satellite device virtual interface.   | All             |
| <b>Interface Name</b>  | Interface name for configured interfaces in the Junos Fusion.<br><br>A satellite device virtual interface named <b>sd-fpc-id/0/0</b> is used to send traffic to extended ports on satellite device <i>fpc-id</i> .  | All             |
| <b>Label</b>           | A multicast ECID assigned to the satellite device interface next hop. If no ECIDs are assigned for the interface, the value displayed in this field is 0.<br><br>Satellite device interfaces might have multiple ECIDs listed that represent different groups of multicast destination extended ports on that satellite device. | All             |

Table 46: show multicast next-hops satellite Command Output Fields (continued)

| Field Name   | Field Description  | Level of Output |
|--------------|--|-----------------|
| <b>Flags</b> | Flags giving additional information about a next-hop entry.<br>Values include: <ul style="list-style-type: none"> <li>SAT—The entry is a satellite composite next hop for extended port destinations that has been resolved and updated with the corresponding satellite device interface, <b>sd-fpc-id/0/0</b>, and the associated ECID shown in the <b>Label</b> field.</li> </ul> | All             |

## Sample Output

### show multicast next-hops satellite

```
user@host> show multicast next-hops satellite
```

| Next-hop ID | Interface index | Interface Name   | Label | Flags |
|-------------|-----------------|------------------|-------|-------|
| 186         | 1               | unknown          | 0     |       |
| 530         | 323             | unknown          | 0     |       |
| 574         | 331             | 1c-0/0/0.32769   | 0     |       |
| 578         | 335             | ge-0/0/4.32770   | 0     |       |
| 583         | 341             | ge-0/0/7.32770   | 0     |       |
| 584         | 343             | ge-0/0/8.32770   | 0     |       |
| 585         | 345             | ge-0/0/9.32770   | 0     |       |
| 586         | 337             | ge-0/0/5.32770   | 0     |       |
| 587         | 339             | ge-0/0/6.32770   | 0     |       |
| 610         | 347             | xe-100/0/6.0     | 0     |       |
| 611         | 349             | xe-100/0/7.0     | 0     |       |
| 612         | 348             | sd-100/0/0.32770 | 4129  | SAT   |
| 618         | 350             | xe-100/0/0.0     | 0     |       |
| 619         | 351             | xe-100/0/1.0     | 0     |       |
| 620         | 352             | xe-100/0/2.0     | 0     |       |
| 621         | 353             | xe-100/0/3.0     | 0     |       |
| 622         | 354             | xe-100/0/4.0     | 0     |       |
| ...         |                 |                  |       |       |
| 1061        | 348             | sd-100/0/0.32770 | 4097  | SAT   |
| 1062        | 346             | sd-103/0/0.32770 | 4103  | SAT   |
| 1068        | 346             | sd-103/0/0.32770 | 4104  | SAT   |
| 1069        | 346             | sd-103/0/0.32770 | 4105  | SAT   |
| 1070        | 346             | sd-103/0/0.32770 | 4106  | SAT   |
| 1071        | 346             | sd-103/0/0.32770 | 4107  | SAT   |
| 1074        | 346             | sd-103/0/0.32770 | 4110  | SAT   |
| 1075        | 346             | sd-103/0/0.32770 | 4111  | SAT   |
| 1076        | 346             | sd-103/0/0.32770 | 4112  | SAT   |
| 1077        | 346             | sd-103/0/0.32770 | 4113  | SAT   |
| 1078        | 346             | sd-103/0/0.32770 | 4114  | SAT   |
| 1079        | 346             | sd-103/0/0.32770 | 4115  | SAT   |
| 1080        | 346             | sd-103/0/0.32770 | 4116  | SAT   |
| 1081        | 346             | sd-103/0/0.32770 | 4117  | SAT   |
| 1082        | 346             | sd-103/0/0.32770 | 4118  | SAT   |
| 1085        | 346             | sd-103/0/0.32770 | 4121  | SAT   |
| 1097        | 346             | sd-103/0/0.32770 | 4109  | SAT   |
| 1189        | 346             | sd-103/0/0.32770 | 4120  | SAT   |
| 1190        | 348             | sd-100/0/0.32770 | 4122  | SAT   |

|      |     |            |   |
|------|-----|------------|---|
| 1363 | 433 | ge-0/0/1.0 | 0 |
| 1364 | 434 | ge-0/0/2.0 | 0 |

## show multicast snooping next-hops satellite

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>show multicast snooping next-hops satellite &lt;brief   detail   extensive&gt; &lt;nexthop-id <i>nexthop-id</i>&gt;</pre>  |
| <b>Release Information</b>      | <p>Command introduced in Junos OS Release 16.1.</p> <p>Command introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.</p>  |
| <b>Description</b>              | <p>Display detailed multicast next-hop information for satellite device destinations.</p> <p>You can use this command to:</p> <ul style="list-style-type: none"> <li>• View the current list of all multicast traffic next hops.</li> <li>• See details about a specified multicast next hop.</li> <li>• Follow aggregation device composite next-hop processing as the aggregation device resolves and updates multicast next-hop table entries for extended port destinations.</li> </ul> <p>The aggregation device allocates ECID tags that represent multicast or broadcast destinations behind satellite device extended ports, associates them with the corresponding satellite device virtual interfaces (<b><i>sd-fpc-id/0/0</i></b>), and updates multicast next-hop table entries accordingly. More detailed output from this command shows events that result in next-hop table updates.</p> |
| <b>Options</b>                  | <p><b>brief   detail   extensive</b>—(Optional) Display the specified level of output. The default output level is <b>brief</b>.</p> <p><b>nexthop-id <i>nexthop-id</i></b>—Display more detailed multicast satellite next-hop information only for the specified next-hop ID.</p>  |
| <b>Required Privilege Level</b> | view  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Understanding Multicast Replication in a Junos Fusion on page 665</a></li> <li>• <a href="#">Egress (Local) Replication on the Satellite Devices on page 674</a></li> <li>• <a href="#">show multicast snooping route satellite on page 705</a></li> <li>• <a href="#">Monitoring Layer 2 Multicast Forwarding in a Junos Fusion Data Center with EVPN</a></li> </ul>  |
| <b>List of Sample Output</b>    | <p><a href="#">show multicast snooping next-hops satellite on page 702</a></p> <p><a href="#">show multicast snooping next-hops satellite nexthop-id (detail view for a specified next-hop ID) on page 702</a></p> <p><a href="#">show multicast snooping next-hops satellite nexthop-id (detail view for a specified next-hop ID on Junos Fusion Data Center with EVPN-VXLAN) on page 703</a></p>  |



[show multicast snooping next-hops satellite nexthop-id](#) (extensive view for a specified next-hop ID) on page 703

**Output Fields** Table 47 on page 701 lists the output fields for the **show ethernet-switching flood next-hops satellite** command. Output fields are listed in the approximate order in which they appear.

Table 47: *show multicast snooping next-hops satellite Command Output Fields*

| Field Name                      | Field Description  | Level of Output     |
|---------------------------------|--|---------------------|
| <b>Next-hop ID</b>              | Multicast next-hop ID (original multicast next hop used with ingress multicast replication).   | All                 |
| <b>Forwarding Next-Hop Type</b> | Type of next-hop entry. Values include: <ul style="list-style-type: none"> <li>• COMPOSITE—Composite next hop.</li> </ul>  | All                 |
| <b>Table</b>                    | Name of routing or forwarding table for the listed entry.  | All                 |
| <b>Flags</b>                    | Flags giving additional information about a next-hop entry. Values include: <ul style="list-style-type: none"> <li>• SAT—The entry is a satellite destination composite next hop for an extended port destination that has been resolved and updated with the corresponding satellite device interface, <b>sd-fpc/0/0</b>, and the associated ECID shown in the <b>label</b> field.</li> <li>• ST—The entry is stale and waiting to be refreshed.</li> <li>• RU—The entry is stale, but is marked to be reused.</li> </ul> | All                 |
| <b>EVPN VXLAN Core</b>          | (Junos Fusion Data Center with EVPN-VXLAN) Ingress replication next-hop chain list for VXLAN remote VTEPs (RVTEPs)   | detail<br>extensive |
| <b>Mrouter</b>                  | Next-hop list for multicast routers connected to the bridge domain or VLAN.  | detail<br>extensive |
| <b>aggregation-device</b>       | Next-hop IDs and corresponding interfaces for the composite next hop to reach local multicast destination ports on the aggregation device.   | detail<br>extensive |
| <b>satellite-device-id id</b>   | Satellite device ID with the next-hop IDs and corresponding interface names for the composite next-hop chain to reach extended ports that are multicast destinations on that satellite device.<br><br>When an ECID has been assigned to destination extended ports on a satellite device, this field lists the satellite next-hop ID, the corresponding virtual satellite device interface ( <b>sd-fpc-id/0/0</b> ), and the allocated ECID ( <b>label</b> field).   | detail<br>extensive |
| <b>AE</b>                       | Link aggregation group interface next-hop IDs and interface names for multicast destination composite next hops.   | detail<br>extensive |

Table 47: show multicast snooping next-hops satellite Command Output Fields (continued)

| Field Name             | Field Description  | Level of Output     |
|------------------------|--|---------------------|
| <b>label</b>           | ECID associated with one or more multicast destination extended ports on the satellite device in the <b>satellite-device-id</b> field. | detail<br>extensive |
| <b>Linked Next-hop</b> | Multicast satellite next-hop ID (next hop used with egress multicast replication).   | detail<br>extensive |
| <b>When</b>            | Elapsed time since an event related to a multicast next-hop entry change.  | extensive           |
| <b>Event</b>           | Brief description of the event related to a multicast next-hop entry change.   | extensive           |
| <b>Action</b>          | Brief description of actions that resulted from the event.   | extensive           |

## Sample Output

### show multicast snooping next-hops satellite

```
user@host> show multicast snooping next-hops satellite
```

| Next-hop ID | Forwarding Next-Hop Type | Table  | Flags |
|-------------|--------------------------|--------|-------|
| 2097265     | COMPOSITE                | inet.0 |       |
| 2097267     | COMPOSITE                | inet.0 |       |
| 2097270     | COMPOSITE                | inet.0 |       |
| 2097271     | COMPOSITE                | inet.0 |       |
| 2094267     | COMPOSITE                | inet.0 | SAT   |

### show multicast snooping next-hops satellite nexthop-id (detail view for a specified next-hop ID)

```
user@host> show multicast snooping next-hops satellite nexthop-id 524296 detail
```

| Next-hop ID | Forwarding Next-Hop Type | Table  | Flags |
|-------------|--------------------------|--------|-------|
| 524296      | COMPOSITE                | inet.0 | SAT   |

```

satellite-device-id 106:
->1839 sd-106/0/0.32770 label=4104
MRouter:
524293
aggregation-device:
->1708 et-0/0/30.0
->1826 xe-0/0/28:1.0
satellite-device-id 100:
->1845 sd-100/0/0.32770 label=4101
satellite-device-id 106:
->1847 sd-106/0/0.32770 label=4103
Linked Next-hop: 524295

```

### show multicast snooping next-hops satellite nexthop-id (detail view for a specified next-hop ID on Junos Fusion Data Center with EVPN-VXLAN)

```
user@host> show multicast snooping next-hops satellite nexthop-id 524296 detail
```

| Next-hop ID | Forwarding Next-Hop Type | Table  | Flags |
|-------------|--------------------------|--------|-------|
| 2101169     | COMPOSITE                | inet.0 | SAT   |

```

aggregation-device:
->1767 xe-0/0/12:2.0
satellite-device-id 101:
->7555 sd-101/0/0.32770 label=4097
EVPN VXLAN Core:
2097156
->4808 VXLAN RVTEP: 10.4.4.4
->4812 VXLAN RVTEP: 10.3.3.3
->9813 VXLAN RVTEP: 10.1.1.1
MRouter:
2099159
aggregation-device:
->1766 xe-0/0/12:1.0
Linked Next-hop: 2101168

```

### show multicast snooping next-hops satellite nexthop-id (extensive view for a specified next-hop ID)

```
user@host> show multicast snooping next-hops satellite nexthop-id 1048576 extensive
```

| Next-hop ID | Forwarding Next-Hop Type | Table   | Flags |
|-------------|--------------------------|---------|-------|
| 1048576     | COMPOSITE                | default |       |

```

satellite-device-id 100:
->54297 xe-100/0/12.0
->54299 xe-100/0/13.0
satellite-device-id 101:
->54303 xe-101/0/12.0
->54339 xe-101/0/13.0
Linked Next-hop: 1048578

```

| When              | Event                     | Action  |
|-------------------|---------------------------|---|
| 1w0d 21:07:51.281 | Next-hop linking          | Linked with satellite nhid:1048578  |
| 1w0d 21:07:51.260 | Adding satellite Indirect | DB add  |
| 1w0d 21:07:51.260 | Processing translate Q    | Translating Multicast composite INH<br>sd-100/0/0.32770 ECID:4105 [nhid=627]<br>sd-101/0/0.32770 ECID:4104 [nhid=626] |
| 1w0d 21:07:51.260 | inh dependency            | [ECID 4105] nhid:627 --> inhid:1048576  |
| 1w0d 21:07:51.260 | inh dependency            | [ECID 4104] nhid:626 --> inhid:1048576  |
| 1w0d 21:07:51.254 | inh dependency            | [ECID 4105] nhid:627 --> inhid:1048576  |
| 1w0d 21:07:51.254 | Add to translate Q        | inhid:1048576 added   |
| 1w0d 21:07:51.254 | inh dependency            | [ECID 4104] nhid:626 --> inhid:1048576  |
| 1w0d 21:07:51.241 | Translate Q Skip          | inhid:1048576: [ECID=0] Next-hop not ready  |
| 1w0d 21:07:51.241 | Translate Q Skip          | inhid:1048576: [ECID=0] Next-hop not ready  |
| 1w0d 21:07:51.241 | Processing translate Q    | Translating Multicast composite INH   |
| 1w0d 21:07:51.241 | Add to translate Q        | inhid:1048576 added   |
| 1w0d 21:07:51.241 | Add to translate Q        | Original INH decoded - Adding to Translate Q  |
| 1w0d 21:07:51.241 | ECID reference            | Added ECID reference-ID:2   |
| 1w0d 21:07:51.241 | ECID reference            | Added ECID reference-ID:1   |
| 1w0d 21:07:51.241 | Next-hop add              | Linked to fwd CNH extension: 0xa67a200  |

```
list[4]: {54297 54299 54303 54339 }  
nhid:1048576 from kernel  
fwd nhid[619]:
```

## show multicast snooping route satellite

**Syntax** show multicast snooping route satellite  
 <brief | detail | extensive>  
 <bridge-domain-name *bridge-domain-name* | <vlan-name *vlan-name*>  
 <group *group-address*>  
 <source *source-address*>  
 <vswitch-name *virtual-switch-name*>

**Release Information** Command introduced in Junos OS Release 16.1.  
 Command introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.

**Description** Display Layer 2 multicast routing information (with IGMP snooping) for destination ports on satellite devices.

This command lists multicast routing entries by route prefix and bridge domain name (Junos Fusion Provider Edge) or VLAN name (Junos Fusion Data Center). Each route entry lists the next-hop ID (**NH Index**) used when the aggregation device performs ingress multicast replication. When local replication is enabled and the VLAN has multicast destination extended ports on a satellite device, the aggregation device:

- Creates a satellite device next-hop chain to those multicast destinations through their corresponding satellite device.
- Updates the multicast route entry with a link to the satellite next-hop chain (**Linked NH Index**).

If a multicast route does not have a satellite next-hop chain, **Linked NH Index** is 0. When the **Linked NH Index** value is non-zero, **NH Index** refers to the *original* next-hop information, but the aggregation device uses the satellite next-hop chain (**Linked NH Index**) for routing multicast traffic to satellite device extended ports. Use the **detail** or **extensive** option to expand the output to include details about the original next-hop and satellite next-hop chains.

**Options** **brief | detail | extensive**—(Optional) Display the specified level of output. The default output level is **brief**. The **detail** output level expands the original and satellite device next-hop chains for each route displayed. The **extensive** output level includes details about multicast next-hop entry update events used mainly for troubleshooting.

**bridge-domain-name *bridge-domain-name***—(Junos Fusion Provider Edge only) Filter output to display bridge domain flooding information only for the specified bridge domain name.

**vlan-name *vlan-name***—(Junos Fusion Data Center only) Filter output to display VLAN flooding information only for the specified VLAN name.

**group *group-address***—Filter output to display flooding information only for the specified multicast group.

**source *source-address***—Filter output to display flooding information only for the specified multicast source.

**vswitch-name *virtual-switch-name***—Filter output to display flooding information only for the specified Layer 2 virtual switch.

**Required Privilege Level** view

- Related Documentation**
- [Understanding Multicast Replication in a Junos Fusion on page 665](#)
  - [Egress \(Local\) Replication on the Satellite Devices on page 674](#)
  - [show multicast snooping next-hops satellite on page 700](#)
  - [Monitoring Layer 2 Multicast Forwarding in a Junos Fusion Data Center with EVPN](#)

**List of Sample Output**

[show multicast snooping route satellite on page 707](#)  
[show multicast snooping route satellite detail on page 708](#)  
[show multicast snooping route satellite group on page 709](#)  
[show multicast snooping route satellite vlan-name \(for specific VLAN on Junos Fusion Data Center\) on page 709](#)  
[show multicast snooping route satellite group address vlan-name \(detail for specific VLAN on Junos Fusion Data Center\) on page 709](#)  
[show multicast snooping route satellite bridge-domain-name \(for specific bridge domain with detail view on Junos Fusion Provider Edge\) on page 710](#)

**Output Fields** [Table 48 on page 706](#) lists the output fields for the **show multicast snooping route satellite** command. Output fields are listed in the approximate order in which they appear.

*Table 48: show multicast snooping route satellite Command Output Fields*

| Field Name                  | Field Description  | Level of Output     |
|-----------------------------|--|---------------------|
| <b>Route</b>                | Multicast route information listed by route prefix under this heading.   | All                 |
| <b>(S, G/m)</b>             | Multicast entry state.   | All                 |
| <b>Bridge Domain</b>        | Bridge domain or VLAN name.  | All                 |
| <b>NH Index</b>             | Multicast next-hop ID (original multicast next hop used with ingress multicast replication).   | brief               |
| <b>Linked NH Index</b>      | Multicast satellite next-hop ID (next hop used with egress multicast replication).   | brief               |
| <b>Next-hop information</b> | Detailed list of next-hop chain information for the original and satellite next-hop chains, listed by original next-hop index ( <b>NH Index</b> ) and satellite next-hop chain index ( <b>Linked NH Index</b> ) output field values. | detail<br>extensive |

Table 48: show multicast snooping route satellite Command Output Fields (continued)

| Field Name                    | Field Description  | Level of Output     |
|-------------------------------|--|---------------------|
| <b>EVPN VXLAN Core</b>        | (Junos Fusion Data Center with EVPN-VXLAN) Ingress replication next-hop chain list for VXLAN remote VTEPs (RVTEPs)   | detail<br>extensive |
| <b>Mrouter</b>                | Next-hop chain list for multicast routers connected to the bridge domain or VLAN.  | detail<br>extensive |
| <b>aggregation-device</b>     | Next-hop IDs and corresponding interfaces for the composite next hop to reach local multicast destination ports on the aggregation device.   | detail<br>extensive |
| <b>satellite-device-id id</b> | Satellite device ID with the next-hop IDs and corresponding interface names for the composite next-hop chain to reach extended ports that are multicast destinations on that satellite device.<br><br>When an ECID has been assigned to destination extended ports on a satellite device, this field lists the satellite next-hop ID, the corresponding virtual satellite device interface ( <b>sd-fpc-id/0/0</b> ), and the allocated ECID ( <b>label</b> field). | detail<br>extensive |
| <b>AE</b>                     | Link aggregation group interface next-hop IDs and interface names multicast destination composite next hops.   | detail<br>extensive |
| <b>label</b>                  | ECID associated with one or more multicast destination extended ports on the satellite device in the <b>satellite-device-id</b> field.   |                     |
| <b>When</b>                   | Elapsed time since an event related to a multicast next-hop entry addition or update.  | extensive           |
| <b>Event</b>                  | Brief description of the event related to a multicast next-hop entry addition or update.   | extensive           |
| <b>Action</b>                 | Brief description of actions that resulted from the event.   | extensive           |

## Sample Output

### show multicast snooping route satellite

```

user@host> show multicast snooping route satellite

-----VSwitch Instance: default-switch-----
Route: 00.04.00.01.00.00.233.252.0.0.0.0.0.0.00.00/72
  (S, G/m): (*, 233.252.0.0/24)
    Bridge Domain:   bd100
    NH Index:        1048582
    Linked NH Index: 1048620
Route: 00.05.00.01.00.00.233.252.0.0.0.0.0.0.00.00/72

```

```

(S, G/m): (*, 233.252.0.0/24)
  Bridge Domain: bd1
  NH Index: 1048582
  Linked NH Index: 1048620
Route: 00.06.00.01.00.00.233.252.0.0.0.0.0.0.00.00/72
(S, G/m): (*, 233.252.0.0/24)
  Bridge Domain: bd10
  NH Index: 1048582
  Linked NH Index: 1048620

```

### show multicast snooping route satellite detail

```
user@host> show multicast snooping route satellite detail
```

```

-----VSwitch Instance: default-switch-----
Route: 00.03.00.01.00.00.233.252.0.0.0.0.0.0.00.00/52
(S, G/m): (*, 233.252.0.0/4)
  Bridge Domain: VLAN800
  Next-hop information:
    524287
    MRouter:
      524286
      aggregation-device:
        ->1708 et-0/0/30.0
        ->1826 xe-0/0/28:1.0
      satellite-device-id 100:
        ->1838 xe-100/0/49:3.0
      satellite-device-id 106:
        ->1834 xe-106/0/11.0
    524294
    MRouter:
      524293
      aggregation-device:
        ->1708 et-0/0/30.0
        ->1826 xe-0/0/28:1.0
      satellite-device-id 100:
        ->1845 sd-100/0/0.32770 label=4101
      satellite-device-id 106:
        ->1847 sd-106/0/0.32770 label=4103
Route: 00.03.00.01.00.00.233.252.0.1.0.0.0.0.00.00/80
(S, G/m): (*, 233.252.0.1/32)
  Bridge Domain: VLAN800
  Next-hop information:
    524295
    satellite-device-id 106:
      ->1804 xe-106/0/13.0
    MRouter:
      524286
      aggregation-device:
        ->1708 et-0/0/30.0
        ->1826 xe-0/0/28:1.0
      satellite-device-id 100:
        ->1838 xe-100/0/49:3.0
      satellite-device-id 106:
        ->1834 xe-106/0/11.0
    524296
    satellite-device-id 106:
      ->1839 sd-106/0/0.32770 label=4104
    MRouter:

```



```

524293
aggregation-device:
->1708 et-0/0/30.0
->1826 xe-0/0/28:1.0
satellite-device-id 100:
->1845 sd-100/0/0.32770 label=4101
satellite-device-id 106:
->1847 sd-106/0/0.32770 label=4103

```

### show multicast snooping route satellite group

```
user@host> show multicast snooping route satellite group 233.252.0.1
```

```

-----VSwitch Instance: default-switch-----
Route: 00.04.00.01.00.00.233.252.0.1.0.0.0.0.00.00/80
(S, G/m): (*, 233.252.0.1/32)
  Bridge Domain:   bd100
  NH Index:        1048585
  Linked NH Index: 1048621

```

### show multicast snooping route satellite vlan-name (for specific VLAN on Junos Fusion Data Center)

```
user@host> show multicast snooping route satellite vlan-name VLAN800 group 233.252.0.1
```

```

-----VSwitch Instance: default-switch-----
Route: 00.03.00.01.00.00.233.252.0.1.0.0.0.0.00.00/80
(S, G/m): (*, 233.252.0.1/32)
  Bridge Domain:   VLAN800
  NH Index:        524295
  Linked NH Index: 524296

```

### show multicast snooping route satellite group address vlan-name (detail for specific VLAN on Junos Fusion Data Center)

```
user@host> show multicast snooping route satellite group 233.252.0.1 vlan-name v1 detail
```

```

-----VSwitch Instance: default-switch-----
Route: 00.02.00.01.00.00.233.252.0.1.0.0.0.0.00.00/80
(S, G/m): (*, 233.252.0.1/32)
  Bridge Domain: v1
  Next-hop information:
    2101168
    aggregation-device:
      ->1767 xe-0/0/12:2.0
    satellite-device-id 101:
      ->6226 xe-101/2/0.0
      ->6227 xe-101/2/1.0
    EVPN VXLAN Core:
      2097156
      ->4808 VXLAN RVTEP: 10.4.4.4
      ->4812 VXLAN RVTEP: 10.3.3.3
      ->9813 VXLAN RVTEP: 10.1.1.1
    MRouter:
      2099159
      aggregation-device:
        ->1766 xe-0/0/12:1.0
    2101169

```

```

aggregation-device:
->1767 xe-0/0/12:2.0
satellite-device-id 101:
->7555 sd-101/0/0.32770 label=4097
EVPN VXLAN Core:
2097156
->4808 VXLAN RVTEP: 10.4.4.4
->4812 VXLAN RVTEP: 10.3.3.3
->9813 VXLAN RVTEP: 10.1.1.1
MRouter:
2099159
aggregation-device:
->1766 xe-0/0/12:1.0

```

**show multicast snooping route satellite bridge-domain-name (for specific bridge domain with detail view on Junos Fusion Provider Edge)**

```

user@host> show multicast snooping route satellite bridge-domain-name bd100 group 233.252.0.1
detail

```

```

-----VSwitch Instance: default-switch-----
Route: 00.04.00.01.00.00.233.252.0.1.0.0.0.0.00.00/80
(S, G/m): (*, 233.252.0.1/32)
Bridge Domain: bd100
Next-hop information:
1048576
satellite-device-id 100:
->54297 xe-100/0/12.0
->54299 xe-100/0/13.0
satellite-device-id 101:
->54303 xe-101/0/12.0
->54339 xe-101/0/13.0
1048578
satellite-device-id 100:
->627 sd-100/0/0.32770 label=4105
satellite-device-id 101:
->626 sd-101/0/0.32770 label=4104

```

## show multicast statistics satellite

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>show multicast statistics satellite</code><br><code>&lt;brief   detail &gt;</code>  |
| <b>Release Information</b>      | Command introduced in Junos OS Release 16.1.<br>Command introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.           |
| <b>Description</b>              | Display statistics about multicast satellite routing tables and ECID management.  |
| <b>Options</b>                  | <b>brief   detail</b> —(Optional) Display the specified level of output. The default output level is <b>brief</b> .                   |
| <b>Required Privilege Level</b> | view  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Understanding Multicast Replication in a Junos Fusion on page 665</a></li> </ul> |
| <b>List of Sample Output</b>    | <a href="#">show multicast statistics satellite on page 711</a>   |

## Sample Output

### show multicast statistics satellite

```

user@host> show multicast statistics satellite

Multicast Statistics:
  Number of flood route entries:          8000
  Number of satellite flood route entries: 8000
  Number of MCINET route entries:        44000
  Number of satellite MCINET route entries: 36000
  Unicast VPLS next-hops(non-satellite): 32
  Number of satellite ECID next-hops:     12
  Number of VPLS composite next-hops:     12000
  Number of satellite composite next-hops: 12000
  Number of Indirect next-hops:           28002
  Number of Satellite Indirect next-hops: 28001
  Number of ECIDs requested:              14
  Number of ECID responses received:      14
  Number of ECID delete messages:         2
  Number of ECID mapping entries in DB:    12
  Number of ECID mapping entries ready:    12

```

## show multicast summary satellite

---

|                          |  |
|--------------------------|--|
| Syntax                   | show multicast summary satellite   |
| Release Information      | Command introduced in Junos OS Release 16.1.<br>Command introduced in Junos OS Release 17.2R1 for Junos Fusion Data Center.  |
| Description              | <p>Display summary status of multicast replication features in a Junos Fusion.</p> <p>This command displays whether or not egress multicast replication (also called local replication) is enabled. When local replication is configured, this command displays <b>Egress replication: Enabled</b>, and <b>Egress replication: Disabled</b> otherwise.</p> <p>This command also displays the graceful restart state of the satellite management control plane processes for local replication when these processes are first activated or have been restarted. The <b>Restart phase</b> output field value indicates the phase where the restart process stalled or failed, or displays a <b>Complete</b> message if the restart process completed successfully.</p> |
| Options                  | This command has no options.   |
| Required Privilege Level | view   |
| Related Documentation    | <ul style="list-style-type: none"><li>• <a href="#">Understanding Multicast Replication in a Junos Fusion on page 665</a></li><li>• <a href="#">Configuring Egress (Local) Replication on a Junos Fusion on page 680</a></li><li>• <a href="#">show multicast statistics satellite on page 711</a></li></ul>   |
| List of Sample Output    | <a href="#">show multicast summary satellite on page 712</a>   |

### Sample Output

#### show multicast summary satellite

```
user@host>show multicast summary satellite
Multicast:
  Restart phase:      Complete (11/11)
  Egress replication: Enabled
```

# Class of Service on Junos Fusion Provider Edge

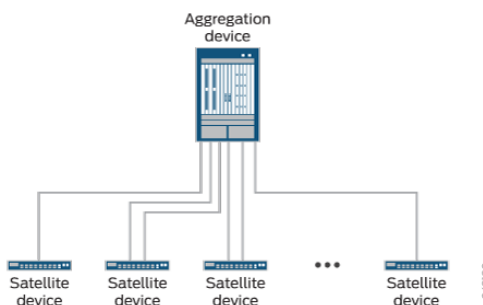
- [Understanding CoS on an MX Series Aggregation Device in Junos Fusion Provider Edge on page 713](#)
- [Configuring CoS on an MX Series Aggregation Device in Junos Fusion on page 720](#)

## Understanding CoS on an MX Series Aggregation Device in Junos Fusion Provider Edge

Junos Fusion provides a method of significantly expanding the number of available network interfaces on an *aggregation device* by allowing the aggregation device to add interfaces through interconnections with *satellite devices*. The entire system—the interconnected aggregation device and satellite devices—is called Junos Fusion. Junos Fusion simplifies network administration by appearing in the network topology as a single device, and the single device is managed from a single IP address.

See [Figure 18 on page 713](#) for an illustration of the Junos Fusion topology.

*Figure 18: Junos Fusion Topology*



An aggregation device can be an MX240, MX480, MX960, or MX2020 Universal Routing Platform that is running Junos OS Release 14.2R3 or later.

This topic describes class of service (CoS) on the different types of ports in Junos Fusion.

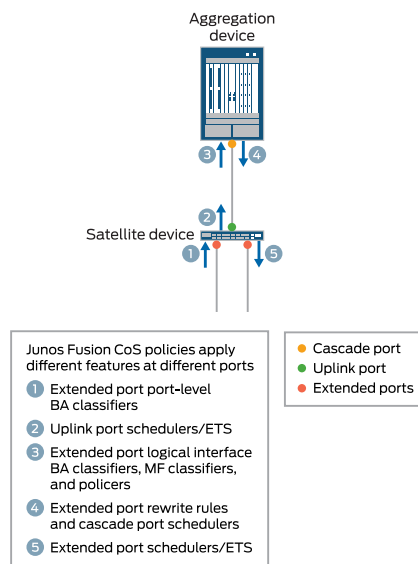
This topic covers:

- [Overview of CoS on Different Types of Ports in Junos Fusion on page 714](#)
- [CoS on Extended Ports and Uplink Ports in Junos Fusion on page 715](#)
- [Per-unit and Hierarchical Scheduling on Extended Ports on page 716](#)
- [Broadband Subscriber Services Support on page 717](#)
- [CoS Hierarchical Port Scheduling with Enhanced Transmission Selection in Junos Fusion on page 718](#)
- [CoS on Cascade Ports in Junos Fusion on page 719](#)

## Overview of CoS on Different Types of Ports in Junos Fusion

[Figure 19 on page 714](#) provides an overview of packet flow through Junos Fusion and how CoS features are applied at the different ports.

*Figure 19: Junos Fusion CoS Feature Application*



All configuration for CoS policies for Junos Fusion is done on the aggregation device. For CoS policies that you define for extended ports, however, different portions of that policy are applied at different points in a packet's path through Junos Fusion. From [Figure 19 on page 714](#):

1. As a packet enters an extended port, any port-level (physical interface-level) behavior aggregate (BA) classifier you define for that port is applied to derive a forwarding class and packet loss priority.
2. As that packet exits the uplink port, you can apply schedulers or enhanced transmission selection (ETS) based on the port-level BA classifier assigned at the ingress extended port.

3. As the packet enters the aggregation device at the cascade port, any multifield classifiers, policers, or logical interface-level BA classifiers you define for the ingress extended port are applied.
4. As the packet exits the aggregation device at the cascade port, any rewrite rules you define for the egress extended port, as well as any schedulers you define for the cascade port, are applied, unless the rewrite rule is associated with an extended port logical interface. Also, the forwarding class determined in the previous step is carried in the 801.2BR header to the satellite device and used to select the output queue at the egress extended port.
5. Finally, as the packet exits an extended port, any schedulers or ETS you define for that port are applied based on the forwarding class determined by the multifield classifiers, policers, or logical interface-level BA classifiers defined for the ingress extended port.

The following sections provide further information about implementing CoS on each port type in Junos Fusion.

## CoS on Extended Ports and Uplink Ports in Junos Fusion

All class of service (CoS) scheduling policies for extended ports and uplink ports on the satellite devices are provisioned on the MX Series aggregation device. Similarly, standard Junos OS CoS commands are issued on the MX Series aggregation device for retrieving extended port and uplink port CoS states and queue statistics. The MX Series aggregation device supports configuring the following CoS features for each extended port and uplink port on each satellite device:

- Behavior aggregate classifiers
- Multifield classifiers
- Input and output policers
- Forwarding classes
- Traffic control profiles
- Schedulers and scheduler maps
- Per-unit and hierarchical schedulers (extended ports only)
- Egress rewrite rules



**NOTE:** Configuring CoS policies on *satellite devices* (on both extended and uplink ports) has the following restrictions:

- Fixed classifiers are not supported.
- IP precedence classifiers are not supported. DSCP classifiers are supported, however.
- Interpolated drop profiles are not supported.
- The **transmit-rate** option is supported for schedulers. However, the **remainder**, **rate-limit**, and **exact** options are not supported under **transmit-rate**.

While CoS features for satellite device ports are configured on the aggregation device, the actual classification, queueing, and scheduling is performed on the satellite devices. Information on actual traffic shaping is not passed back to the aggregation device. Logical interface statistics for the **show interfaces** command are collected on the aggregate device and do not include shaping rate data. For actual traffic statistics gathered on satellite device interfaces, use the statistics for the physical interface and not the logical interface.



**NOTE:** You cannot retrieve CoS statistics on extended ports through an SNMP query. To see CoS statistics on an extended port, use the **show interfaces queue interface-name *extended-port-interface-name*** and **show interfaces *extended-port-interface-name* extensive** commands.

---

## Per-unit and Hierarchical Scheduling on Extended Ports

Beginning with Junos OS 17.2R1, Junos Fusion Provider Edge supports per-unit and hierarchical schedulers on extended ports. To support per-unit or hierarchical scheduling on an extended port, all cascade ports on the aggregation device for that extended port must have a queueing chip.



**NOTE:** Multihomed satellite devices do not support per-unit and hierarchical scheduling.

To enable per-unit scheduling on an extended port, enable the **per-unit-scheduler** option at the **[edit interfaces *interface-name*]** hierarchy level for the extended port.

To enable hierarchical scheduling on an extended port, enable the **hierarchical-scheduler** option at the **[edit interfaces *interface-name*]** hierarchy level for the extended port.



**NOTE:** If you enable hierarchical scheduling on an extended port, you must also explicitly configure schedulers at the interface set or VLAN level.



Junos Fusion treats the cascade ports connecting the aggregation device to the satellite device as aggregated Ethernet ports with aggregation done automatically without configuration. By default the Junos Fusion implementation of hierarchical CoS applies the scheduler parameters across all cascade ports in **scale** mode. Because **scale** mode divides the configured shaper equally across the cascade ports, traffic drops can start before a customer reaches its committed rate for a particular flow. Starting with Junos OS Release 18.1R1, you can set all cascade ports on an aggregation device to be in **replicate** mode, thereby copying scheduler parameters to each level of the aggregated interface member links, and automatically target all of an extended port's traffic to a specific cascade port. To do this, simply enable **target-mode** for the satellite device at the **[edit chassis satellite-management fpc fpc-number]** hierarchy level. For example:

```
[edit]
user@host# show chassis satellite-management
fpc 100 {
    target-mode;
    cascade-ports [ xe-0/0/1:0 xe-1/0/0:1 xe-1/0/0:2 xe-1/0/1:1 ];
}
```



**CAUTION:** Enabling or disabling **target-mode** disrupts traffic on the satellite device while extended ports are deleted and re-added and cascade ports are reconfigured on the aggregate device.

## Broadband Subscriber Services Support

Starting in Junos OS Release 18.4R1, Junos Fusion Provider Edge supports Broadband Edge Subscriber Management, including standard CoS functionality for Broadband Edge Subscriber Management.

BNG on Junos Fusion Provider Edge supports the following CoS scheduling hierarchies:

- Dynamic logical interface set/Static-VLAN-Demux/Extended port physical interface
- Dynamic logical interface/Extended port physical interface
- Dynamic logical interface set/Extended port physical interface
- Dynamic logical interface/Dynamic logical interface set/Extended port physical interface

To support 4 levels of hierarchical scheduling (for example, queue/dynamic logical interface/dynamic logical interface set/extended port physical interface), you need MPCs on the aggregation device that support at least 5 levels of hierarchical scheduling. This is because one level of scheduling is consumed by the cascade port. Every MPC on the aggregation device configured for Broadband Edge Subscriber Management must support at least 4 levels of hierarchical scheduling. Also, the **maximum-hierarchy-levels** option at the **[edit interfaces interface-name hierarchical-scheduler]** hierarchy for the extended port must be set to one less what the MPC for the associated cascade port supports because of the one level of scheduling the cascade port consumes.

Classifiers and rewrite rules are supported on subscriber logical interfaces.

Shaping calculations include the 801.BR overhead bytes.



**NOTE:** Multicast is supported through a separate VLAN on the extended port, but multicast is not supported using subscriber dynamic profiles and there is no CoS bandwidth adjustment support for the subscribers.

The `show class-of-service scheduler-hierarchy interface` command is supported and shows the cascade port as part of the hierarchy. For example:

```
user@host > show class-of-service scheduler-hierarchy interface demux0.3221225473
```

| Interface/<br>Excess<br>Resource name<br>weight | Shaping<br>rate<br>kbits | Guaranteed<br>rate<br>kbits | Guaranteed/<br>Excess<br>priority | Queue<br>weight |
|---|--------------------------|-----------------------------|-----------------------------------|-----------------|
| high/low  |                          |                             |                                   |                 |
| ge-100/0/0(xe-2/0/5)                            | 10000000                 |                             |                                   |                 |
| ge-100/0/0(xe-2/0/5) RTP                        | 10000000                 |                             |                                   |                 |
| demux0.3221225473                               | 1000                     | 0                           |                                   | 500             |
| 500   |                          |                             |                                   |                 |
| best-effort                                     | 1000                     | 0                           | Low Low                           | 95              |
| network-control                                 | 1000                     | 0                           | Low Low                           | 5               |

In the above sample output, **ge-100/0/0** is the extended port and **xe-2/0/5** is the cascade port.

#### Release History Table

| Release | Description   |
|---------|---|
| 18.4R1  | Starting in Junos OS Release 18.4R1, Junos Fusion Provider Edge supports Broadband Edge Subscriber Management, including standard CoS functionality for Broadband Edge Subscriber Management. |

#### Related Documentation

- [Broadband Subscription Services on Junos Fusion on page 38](#)
- [CoS for Subscriber Access Overview](#)

## CoS Hierarchical Port Scheduling with Enhanced Transmission Selection in Junos Fusion

In Junos Fusion, the satellite device can be either a QFX5100 or an EX4300 device. The QFX5100 supports enhanced transmission selection (ETS), which is described in IEEE 802.1Qaz. Configuration support for ETS has been added to the MX Series device only for satellite device ports that support this feature. If ETS is configured on the MX Series aggregation device for a satellite device port that does not support ETS, the satellite devices converts the ETS configuration to port scheduler.



**NOTE:** Local ports on the MX Series aggregation device do not support ETS.

**Related  
Documentation**

- *Understanding CoS Hierarchical Port Scheduling (ETS)*
- *CoS on Virtual Chassis Fabric (VCF) EX4300 Leaf Devices (Mixed Mode)*

## CoS on Cascade Ports in Junos Fusion

When a cascade port is created, two logical interfaces are automatically created:

- One in-band management logical interface (assigned unit 32769) for traffic that only flows between the aggregation device and the satellite devices, such as keepalives, for provisioning information, and for software updates.
- One for data logical interface (assigned unit 32770) for regular traffic that flows into and out of Junos Fusion.

Per-unit scheduling is automatically enabled on the cascade port to support multiple queues on each of the logical interfaces.



**NOTE:** All cascade ports must be configured on Modular Port Concentrators (MPCs) that support per-unit scheduling.

50 Mbps of bandwidth is reserved for the management logical interface. The remaining bandwidth is available to the data logical interface. A shaping rate of 10 percent is also applied to the management logical interface, which means it can use up to 10 percent of the full interface bandwidth, if available.

The default scheduling policy is applied to the data logical interface. This reserves 95 percent of the available bandwidth and buffer space for the best effort forwarding class (mapped to queue 0) and 5 percent for the network control forwarding class (mapped to queue 3). You can create custom forwarding classes and schedulers by applying a custom scheduler map to this logical interface.

Release History Table

| Release | Description   |
|---------|---|
| 18.4R1  | Starting in Junos OS Release 18.4R1, Junos Fusion Provider Edge supports Broadband Edge Subscriber Management, including standard CoS functionality for Broadband Edge Subscriber Management.   |
| 18.1R1  | Starting with Junos OS Release 18.1R1, you can set all cascade ports on an aggregation device to be in <b>replicate</b> mode, thereby copying scheduler parameters to each level of the aggregated interface member links, and automatically target all of an extended port's traffic to a specific cascade port. |
| 17.2R1  | Beginning with Junos OS 17.2R1, Junos Fusion Provider Edge supports per-unit and hierarchical schedulers on extended ports.   |

#### Related Documentation

- [Junos Fusion Provider Edge Overview on page 3](#)
- [Understanding Junos Fusion Provider Edge Components on page 5](#)
- [Configuring CoS on an MX Series Aggregation Device in Junos Fusion on page 720](#)

## Configuring CoS on an MX Series Aggregation Device in Junos Fusion

Junos Fusion significantly expands the number of available network interfaces on an *aggregation device* by allowing the aggregation device to add interfaces through interconnections with *satellite devices*. The entire system—the interconnected aggregation device and satellite devices—is called Junos Fusion. Junos Fusion simplifies network administration by appearing in the network topology as a single device, and the single device is managed from a single IP address.

This topic describes how to configure CoS on the different types of ports in Junos Fusion.

This topic covers:

- [Configuring Behavior Aggregate Classifiers on Satellite Device Extended Ports on page 720](#)
- [Configuring Rewrite Rules on Satellite Device Extended Ports on page 722](#)
- [Configuring CoS Hierarchical Port Scheduling with Enhanced Transmission Selection on Satellite Device Ports on page 723](#)
- [Changing the Default Scheduling Policy on an Aggregated Device Cascade Port on page 725](#)

### Configuring Behavior Aggregate Classifiers on Satellite Device Extended Ports

Normally, you apply a behavior aggregate (BA) classifier to a logical interface on an MX Series device at the `[edit class-of-service interfaces interface-name unit logical-unit-number]` hierarchy level. When traffic from a satellite device extended port reaches the aggregation device, the BA classifier configured for the logical interface level of the satellite device extended port is applied the same as it is for traffic from other non-extended ports to help determine the forwarding class of the traffic; policers and multifield classifiers can

also factor in determining the forwarding class of the traffic. When the aggregation device sends the traffic out to the satellite device, the forwarding class is carried in the 801.2BR header. The satellite device then uses the forwarding class to select the output queue at the *egress extended port*.

You can also apply a BA classifier at the physical interface level of an extended port. This classifier is used to determine the output queue at the *uplink port* of the satellite device.



**NOTE:** IP precedence classifiers are not supported on extended ports at the physical interface level. DSCP classifiers are supported, however.



**NOTE:** You cannot apply a physical interface-level classifier on an MX Series local port.

To add a behavior aggregate classifier to the physical interface level of a satellite device extended port in Junos Fusion:

1. Define the classifier.

```
[edit class-of-service]
user@mx-agg-device#set classifiers dscp dscp-1 forwarding-class best-effort-3
loss-priority low code-points 001010
```

2. Apply the classifier to the physical extended port.

```
[edit class-of-service]
user@mx-agg-device#set interfaces xe-100/0/33 classifiers dscp dscp-1
```

3. Commit the changes and then confirm the configuration.

```
[edit class-of-service]
user@mx-agg-device# show
classifiers {
  dscp dscp-1 {
    forwarding-class best-effort-3 {
      loss-priority low code-points 001010;
    }
  }
}
interfaces {
  xe-100/0/33 {
    classifiers {
      dscp dscp-1;
    }
  }
}
```

In the above configuration example, packets entering port xe-100/0/33 with a DSCP value of **001010** will be assigned a forwarding class of **best-effort-3** to select the output queue at the uplink port as the packet travels from the satellite device to the aggregation device.

- See Also**
- [Understanding Junos Fusion Ports on page 13](#)
  - *Understanding How Behavior Aggregate Classifiers Prioritize Trusted Traffic*
  - *Overview of Assigning Service Levels to Packets Based on Multiple Packet Header Fields*

## Configuring Rewrite Rules on Satellite Device Extended Ports

You apply rewrite rules to logical interfaces on satellite device extended ports.

To add a rewrite rule to a satellite device extended port in a Junos Fusion:

1. Define the rewrite rule.

```
[edit class-of-service]
user@mx-agg-device#set rewrite-rules ieee-802.1 rewrite1p forwarding-class
best-effort loss-priority low code-point 010
```

2. Apply the rewrite rule to a logical interface.

```
[edit class-of-service]
user@mx-agg-device#set interfaces xe-108/0/47 unit 0 rewrite-rules ieee-802.1
rewrite1p
```

3. Commit the changes and then confirm the configuration.

```
[edit class-of-service]
user@mx-agg-device# show
rewrite-rules {
  ieee-802.1 rewrite1p {
    forwarding-class best-effort {
      loss-priority low code-point 010;
    }
  }
}
interfaces {
  xe-108/0/47 {
    unit 0 {
      rewrite-rules {
        ieee-802.1 rewrite-1p;
      }
    }
  }
}
```

In Junos OS, rewrite rules only look at the forwarding class and packet loss priority of the packet (as assigned by a behavior aggregate or multifield classifier at ingress), not at

the incoming CoS value, to determine the CoS value to write to the packet header at egress. The above configuration means that, for any packet exiting the xe-108/0/47.0 interface that has a forwarding class of **best-effort** and a packet loss priority of **low**, the ieee-802.1 CoS value will be rewritten to **010**.

- See Also**
- [Understanding Junos Fusion Ports on page 13](#)
  - *Rewriting Packet Headers to Ensure Forwarding Behavior*

## Configuring CoS Hierarchical Port Scheduling with Enhanced Transmission Selection on Satellite Device Ports

You can configure enhanced transmission selection (ETS) for both extended ports and uplink ports on satellite devices. The configuration is done on the aggregation device. To configure ETS for a satellite device port in Junos Fusion:

1. Define the traffic control profiles.

```
[edit class-of-service]
user@mx-agg-device#set traffic-control-profiles be-tcp-1 scheduler-map be-map-1
user@mx-agg-device#set traffic-control-profiles be-tcp-1 shaping-rate percent 80
user@mx-agg-device#set traffic-control-profiles be-tcp-1 guaranteed-rate 4g
user@mx-agg-device#set traffic-control-profiles be-tcp-3 scheduler-map be-map-3
user@mx-agg-device#set traffic-control-profiles be-tcp-3 shaping-rate percent 80
user@mx-agg-device#set traffic-control-profiles be-tcp-3 guaranteed-rate 6g
```

2. Define the forwarding class sets.

```
[edit class-of-service]
user@mx-agg-device#set forwarding-class-sets FC-1 class best-effort-1
user@mx-agg-device#set forwarding-class-sets FC-1 class best-effort-2
user@mx-agg-device#set forwarding-class-sets FC-3 class best-effort-3
```

3. Apply the forwarding class sets to a satellite device port.

```
[edit class-of-service]
user@mx-agg-device#set interfaces xe-100/0/26 forwarding-class-set FC-1
output-traffic-control-profile be-tcp-1
user@mx-agg-device#set interfaces xe-100/0/26 forwarding-class-set FC-3
output-traffic-control-profile be-tcp-3
```

4. Commit the changes and then confirm the configuration.

```
[edit class-of-service]
user@mx-agg-device# show
traffic-control-profiles {
  be-tcp-1 {
    scheduler-map be-map-1;
    shaping-rate percent 80;
    guaranteed-rate 4g;
  }
}
```

```

    }
    be-tcp-3 {
        scheduler-map be-map-3;
        shaping-rate percent 80;
        guaranteed-rate 6g;
    }
}
forwarding-class-sets {
    FC-1 {
        class best-effort-1;
        class best-effort-2;
    }
    FC-3 {
        class best-effort-3;
    }
}
interfaces {
    xe-100/0/26 {
        forwarding-class-set {
            FC-1 {
                output-traffic-control-profile be-tcp-1;
            }
            FC-3 {
                output-traffic-control-profile be-tcp-3;
            }
        }
    }
}

```

- Run **show interfaces queue egress *interface name*** to show the statistics of transmitted and dropped packets for each queue on the satellite device port.

```

user@mx-agg-device> show interfaces queue egress xe-100/0/26:0
Physical interface: xe-100/0/26:0 (Extended Port, Enabled, Physical link is Up)
Interface index: 3040, SNMP ifIndex: 1085
Forwarding classes: 16 supported, 4 in use
Egress queues: 8 supported, 4 in use
Queue: 0, Forwarding classes: best-effort-1
  Queued:
    Packets      :                0                0 pps
    Bytes        :                0                0 bps
  Transmitted:
    Packets      :             7182746             24998 pps
    Bytes        :          4195267965          116853536 bps
    Tail-dropped packets :                0                0 pps
    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: best-effort-2
  Queued:
    Packets      :                0                0 pps
    Bytes        :                0                0 bps
  Transmitted:
    Packets      :                0                0 pps
    Bytes        :                0                0 bps
    Tail-dropped packets :                0                0 pps
    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: best-effort-3
  Queued:
    Packets              :                0          0 pps
    Bytes                 :                0          0 bps
  Transmitted:
    Packets              :                0          0 pps
    Bytes                 :                0          0 bps
    Tail-dropped packets :                0          0 pps
    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: network-control
  Queued:
    Packets              :                0          0 pps
    Bytes                 :                0          0 bps
  Transmitted:
    Packets              :            14505          1 pps
    Bytes                 :       11746583       1448 bps
    Tail-dropped packets :                0          0 pps
    RL-dropped packets   :                0          0 pps
    RL-dropped bytes     :                0          0 bps
    RED-dropped packets   :                0          0 pps
    RED-dropped bytes     :                0          0 bps

```



**NOTE:** Queued statistics for each queue are not available for satellite device ports and will always show 0.

- See Also**
- *Understanding CoS Hierarchical Port Scheduling (ETS)*
  - *CoS on Virtual Chassis Fabric (VCF) EX4300 Leaf Devices (Mixed Mode)*
  - *Example: Configuring CoS Hierarchical Port Scheduling (ETS)*

## Changing the Default Scheduling Policy on an Aggregated Device Cascade Port

When a cascade port is created, two logical interfaces are automatically created:

- One in-band management logical interface (assigned unit 32769) for traffic that only flows between the aggregation device and the satellite devices, such as keepalives, for provisioning information, and for software updates.
- One for data logical interface (assigned unit 32770) for regular traffic that flows into and out of Junos Fusion.

Let's say, for example, that interface xe-0/0/1 is configured as a cascade port. The command **show interfaces xe-0/0/1 terse** produces output similar to the following:

```
user@mx-agg-device# run show interfaces xe-0/0/1 terse
Interface      Admin Link Proto  Local      Remote
xe-0/0/1       up    up
xe-0/0/1.32769 up    up    inet   10.0.0.5/30
xe-0/0/1.32770 up    up    bridge
```

The control logical interface (unit 32769) is automatically assigned an internal traffic control profile (**\_\_cp\_control\_tc\_prof**) that guarantees 50 Mbps of bandwidth for the logical interface, a 10 percent shaping rate, and the default scheduling policy. The default scheduling policy is applied to the data logical interface. For example:

```
user@mx-agg-device# run show class-of-service interface xe-0/0/1
Physical interface: xe-0/0/1, Index: 144
Maximum usable queues: 8, Queues in use: 4
  Scheduler map: <default>, Index: 2
  Congestion-notification: Disabled

  Logical interface: xe-0/0/1.32769, Index: 344
Object      Name                               Type      Index
Traffic-control-profile __cp_control_tc_prof      Output    17227
Classifier   ipprec-compatibility      ip         13

  Logical interface: xe-0/0/1.32770, Index: 343
Object      Name                               Type      Index
Scheduler-map <default>                     Output     2
```

and:

```
user@mx-agg-device# run show class-of-service scheduler-hierarchy interface
xe-0/0/1
Interface/   Shaping  Guaranteed  Guaranteed/  Queue  Excess
Resource name rate    rate        Excess       weight weight
               kbits   kbits       priority
xe-0/0/1.32770 10000000  0           Low  Low    118    1  1
  BE           10000000  0           Low  Low    6
  NC           10000000  0           Low  Low    6
xe-0/0/1.32769 1000000   50000       Low  Low    118    62 62
  BE           1000000   47500       Low  Low    6
  NC           1000000   2500        Low  Low    6
```

You can create custom forwarding classes and schedulers for the data logical interface by applying a customer scheduler map to that logical interface. For example, to apply a customer scheduler policy to the data logical interface:

1. Create customer schedulers.

```
[edit class-of-service]
user@mx-agg-device#set schedulers AF_SCH_CORE transmit-rate percent 40
user@mx-agg-device#set schedulers AF_SCH_CORE buffer-size percent 40
```

```

user@mx-agg-device#set schedulers AF_SCH_CORE priority medium-high
user@mx-agg-device#set schedulers BE_SCH_CORE transmit-rate percent 10
user@mx-agg-device#set schedulers BE_SCH_CORE buffer-size percent 10
user@mx-agg-device#set schedulers BE_SCH_CORE priority low
user@mx-agg-device#set schedulers EF_SCH_CORE transmit-rate percent 40
user@mx-agg-device#set schedulers EF_SCH_CORE buffer-size percent 40
user@mx-agg-device#set schedulers EF_SCH_CORE priority medium-low
user@mx-agg-device#set schedulers NC_SCH_CORE transmit-rate percent 10
user@mx-agg-device#set schedulers NC_SCH_CORE buffer-size percent 10
user@mx-agg-device#set schedulers NC_SCH_CORE priority high

```

2. Create a scheduler map.

```

[edit class-of-service]
user@mx-agg-device#set scheduler-maps CORE_SCHED_MAP forwarding-class BE
scheduler BE_SCH_CORE
user@mx-agg-device#set scheduler-maps CORE_SCHED_MAP forwarding-class EF
scheduler EF_SCH_CORE
user@mx-agg-device#set scheduler-maps CORE_SCHED_MAP forwarding-class AF
scheduler AF_SCH_CORE
user@mx-agg-device#set scheduler-maps CORE_SCHED_MAP forwarding-class NC
scheduler NC_SCH_CORE

```

3. Apply the scheduler map to the data logical interface.

```

[edit class-of-service]
user@mx-agg-device#set interfaces xe-0/0/1 unit 32770 scheduler-map
CORE_SCHED_MAP

```

4. Commit the changes and then confirm the configuration.

```

[edit class-of-service]
user@mx-agg-device# show
interfaces {
  xe-0/0/1 {
    unit 32770 {
      scheduler-map CORE_SCHED_MAP;
    }
  }
}
scheduler-maps {
  CORE_SCHED_MAP {
    forwarding-class BE scheduler BE_SCH_CORE;
    forwarding-class EF scheduler EF_SCH_CORE;
    forwarding-class AF scheduler AF_SCH_CORE;
    forwarding-class NC scheduler NC_SCH_CORE;
  }
}
schedulers {
  BE_SCH_CORE {
    transmit-rate percent 10;
    buffer-size percent 10;
    priority low;
  }
}

```

```

    }
    EF_SCH_CORE {
        transmit-rate percent 40;
        buffer-size percent 40;
        priority medium-low;
    }
    AF_SCH_CORE {
        transmit-rate percent 40;
        buffer-size percent 40;
        priority medium-high;
    }
    NC_SCH_CORE {
        transmit-rate percent 10;
        buffer-size percent 10;
        priority high;
    }
}

```

5. Verify your changes.

```

user@mx-agg-device# run show class-of-service interface xe-0/0/1
Physical interface: xe-0/0/1, Index: 144
Maximum usable queues: 8, Queues in use: 4
  Scheduler map: <default>, Index: 2
  Congestion-notification: Disabled

```

```

  Logical interface: xe-0/0/1.32769, Index: 344
Object      Name                                     Type      Index
Traffic-control-profile __cp_control_tc_prof  Output    17227
Classifier   ipprec-compatibility  ip         13

  Logical interface: xe-0/0/1.32770, Index: 343
Object      Name                                     Type      Index
Scheduler-map CORE_SCHED_MAP                Output    23433

```

and:

```

user@mx-agg-device# run show class-of-service scheduler-hierarchy interface
xe-0/0/1

```

| Interface/<br>Resource name | Shaping<br>rate | Guaranteed<br>rate | Guaranteed/<br>Excess | Queue<br>weight | Excess<br>weight |
|-----------------------------|-----------------|--------------------|-----------------------|-----------------|------------------|
|                             | kbits           | kbits              | priority              |                 | high/low         |
| xe-0/0/1.32770              | 10000000        | 0                  |                       |                 | 1                |
| 1                           |                 |                    |                       |                 |                  |
| BE                          | 10000000        | 0                  | Low Low               | 12              |                  |
| EF                          | 10000000        | 0                  | Medium Low            | 50              |                  |
| AF                          | 10000000        | 0                  | Medium Low            | 50              |                  |
| NC                          | 10000000        | 0                  | High High             | 12              |                  |
| xe-0/0/1.32769              | 1000000         | 50000              |                       |                 | 62               |
| 62                          |                 |                    |                       |                 |                  |
| BE                          | 1000000         | 47500              | Low Low               | 118             |                  |
| NC                          | 1000000         | 2500               | Low Low               | 6               |                  |

- See Also**
- *How Schedulers Define Output Queue Properties*
  - *Default Schedulers Overview*

- Related Documentation**
- [Understanding CoS on an MX Series Aggregation Device in Junos Fusion Provider Edge on page 713](#)

