

Junos Fusion Provider Edge User Guide

Published
2022-03-11

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Junos Fusion Provider Edge User Guide
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About This Guide

Junos Fusion Provider Edge simplifies network administration by enabling customers to configure an aggregation device to manage thousands of ports on satellite devices. Use the topics on this page to understand Junos Fusion, configure the aggregation device , and to manage satellite devices.

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Junos Fusion Provider Edge Overview

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Junos Fusion Provider Edge Overview

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.

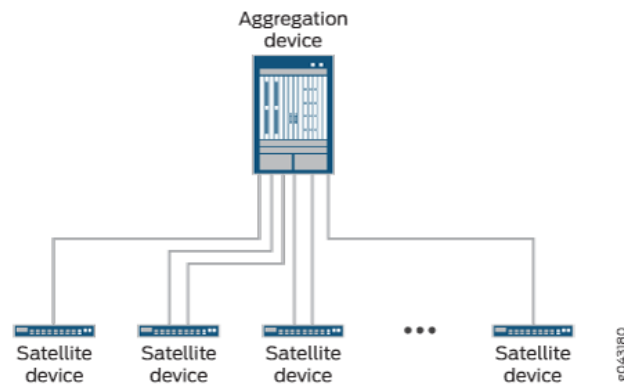
Junos Fusion Provider Edge brings the Junos Fusion technology to the service provider edge. For example in a Junos Fusion Provider Edge, MX Series 5G Universal Routing Platforms act as aggregation devices while EX4300 Series and QFX5100, QFX 5110, or QFX5200 Series switches act as satellite devices.

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.

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Understanding Junos Fusion Provider Edge Components

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

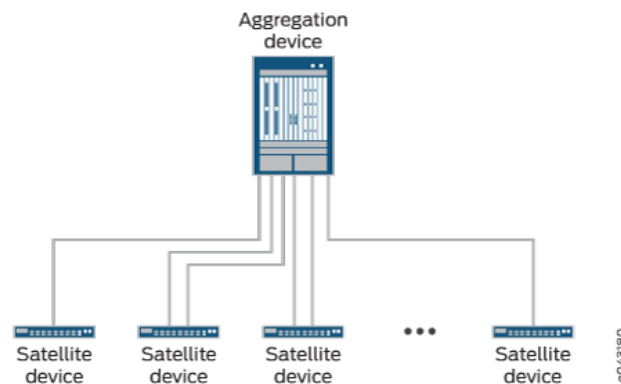
This topic covers:

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 6](#) 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:

- 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:

- 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.

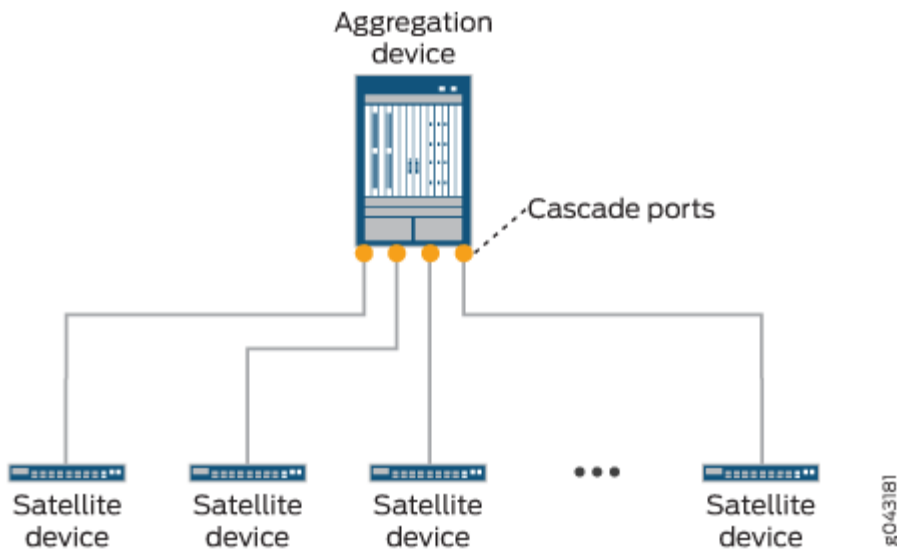
The link that connects an aggregation device to a satellite device has an interface on each end of the link. The interface on the aggregation device end of the link is a cascade port. The interface on the satellite device end of the link is an uplink port.

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 but not limited to 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 8](#).

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 but not limited to 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 **ABCDEFGHJKLM** was assigned to FPC ID 110 using unique-ID based FPC identification, the satellite device with the serial number **ABCDEFGHJKLM** will always be associated with FPC ID 110 in the Junos Fusion. If the satellite device with the serial number **ABCDEFGHJKLM** 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 21](#).

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 9](#).

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

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Understanding Satellite Device Clustering in a Junos Fusion

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- [Understanding 40-Gbps Interfaces with QSFP+ Transceiver Roles for Satellite Devices in a Satellite Device Cluster](#) | 14

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

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.

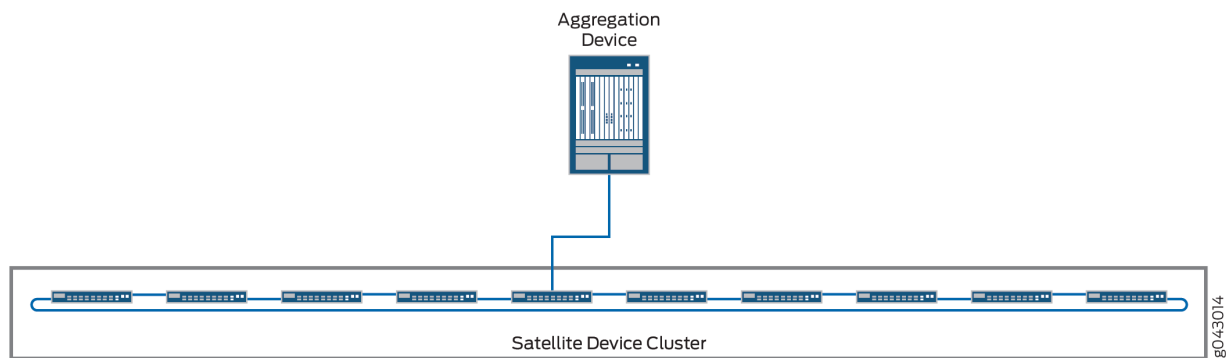
Satellite device clustering is particularly useful in scenarios where optical cabling options between buildings are limited and in scenarios where you want to preserve optical interfaces for other purposes. If you have, for instance, two buildings that have limited optical interfaces between each other 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 12 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.

NOTE: DAC cables are not supported on cluster interfaces.

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 1 on page 14](#) 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 1: 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
EX4300-24P (4 ports each on PIC1 and PIC2)	1/0 through 1/3 and 2/0 through 2/3

Table 1: Default Uplink Interfaces for Junos Fusion Enterprise Satellite Devices *(Continued)*

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 1/0 through 1/1 2/0 through 2/7
EX4300-48P (4 ports each on PIC1 and PIC2)	1/0 through 1/3 and 2/0 through 2/3
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 THIS SECTION

- [Understanding Cascade Ports | 18](#)
- [Understanding Uplink Ports | 18](#)
- [Understanding Extended Ports | 19](#)

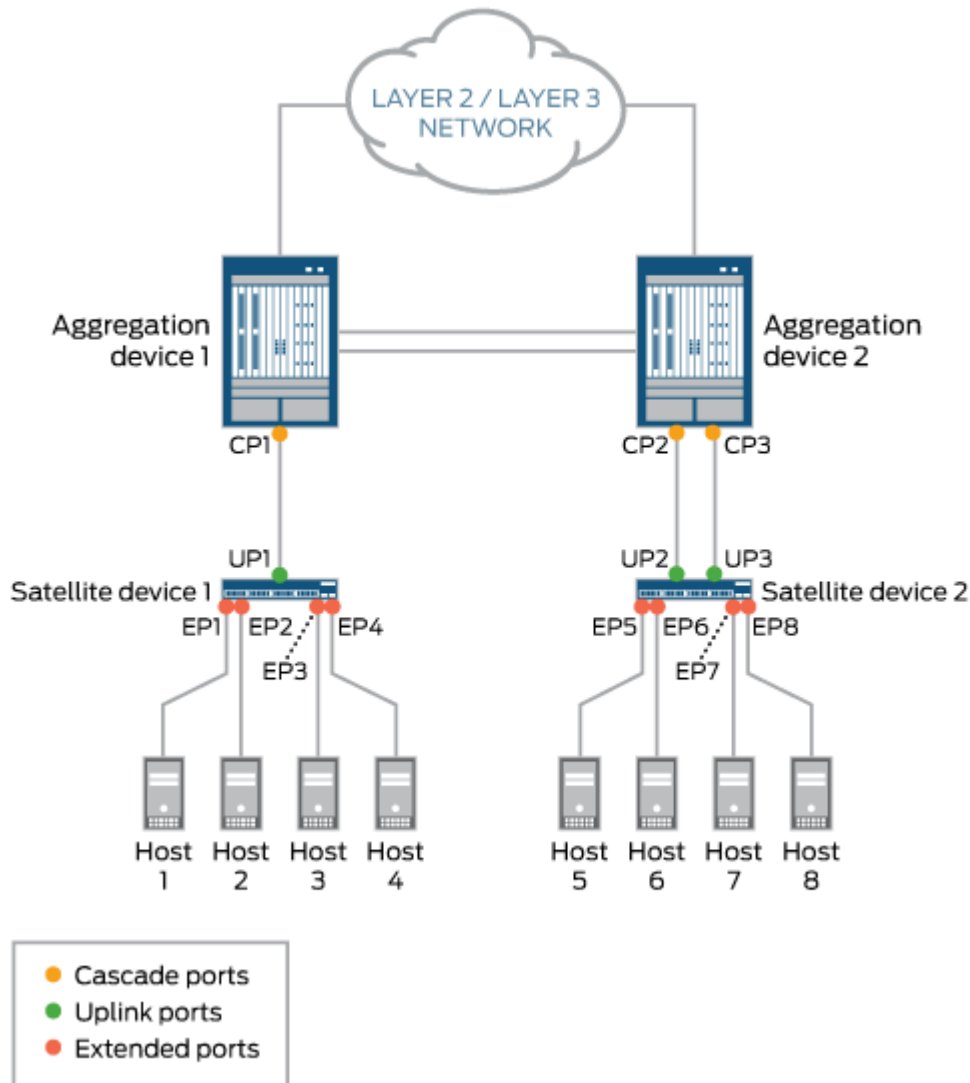
In a Junos Fusion topology, cascade, uplink, and extended ports are components that play key roles. [Figure 5 on page 17](#) shows a sample Junos Fusion topology, which serves as a point of reference for this discussion of cascade, uplink, and extended ports.

In the Junos Fusion topology shown in [Figure 5 on page 17](#), 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 has a single-homed connection to its respective aggregation device through one or two links.

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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This topic provides the following information:

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 17](#), 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.

When there are multiple cascade port connections to a satellite device, as shown in [Figure 5 on page 17](#), 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 17](#), 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.

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 17](#), 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, Ethertype, 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 17](#), 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

- CoS policies

RELATED DOCUMENTATION

Understanding the Flow of Data Packets in a Junos Fusion Topology

[hash-key](#)

[enhanced-hash-key](#)

Understanding Port-Based Authentication in a Junos Fusion Provider Edge

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

IN THIS SECTION

- [Understanding Junos OS for the Aggregation Device in a Junos Fusion | 21](#)
- [Understanding Satellite Software for the Satellite Devices in a Junos Fusion | 21](#)
- [Understanding the Preboot eXecution Environment \(PXE\) Junos OS Software Package for QFX5100 Switches in a Junos Fusion | 22](#)
- [Understanding Minimum Software Requirements for a Junos Fusion | 23](#)
- [Understanding Satellite Software Upgrade Groups | 23](#)

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

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*.

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

IN THIS SECTION

- [Aggregation Devices | 24](#)
- [Satellite Devices | 28](#)

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

It covers:

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

[Table 2 on page 25](#) 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 2: 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
MX10008 Universal Routing Platform	20.1R1
MX10016 Universal Routing Platform	20.1R1

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 function (GNF) on an MX480, MX960, 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, only EX4300 and QFX 5110 switches are supported 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 3 on page 27 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 3: 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
MPC2 EQ	14.2R3
MPC2E EQ	14.2R3
MPC2E NG	14.2R6
MPC2E NG Q	14.2R6
MPC3E	14.2R3
MPC3E NG	14.2R6

Table 3: MX Series 5G Universal Routing Platform Line Card Cascade Port Support *(Continued)*

Hardware	Initial Junos OS Release
MPC3E NG Q	14.2R6
MPC4E	14.2R3
MPC5E	14.2R3
MPC5EQ	14.2R3
MPC6E	14.2R3
NOTE: MPC6E is supported with the 10-Gigabit Ethernet MIC with SFP+ (24 Ports) only	
MPC7E-10G	16.1R1
MPC7E-MRATE	16.1R1
NOTE: You can configure the 10-Gigabit Ethernet, 40-Gigabit Ethernet, or the 100-Gigabit Ethernet ports on the MPC7E-MRATE as cascade ports.	
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

Table 4 on page 29 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 recommend 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 4: Supported Satellite Device Hardware and Initial Junos OS Release

Hardware	Initial Junos OS Release —Satellite Device	Initial Junos OS Release—Aggregation Device	Minimum Satellite Software 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
QFX5110-48S	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

Table 4: Supported Satellite Device Hardware and Initial Junos OS Release (Continued)

Hardware	Initial Junos OS Release —Satellite Device	Initial Junos OS Release—Aggregation Device	Minimum Satellite Software Version
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

NOTE: The QFX5110-48S does not support channelized ports in a Junos Fusion environment.

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 function (GNF) on an MX480, MX960, MX2010, and MX2020 series router.

RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 52](#)

[Managing Satellite Software Upgrade Groups in a Junos Fusion | 111](#)

[Converting a Satellite Device in a Junos Fusion to a Standalone Device | 133](#)

Understanding the Flow of Data Packets in a Junos Fusion Topology

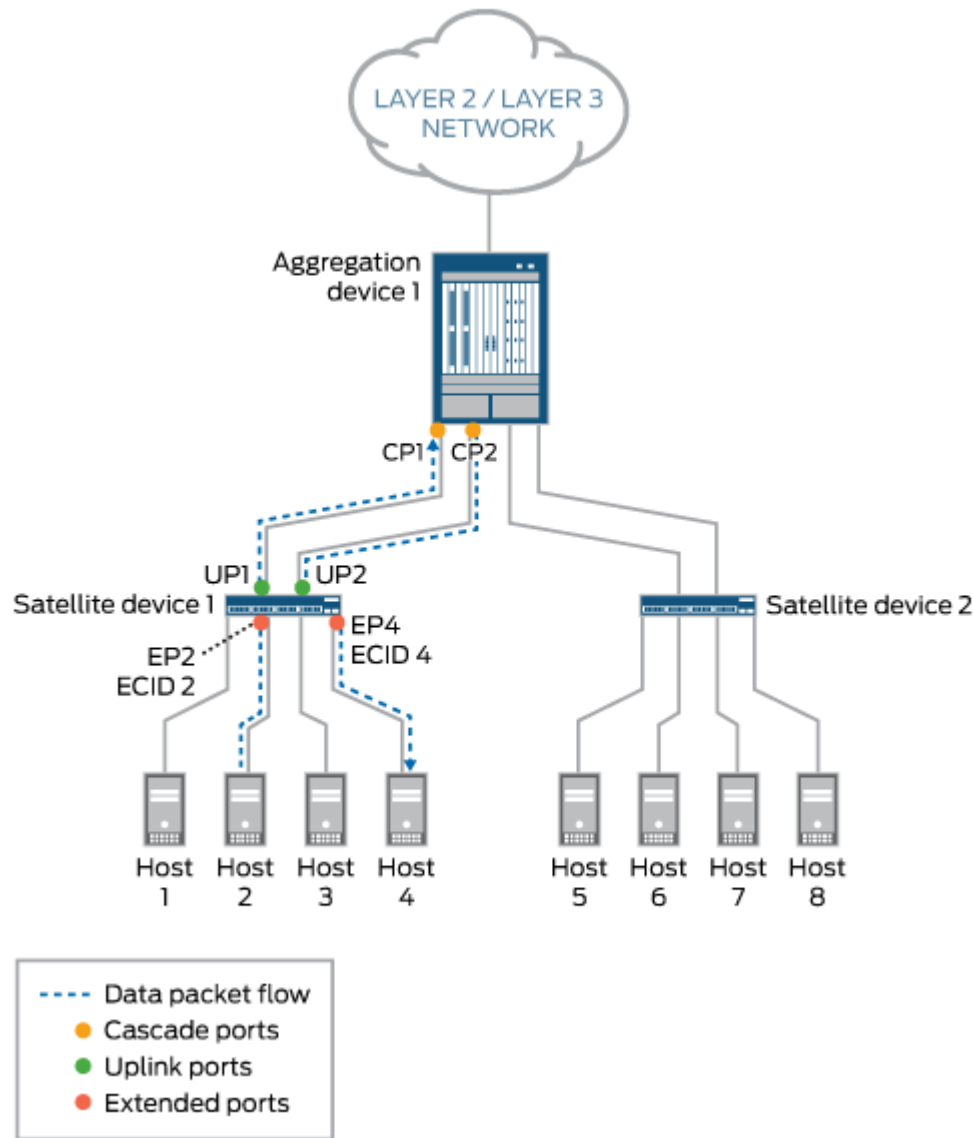
All Ethernet data packets that are exchanged between aggregation devices and satellite devices in a Junos Fusion topology include an E-channel tag (ETAG) header that carries an E-channel identifier (ECID) value. The ECID value, which is assigned by the aggregation device, identifies the source or destination 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 6 on page 32.](#))

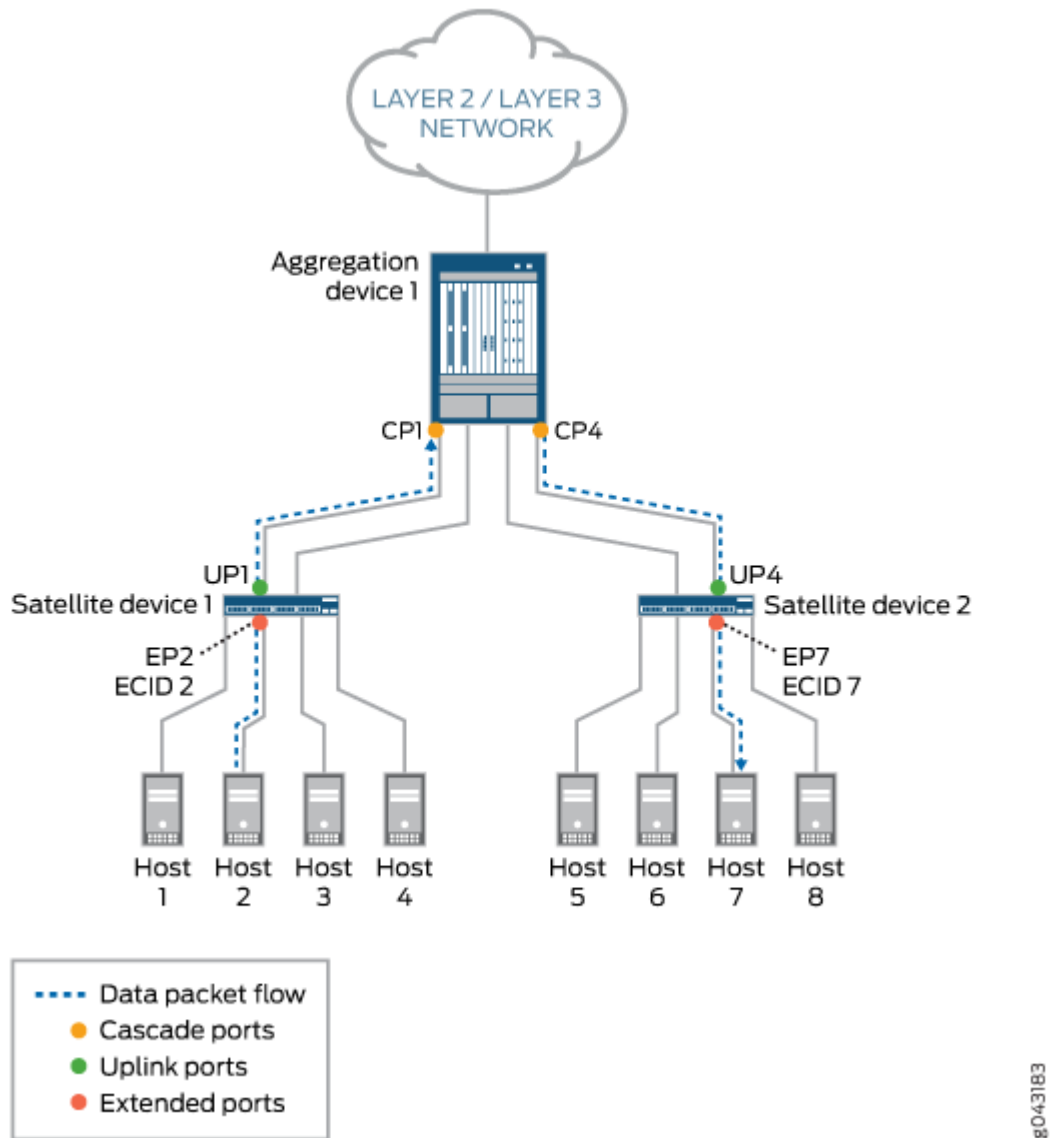
- Scenario 2—A host on one satellite device sends a packet to another host on the other satellite device. For example, Host 2, which is connected to Satellite device 1, sends a unicast packet to Host 7, which is connected to Satellite device 2. (See [Figure 7 on page 33.](#))

Figure 6: Layer 2 Unicast Data Packet Flow Through a Junos Fusion Topology—Scenario 1



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Figure 7: 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 | 5](#)

[Understanding Junos Fusion Enterprise Components](#)

Understanding Satellite Policies in a Junos Fusion

IN THIS SECTION

- [Satellite Policies Overview | 35](#)
- [Understanding Environment Monitoring Satellite Policies | 35](#)

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.

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.

RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 52](#)

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

Junos Fusion Provider Edge Supported Protocols

IN THIS SECTION

- [Layer 3 Protocols Supported on Junos Fusion Provider Edge | 37](#)
- [Multicast Protocols Supported on Junos Fusion Provider Edge | 39](#)
- [VPN Protocols Supported on Junos Fusion Provider Edge | 40](#)

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

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
- LACP
- Segment Routing

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
- LACP

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 centralized BFD with the `no-delegate-processing` statement included in the `[edit routing-options ppm]` hierarchy. LACP does not work when `no-delegate-processing` is enabled.

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 User 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 User 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 User Guide](#) and the CLI statements `ospf` and `ospf3`.

LACP Support on Junos Fusion Provider Edge

Link Aggregation Control Protocol (LACP) is one method of bundling several physical interfaces to form one logical aggregated Ethernet interface. For more information, see "[Understanding Link Aggregation and Link Aggregation Control Protocol in a Junos Fusion](#)" on page 768 and [Configuring Aggregated Ethernet Interfaces](#).

Segment Routing

Segment routing (SR) is a source-based routing technique that simplifies traffic engineering and management across network domains. It removes network state information from the transit routers and nodes in the network and places the path state information into packet headers at an ingress node. Segment routing traffic engineering (SR-TE) uses policies to steer traffic through the network. When you configure segment routing, keep in mind that the extended ports on satellite devices can only be configured as customer edge (CE) router interfaces. [Table 5 on page 39](#) lists the supported segment routing features on Junos fusion for provider edge:

Table 5: Supported Segment Routing Features

Features	Additional Information
SR and SR-TE for Intermediate System-to-Intermediate System	<i>Understanding Source Packet Routing in Networking (SPRING)</i>
Layer 2 Circuits, Layer 2 VPNs, VPLS over SR-ISIS and uncolored SR-TE	<i>Static Segment Routing Label Switched Path</i>
Layer 3 VPNs over SR-ISIS and color and Uncolored SR-TE	<i>Static Segment Routing Label Switched Path</i>
Hierarchical Class of Service of VPNs over Segment Routing	"Understanding CoS on an MX Series Aggregation Device in Junos Fusion Provider Edge" on page 874
EVPN MPLS with single-active and all -active multihoming redundancy.	<i>Segment Routing Traffic Engineering at BGP Ingress Peer Overview</i>

Multicast Protocols Supported on Junos Fusion Provider Edge

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

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](#).

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 823.

BGP MVPN on Junos Fusion Provider Edge

BGP multicast VPN (MVPN) is a method for implementing multiprotocol multicast services on a BGP MPLS Layer 3 VPN. BGP MVPNs use existing BGP and MPLS VPN infrastructure to support multicast traffic between sets of senders and sets of receivers. Junos Fusion supports the connection of BGP-based multicast VPN CE devices on the extended ports of the satellite device. For more information, see *Configuring BGP MVPNs*.

VPN Protocols Supported on Junos Fusion Provider Edge

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

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.

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 User 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 User Guide for Routing Devices](#).

DHCP Relay Support on Layer 3 VPNs

Dynamic Host Configuration Protocol (DHCP) is a network management protocol that is used to dynamically assign IP addresses and other related configuration information to network devices. The DHCP server automatically assigns IP addresses and other network parameters to client devices on the network. DHCP Relay Agent forwards the DHCP messages between the DHCP clients and the DHCP servers when the servers and clients are on different networks. Junos fusion for provider edge supports DHCP relay on EVPN-MPLS networks. It is not supported on an EVPN-MPLS network over segment routing. For more information, see [DHCP Relay Agent](#).

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 User Guide for Routing Devices](#).

EVPN with VXLAN

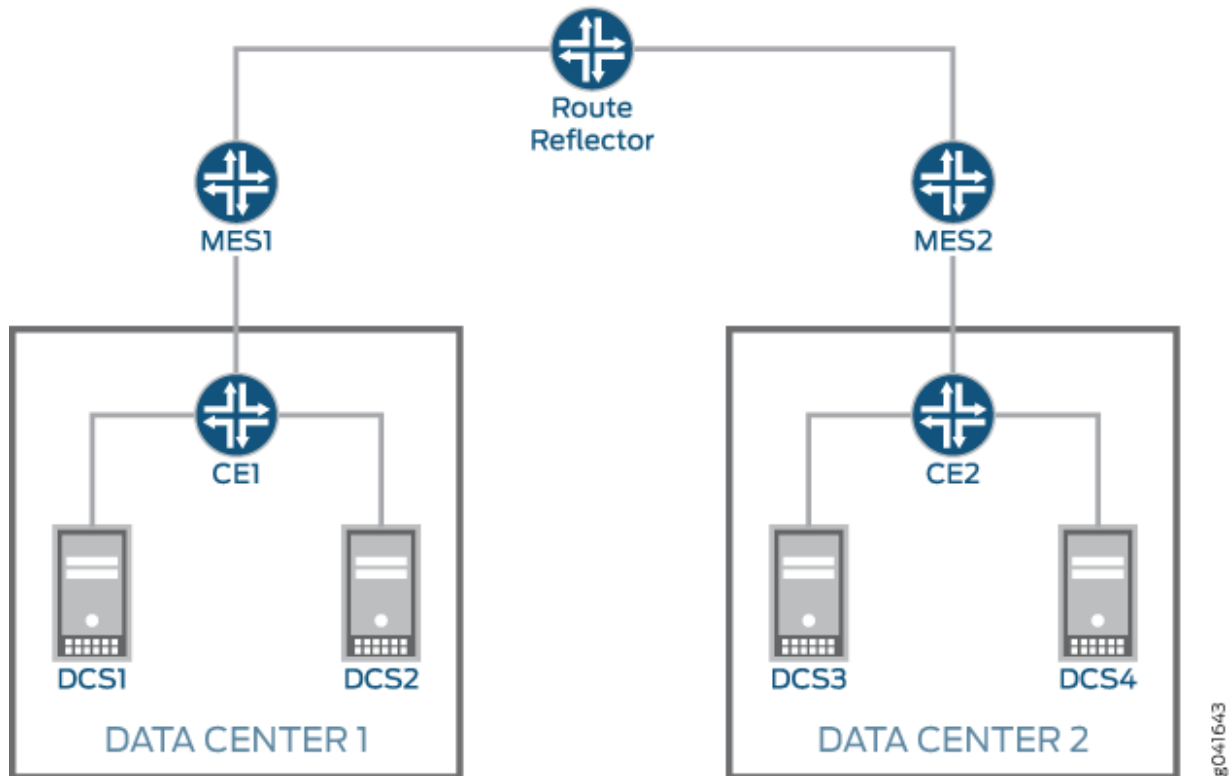
You can configure ports on the satellite devices managed by MX Series routers to support Ethernet VPNs (EVPNs) with Virtual Extensible LAN (VXLAN) encapsulation. EVPN provides layer 2 VPN services with advance multi-homing capabilities by using the BGP control plane to distribute routes over IP or IP/MPLS 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*.

EVPN-MPLS

An Ethernet VPN (EVPN) enables you to connect dispersed customer sites using a Layer 2 virtual bridge. EVPN-MPLS extends layer 2 VPN services over an MPLS network. It consists of customer edge (CE) devices connecting to MPLS edge switches, often provider edge (PE) devices that provide MPLS label functionality, EVPN-MPLS Junos Fusion Provider Edge supports connecting a customer edge (CE) on the

extended ports of the satellite device. [Figure 8 on page 42](#) shows a typical EVPN deployment. For more information on EVPN-MPLS, see *EVPN Overview*.

Figure 8: EVPN-MPLS Network

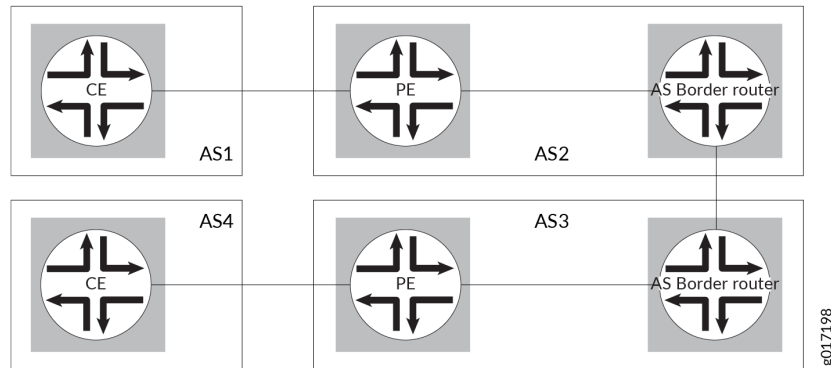


Interprovider and Carrier-of-Carrier VPNs

Interprovider VPNs provide connectivity between separate ASs. This functionality is used by a VPN customer who has connections to several different service providers, or different connections to the same service provider in different geographic regions, each of which has a different AS. For Interprovider VPNs, Junos Fusion only supports intra-AS connection on a Autonomous System Border Router (ASBR)

to the extended port. For example, in [Figure 9 on page 43](#), extended ports can only be used on the ASBR towards the PE router within each AS.

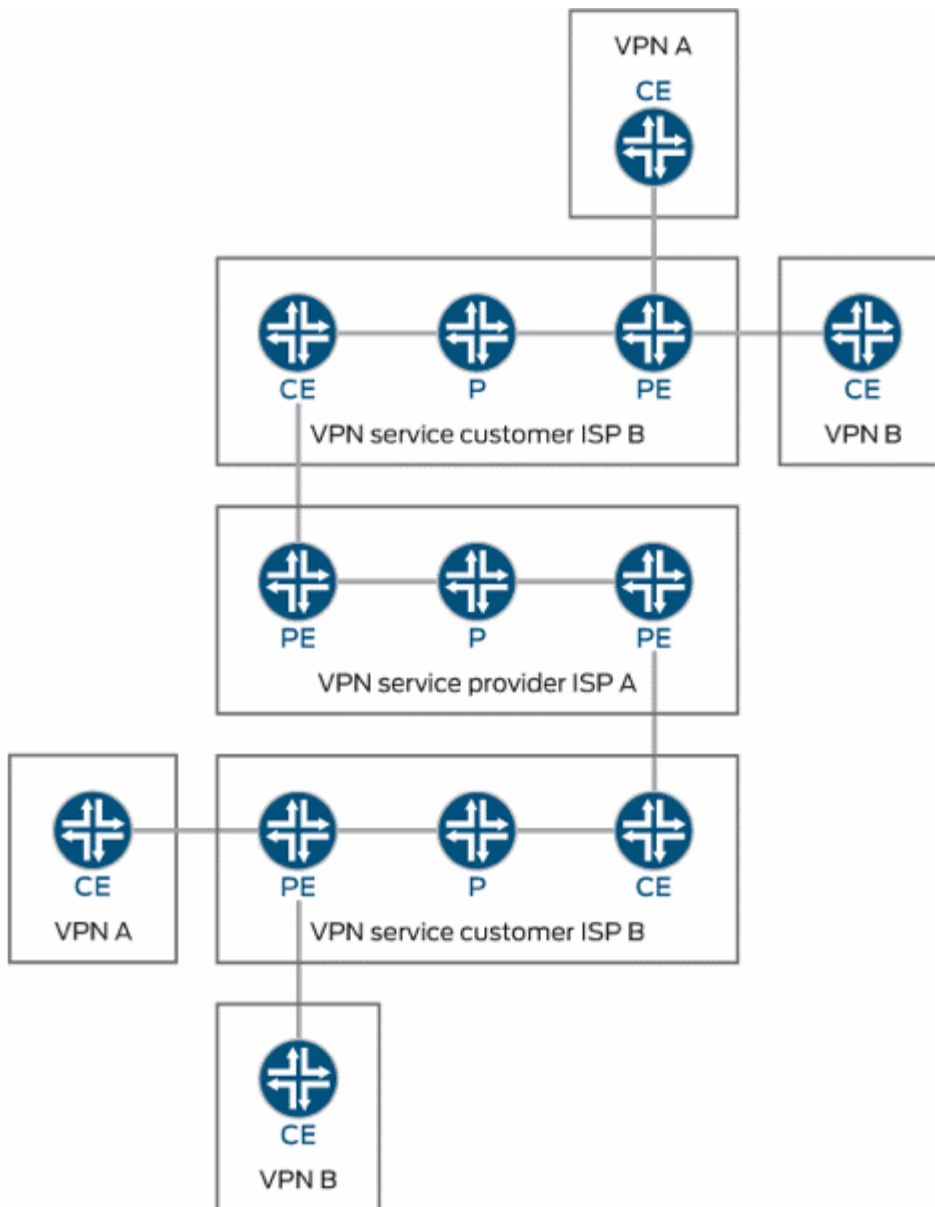
Figure 9: Inteprovider VPN Network Topology



Carrier-of-Carrier VPN service describes a hierarchical VPN (also known as a recursive VPN) model where one carrier (VPN service customer) transports their VPN traffic inside another carrier's VPN (VPN service provider). [Figure 10 on page 44](#) shows the carrier-of-carrier model with a VPN service provider (ISP A) and a VPN service customer (ISP B). The VPN service provider is the backbone network carrier and provides VPN support for the VPN service customers. Junos Fusion PE currently supports PE routers for VPN service customers. In 21.1R1, Junos Fusion PE also supports PE routers for VPN service providers. VPN-IPv4 addresses for the VPN service customer are treated as external routes by the VPN service provider and are not imported into the VPN service provider's VRF table. The VPN service provider uses MPLS to route the VPN traffic, so it must be configured on the VPN service provider network. The VPN service customer only needs to configure MPLS in the CE device that is connected to

the PE device of the VPN service provider. You can connect routers for Internet Service Provider as the customer and VPN Service Provider as the customer on the extended port.

Figure 10: Carrier-of-Carriers VPN Model



Junos Fusion Provider Edge supports 6vPE in both interprovider and carrier-of-carrier VPNs. For more information, see *Interprovider and Carrier-of-Carriers VPNs*.

RELATED DOCUMENTATION

[Understanding the Flow of Data Packets in a Junos Fusion Topology | 31](#)

[Junos Fusion Provider Edge Overview | 3](#)

Local Switching on Junos Fusion Provider Edge

IN THIS SECTION

- [Selective VLAN Local Switching | 46](#)
- [Policer | 46](#)
- [Example: Configuring Selective VLAN Local Switching | 47](#)

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

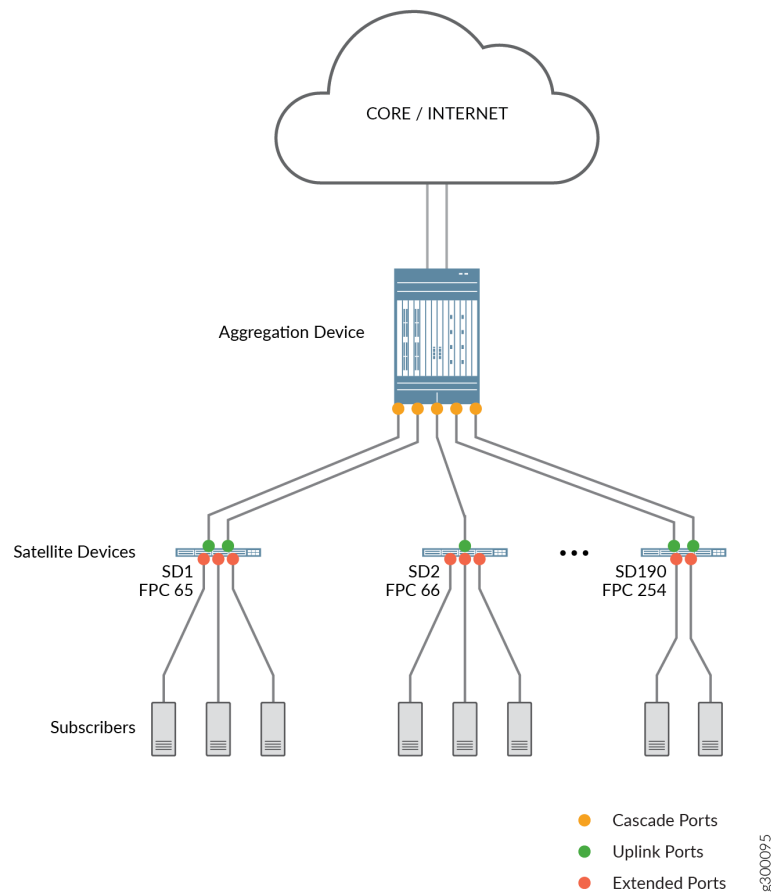
IN THIS SECTION

- [Benefits of Broadband Subscription on Junos Fusion](#) | 51

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 11 on page 50 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 11: Broadband Network Gateway on Junos Fusion



NOTE:

BNG on Junos Fusion Provider Edge is supported only with a MX204, 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 PPPoE 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](#) | 874

Junos Fusion Provider Edge Configuration

IN THIS CHAPTER

- [Configuring Junos Fusion Provider Edge | 52](#)
- [Configuring Satellite Device Alarm Handling Using an Environment Monitoring Satellite Policy in a Junos Fusion | 68](#)

Configuring Junos Fusion Provider Edge

IN THIS SECTION

- [Preparing the Aggregation Device | 52](#)
- [Configuring the Cascade Ports on the Aggregation Device | 54](#)
- [Configuring the FPC Slot Identifiers | 55](#)
- [Configuring Software Upgrade Groups on the Aggregation Device | 56](#)
- [Preparing the Satellite Device | 58](#)
- [Adding Satellite Devices to the Junos Fusion Provider Edge | 60](#)

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

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 54](#), ["Configuring the FPC Slot Identifiers" on page 55](#), and ["Configuring Software Upgrade Groups on the Aggregation Device" on page 56](#). 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 its 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 101 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:

```
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

IN THIS SECTION

- [Autoconverting a Switch into a Satellite Device | 60](#)
- [Manually Converting a Switch into a Satellite Device | 63](#)
- [Configuring a Switch into a Satellite Device Before Interconnecting It into a Junos Fusion Provider Edge | 66](#)

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

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 58](#).

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 54.](#)

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 55.](#)

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 101 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 56](#).

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 58](#) 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 54](#).

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 55](#).

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 101 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 56](#).

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

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.

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.

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 54.](#)

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 55.](#)

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 101 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 56.](#)

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

[Understanding Junos Fusion Provider Edge Components | 5](#)

[Understanding Software in a Junos Fusion Provider Edge | 21](#)

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 | 52](#)

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

Junos Fusion Provider Edge Configuration Statements

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aging-timer (Junos Fusion)

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Syntax

```
aging-timer aging-timer;
```

Hierarchy Level

```
[edit chassis satellite-management]
```

Description

Configure the aging timer on the aggregation device in a Junos Fusion.

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.

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.

Default

The default aging time is 10 minutes.

Options

The remaining statements are explained separately.

- **Range:** 2 through 60,000 minutes

Required Privilege Level

admin—To view this statement in the configuration.

admin-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

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

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alarm (Satellite Policies)

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Syntax

```
alarm {  
    linkdown [ignore | red | yellow]  
}
```

Hierarchy Level

```
[edit policy-options satellite-policies environment-monitoring-policy policy-name]
```

Description

Configure the link down alarm that is sent within the Junos Fusion whenever a satellite device experiences a link-down error.

Default

Link-down alarms are not sent on satellite devices in a Junos Fusion until an environment monitoring policy is configured.

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.

Release Information

Statement introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

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

alias (Junos Fusion)

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Syntax

```
alias alias;
```

Hierarchy Level

```
[edit chassis satellite-management fpc slot-id]
```

Description

Configure an alias to label a satellite device.

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 **show** command outputs, as well as with some configuration tasks that provide an option to identify a satellite device by its alias.

Default

Satellite devices are not assigned an alias, by default.

Options

alias The user-defined text name of the alias.

Required Privilege Level

admin—To view this statement in the configuration.

admin-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

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

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auto-satellite-conversion (Junos Fusion)

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Syntax

```
auto-satellite-conversion {  
    satellite [slot-id | range | all];  
}
```

Hierarchy Level

```
[edit chassis satellite-management]
```

Description

Enable automatic satellite conversion in a Junos Fusion.

Automatic satellite conversion automatically configures a switch into a satellite device when it is cabled into the aggregation device.

Additional configuration steps are required to add satellite devices to a Junos Fusion using automatic satellite conversion. See ["Configuring Junos Fusion Provider Edge" on page 52](#) or [Configuring or Expanding a Junos Fusion Enterprise](#).

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.

Release Information

Statement introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

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

cascade-port

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Syntax

```
cascade-port;
```

Hierarchy Level

```
[edit interfaces interface-name]
```

Description

Configure the specified interface on the aggregation device in a Junos Fusion into a cascade port.

Additional configuration is required to configure cascade ports on a Junos Fusion. See ["Configuring Junos Fusion Provider Edge" on page 52](#) or [Configuring or Expanding a Junos Fusion Enterprise](#).

Default

No interfaces are cascade ports, by default.

Options

interface-name Specifies the name of the interface.

Required Privilege Level

admin—To view this statement in the configuration.

admin-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

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

[Configuring Junos Fusion Provider Edge | 52](#)

cascade-ports

IN THIS SECTION

- [Syntax | 81](#)
- [Hierarchy Level | 81](#)
- [Description | 81](#)
- [Default | 81](#)
- [Options | 81](#)
- [Required Privilege Level | 82](#)
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Syntax

```
cascade-ports interface-name;
```

Hierarchy Level

```
[edit chassis satellite-management fpc slot-id]
```

Description

Associate a cascade port with an FPC slot ID number in a Junos Fusion.

The FPC slot ID of the satellite device is determined by the value entered as the FPC *slot-id*. For instance, if the **set chassis satellite-management fpc 105 cascade-ports xe-0/0/1** 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.

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.

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 its FPC ID—uses ge-101/0/2 as its interface name.

For additional information on the role of FPC slot IDs in a Junos Fusion, see ["Understanding Junos Fusion Provider Edge Components" on page 5](#) or [Understanding Junos Fusion Enterprise Components](#).

Default

No FPC slot IDs are associated with satellite devices, by default.

Options

interface-name Specifies the name of the interface.

Required Privilege Level

admin—To view this statement in the configuration.

admin-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

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

[Configuring Junos Fusion Provider Edge](#) | 52

description (Junos Fusion)

IN THIS SECTION

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- [Description](#) | 83
- [Default](#) | 83
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Syntax

```
description description;
```

Hierarchy Level

```
[edit chassis satellite-management fpc slot-id]
```

Description

Configure a description for the satellite device.

The description is optional and used for information purposes only.

Default

Satellite devices do not have descriptions, by default.

Options

description A text description of the satellite device.

Required Privilege Level

admin—To view this statement in the configuration.

admin-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge](#) | 52

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

environment-monitoring-policy (satellite-management)

IN THIS SECTION

- [Syntax | 84](#)
- [Hierarchy Level | 84](#)
- [Description | 84](#)
- [Default | 85](#)
- [Options | 85](#)
- [Required Privilege Level | 85](#)
- [Release Information | 85](#)

Syntax

```
environment-monitoring-policy policy-name;
```

Hierarchy Level

```
[edit chassis satellite-management]  
[edit chassis satellite-management fpc slot-id]
```

Description

Enable an environment monitoring policy in a Junos Fusion.

You configure environment monitoring policies for a Junos Fusion in the [edit policy-options environment-monitoring-policy *policy-name*] hierarchy.

You can configure an environment monitoring policy in a Junos Fusion for a single satellite device using the **fpc *slot-id*** option, or for all satellite devices in the Junos Fusion by not specifying the **fpc *slot-id*** option.

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.

Default

No environment monitoring policies for the Junos Fusion are present.

If you enable an environment monitoring policy in a Junos Fusion without specifying the **fpc slot-id** option, the environment monitoring policy is applied for all satellite devices in the Junos Fusion.

Options

policy-name Specifies the name of the environment monitoring policy.

The *policy-name* name is defined as part of the environment monitoring policy configuration procedure, which is handled in the [edit policy-options environment-monitoring-policy *policy-name*] hierarchy.

Required Privilege Level

admin—To view this statement in the configuration.

admin-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

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

Understanding Satellite Policies in a Junos Fusion

environment-monitoring-policy (satellite-policies)

IN THIS SECTION

- [Syntax | 86](#)
- [Hierarchy Level | 86](#)
- [Description | 86](#)
- [Options | 87](#)
- [Required Privilege Level | 87](#)
- [Release Information | 87](#)

Syntax

```
environment-monitoring-policy policy-name {  
    alarm {  
        linkdown [ignore | red | yellow]  
    }  
    term term-name{  
        from {  
            product-model model-name;  
        }  
    }  
}
```

Hierarchy Level

```
[edit policy-options satellite-policies]
```

Description

Configure an environment monitoring satellite policy for a device or devices in a Junos Fusion.

An environment monitoring satellite policy is used to configure alarm behavior on satellite devices in a Junos Fusion.

The environment monitoring policy is applied to a Junos Fusion using the `environment-monitoring-policy` statement in the `[edit chassis satellite-management]` or `[edit chassis satellite-management fpc slot-id]` hierarchy levels.

Options

policy-name Specifies the user-defined name of the environment monitoring policy.

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.

Release Information

Statement introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

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

Understanding Satellite Policies in a Junos Fusion

fpc (Junos Fusion)

IN THIS SECTION

- [Syntax | 88](#)
- [Hierarchy Level | 88](#)
- [Description | 88](#)
- [Options | 88](#)
- [Required Privilege Level | 89](#)

Syntax

```
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;
  }
}
```

Hierarchy Level

```
[edit chassis satellite-management]
```

Description

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.

Options

- slot-id*** Specifies the FPC identifier of the device and functions as the FPC identifier in the interface name when configuring satellite device interfaces.
- In a Junos Fusion Enterprise or Junos Fusion Provider Edge, the *slot-id* must have a value of 34 or greater.

NOTE: MPC10E and MPC11E are not supported in Junos Fusion, but can coexist with other MPC line cards in the MX router chassis that connect to satellite devices. When using MPC10E/MPC11E line cards in an MX series router that is supporting Junos Fusion, you must use a value range of 160 - 252 as the FPC identifier for the satellite device interfaces.

Junos Fusion does not support the hyper mode feature, so you must also use the `set forwarding-options no-hyper-mode` statement.

local switching Enables local-switching for all the ports on the satellite device.

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.

Release Information

Statement introduced in Junos OS Release 14.2R3.

local-switching and selective-vlan-switching introduced in Junos OS Release 17.2R1 for Junos Fusion Provider Edge.

RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 52](#)

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

linkdown (satellite-policies alarm)

IN THIS SECTION

- [Syntax | 90](#)
- [Hierarchy Level | 90](#)
- [Description | 90](#)
- [Options | 90](#)
- [Required Privilege Level | 91](#)
- [Release Information | 91](#)

Syntax

```
linkdown [ignore | red | yellow]
```

Hierarchy Level

```
[edit policy-options satellite-policies environment-monitoring-policy policy-name alarm]
```

Description

Configure the alarm behavior when an Ethernet link goes down on a satellite device in a Junos Fusion.

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.

Options

- | | |
|---------------|-----------------------------------------------------------------|
| ignore | Do not signal an alarm when an Ethernet link-down event occurs. |
| red | Raise a major alarm when an Ethernet link-down event occurs. |
| yellow | Raise a minor alarm when an Ethernet link-down event occurs. |

Required Privilege Level

admin—To view this statement in the configuration.

admin-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

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

Understanding Satellite Policies in a Junos Fusion

network-services

IN THIS SECTION

- [Syntax | 91](#)
- [Hierarchy Level | 92](#)
- [Description | 92](#)
- [Default | 92](#)
- [Options | 92](#)
- [Required Privilege Level | 92](#)
- [Release Information | 93](#)

Syntax

```
network-services (ethernet | enhanced-ethernet | ip | enhanced-ip | lan);
```

Hierarchy Level

[edit chassis]

Description

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 enhanced-ip or enhanced-ethernet.

MX2010 and MX2020 support only enhanced-ip and enhanced-ethernet network services modes.

Default

- MX80, MX104, MX2010, MX2020—enhanced-ip
- MX240, MX480, MX960—ip

Options

ethernet—Set the router's network services to Ethernet and use standard, compiled firewall filter format.

enhanced-ethernet—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.

ip—Set the router's network services to Internet Protocol and use standard, compiled firewall filter format.

enhanced-ip—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.

lan—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.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced before Junos OS Release 8.5.

enhanced-ethernet and enhanced-ip options introduced in Junos OS Release 11.4.

limited-ifl-scaling option introduced in Junos OS Release 15.1R3 for MX Series routers.

RELATED DOCUMENTATION

[Network Services Mode Overview](#)

[Firewall Filters and Enhanced Network Services Mode Overview](#)

[Configuring Junos OS to Run a Specific Network Services Mode in MX Series Routers](#)

[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)

IN THIS SECTION

- [Syntax | 93](#)
- [Hierarchy Level | 94](#)
- [Description | 94](#)
- [Options | 94](#)
- [Required Privilege Level | 94](#)
- [Release Information | 94](#)

Syntax

```
satellite [slot-id | range | all];
```


Hierarchy Level

```
[edit chassis satellite-management auto-satellite-conversion]
```

Description

Specify the interface to enable automatic software conversion in a Junos Fusion.

The device that is cabled to the slot specified in this command is automatically converted into a satellite device.

Additional configuration steps are required to add satellite devices to a Junos Fusion using automatic satellite conversion. See [Configuring or Expanding a Junos Fusion Enterprise](#) or ["Configuring Junos Fusion Provider Edge" on page 52](#).

Options

slot-id Specifies the FPC slot identifier of the device that will be automatically converted into a satellite device.

The FPC identifier must be mapped to a cascade port interface before this command is operational. See [Configuring or Expanding a Junos Fusion Enterprise](#) or ["Configuring Junos Fusion Provider Edge" on page 52](#).

range 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 *range* of **103-105**.

all Specifies that all FPC slot identifiers in the Junos Fusion will automatically be converted into satellite devices.

Required Privilege Level

admin—To view this statement in the configuration.

admin-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 52](#)

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

satellite (Junos Fusion Satellite Software Upgrade Groups)

IN THIS SECTION

- [Syntax | 95](#)
- [Hierarchy Level | 95](#)
- [Description | 95](#)
- [Options | 96](#)
- [Required Privilege Level | 96](#)
- [Release Information | 96](#)

Syntax

```
satellite [slot-id | range | all];
```

Hierarchy Level

```
[edit chassis satellite-management upgrade-groups upgrade-group-name]
```

Description

Specify the satellite device to add to the satellite software upgrade group.

This statement is entered on an aggregation device in a Junos Fusion. Software upgrade groups are configured and managed using the aggregation device.

Options

- slot-id*** Specifies the FPC slot identification number of the satellite device that is being added to the satellite software upgrade group.
- range*** 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 *range* of **103-105**.
- all** Specifies that all FPC slot identifiers in the Junos Fusion are added to 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.

Release Information

Statement introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 52](#)

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

satellite-management (Junos Fusion)

IN THIS SECTION

- [Syntax | 97](#)
- [Hierarchy Level | 98](#)
- [Description | 99](#)

- Options | 99
- Required Privilege Level | 99
- Release Information | 99

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;
        }
    }
    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;
            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](#)]

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.

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.

Release Information

Statement introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

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

[Configuring Junos Fusion Provider Edge | 52](#)

serial-number (Junos Fusion)

IN THIS SECTION

- [Syntax | 100](#)
- [Hierarchy Level | 100](#)
- [Description | 100](#)
- [Default | 100](#)
- [Options | 101](#)
- [Required Privilege Level | 101](#)

Syntax

```
serial-number serial-number;
```

Hierarchy Level

```
[edit chassis satellite-management fpc slot-id]
```

Description

Bind the specified FPC slot ID to a satellite device based on the serial number.

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 unique ID-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.

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 its FPC ID—uses ge-101/0/2 as its interface name.

For additional information on the role of FPC slot IDs in a Junos Fusion, see [Understanding Junos Fusion Enterprise Components](#) or "[Understanding Junos Fusion Provider Edge Components](#)" on page 5.

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.

Default

No FPC slot IDs are associated with satellite devices, by default.

Options

serial-number Specifies the serial number of the satellite device.

Required Privilege Level

admin—To view this statement in the configuration.

admin-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 14.2R3.

Statement introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.

RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 52](#)

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

selective-vlan-switching

IN THIS SECTION

- [Syntax | 102](#)
- [Hierarchy Level | 102](#)
- [Description | 102](#)
- [Options | 102](#)
- [Required Privilege Level | 102](#)
- [Release Information | 102](#)

Syntax

```
selective-vlan-switching {  
    routing-instance routing-instance;  
}
```

Hierarchy Level

```
[edit forwarding-options satellite fpc],
```

Description

Enables local switching for only a select number of VLANs on the satellite device.

Options

routing-instance Configure routing instance.

Required Privilege Level

admin—To view this statement in the configuration.

admin-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 17.2R1.

RELATED DOCUMENTATION

| [Configuring Junos Fusion Provider Edge](#) | 52

single-home (Junos Fusion)

IN THIS SECTION

- [Syntax | 103](#)
- [Hierarchy Level | 103](#)
- [Description | 103](#)
- [Options | 103](#)
- [Required Privilege Level | 103](#)
- [Release Information | 104](#)

Syntax

```
single-home {  
    satellite [slot-id | slot-id-range | all];  
}
```

Hierarchy Level

```
[edit chassis satellite-management]
```

Description

Specify that the links connecting the satellite device to the aggregation device are connected to the aggregation device only.

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.

Release Information

Statement introduced in Junos OS Release 14.2R3.

Statement introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.

RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 52](#)

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

system-id (Junos Fusion)

IN THIS SECTION

- [Syntax | 104](#)
- [Hierarchy Level | 105](#)
- [Description | 105](#)
- [Default | 105](#)
- [Options | 105](#)
- [Required Privilege Level | 106](#)
- [Release Information | 106](#)

Syntax

```
system-id mac-address;
```

Hierarchy Level

```
[edit chassis satellite-management fpc slot-id]
```

Description

Assign the specified FPC identifier to the satellite device based on the satellite device's MAC address.

For instance, if you wanted the satellite device using MAC address **01:02:03:AA:BB:CC** to be assigned FPC identifier 101, enter the **set chassis satellite-management fpc 101 system-id 01:02:03:AA:BB:CC** statement.

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.

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 its FPC ID—uses ge-101/0/2 as its interface name.

For additional information on the role of FPC slot IDs in a Junos Fusion, see ["Understanding Junos Fusion Provider Edge Components" on page 5](#) or [Understanding Junos Fusion Enterprise Components](#).

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.

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.

Default

No FPC slot IDs are associated with satellite devices, by default.

Options

mac-address Specifies the MAC address of the satellite device.

Required Privilege Level

admin—To view this statement in the configuration.

admin-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 52](#)

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

term (satellite-policies)

IN THIS SECTION

- [Syntax | 106](#)
- [Hierarchy Level | 107](#)
- [Description | 107](#)
- [Options | 107](#)
- [Required Privilege Level | 108](#)
- [Release Information | 108](#)

Syntax

```
term term-name{
  from {
    product-modelmodel-name;
  }
}
```

Hierarchy Level

```
[edit policy-options satellite-policies candidate-uplink-policy policy-name],
[edit policy-options satellite-policies environment-monitoring-policy policy-name],
[edit policy-options satellite-policies forwarding-policy policy-name]
```

Description

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.

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.

The actions of a candidate uplink satellite policy, an environment monitoring satellite policy, or forwarding-policy satellite policy are defined at the [edit policy-options satellite-policies candidate-uplink-policy *policy-name*, [edit policy-options satellite-policies environment-monitoring-policy *policy-name*], and [edit policy-options satellite-policies forwarding-policy *policy-name* hierarchy levels.

Options

term <i>term-name</i>	<p>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>
from	<p>(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 <i>from</i> option, the satellite policy is applied globally.</p>
product-model <i>model-name</i>	<p>Defines the product model of the satellite device that uses the satellite policy.</p> <p>If you want the satellite policy to apply to all EX4300 switches in the satellite device role, enter EX4300* as the <i>model-name</i>.</p> <p>If you want the satellite policy to apply to all QFX5100 switches in the satellite device role, enter QFX5100* as the <i>model-name</i>.</p>

Required Privilege Level

admin—To view this statement in the configuration.

admin-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 14.2R3.

Statement introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.

RELATED DOCUMENTATION

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

Understanding Satellite Policies in a Junos Fusion

upgrade-groups (Junos Fusion)

IN THIS SECTION

- [Syntax | 109](#)
- [Hierarchy Level | 109](#)
- [Description | 109](#)
- [Default | 110](#)
- [Options | 110](#)
- [Required Privilege Level | 110](#)
- [Release Information | 110](#)

Syntax

```
upgrade-groups upgrade-group-name {
    satellite [slot-id | range | all];
}
```

Hierarchy Level

```
[edit chassis satellite-management]
```

Description

Create and name a satellite software upgrade group for a Junos Fusion, or specify an existing satellite software upgrade group to configure.

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.

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.

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

To associate a satellite software package with a satellite software upgrade group, use the **request system software add *package-name* upgrade-group *upgrade-group-name*** command.

This statement is entered on an aggregation device in a Junos Fusion. Software upgrade groups are configured and managed from the aggregation device.

The software upgrade group configurations must match exactly—including the same *package-name* and *upgrade-group-name*—in every Junos Fusion with dual aggregation devices to avoid satellite device downtime.

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 [Understanding Software](#)

in a [Junos Fusion Enterprise](#) for additional information on software management for a satellite device cluster.

Default

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.

Release Information

Statement introduced in Junos OS Release 14.2R3.

Statement introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.

RELATED DOCUMENTATION

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

[Configuring Junos Fusion Provider Edge](#) | 52

Junos Fusion Provider Edge Administration

IN THIS CHAPTER

- Managing Satellite Software Upgrade Groups in a Junos Fusion | 111
- Verifying Connectivity, Device States, Satellite Software Versions, and Operations in a Junos Fusion | 116
- Converting a Satellite Device in a Junos Fusion to a Standalone Device | 133
- Installing Junos OS Software on a Standalone Device Running Satellite Software | 138

Managing Satellite Software Upgrade Groups in a Junos Fusion

IN THIS SECTION

- Creating a Satellite Software Upgrade Group | 112
- Adding Satellite Devices to a Satellite Software Upgrade Group | 112
- Removing a Satellite Device from a Satellite Software Upgrade Group | 113
- Modifying the Satellite Software Used by a Satellite Software Upgrade Group | 114
- Deleting Associated Satellite Software from a Satellite Software Upgrade Group | 115
- Deleting Satellite Software on the Aggregation Device | 116

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 52](#) 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

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 52](#) 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 52](#) or [Configuring or Expanding a Junos Fusion Enterprise](#).

Modifying the Satellite Software Used by a Satellite 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.

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

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 | 52](#)

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

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

IN THIS SECTION

- [Verifying a Junos Fusion Configuration | 117](#)
- [Verifying Basic Junos Fusion Connectivity | 118](#)
- [Verifying the Satellite Device Hardware Model | 120](#)
- [Verifying Cascade Port and Uplink Port State | 121](#)
- [Verifying That a Cascade Port Recognizes a Satellite Device | 125](#)
- [Verifying Extended Port Operation | 128](#)

- [Verifying the Satellite Software Version | 130](#)
- [Verifying the Devices and Software Used in a Satellite Software Upgrade Group | 132](#)

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

IN THIS SECTION

- [Purpose | 117](#)
- [Action | 117](#)
- [Meaning | 118](#)

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.

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

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

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

IN THIS SECTION

- Purpose | 118
- Action | 118
- Meaning | 119

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.

user@aggregation-device> show chassis satellite					
		Device	Cascade	Port	Extended Ports
Alias	Slot	State	Ports	State	Total/Up
qfx5100-24q-01	100	Online	xe-0/0/1	online	9/2
			xe-1/3/0	online	
qfx5100-24q-02	101	Online	xe-0/0/2	online	20/12
			xe-1/3/1	online	

qfx5100-24q-03	102	Online	xe-0/0/3	online	16/6
			xe-1/3/2	online	
qfx5100-24q-04	103	Online	xe-0/0/4	online	16/4
			xe-1/3/3	online	
qfx5100-24q-05	104	Online	xe-0/0/5	online	13/3
			xe-1/3/4	online	
qfx5100-24q-06	105	Online	xe-0/0/6	online	24/15
			xe-1/3/5	online	
qfx5100-24q-07	106	Online	xe-0/0/7	online	24/15
			xe-1/3/6	online	
qfx5100-24q-08	107	Online	xe-0/0/8	online	21/12
			xe-1/3/7	online	
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

IN THIS SECTION

- Purpose | 120
- Action | 120
- Meaning | 121

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
```

Device		Extended Ports		
Slot	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

IN THIS SECTION

- Purpose | 121
- Action | 121
- Meaning | 125

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

IN THIS SECTION

- Purpose | 125
- Action | 125
- Meaning | 127

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

IN THIS SECTION

- Purpose | 128
- Action | 128
- Meaning | 130

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	Tx State	Admin/Op Request State	IFD State	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

IN THIS SECTION

- Purpose | 130
- Action | 130
- Meaning | 131

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
                  group2
                  group3
                  group4
                  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

IN THIS SECTION

- Purpose | 132
- Action | 132
- Meaning | 133

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	Slot	Device
		State		State
__ungrouped__				
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
			113	version-in-sync
group2	3.0R1.1	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 | 52](#)

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

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

IN THIS SECTION

- [Download Junos OS Software | 134](#)
- [Disable the Automatic Conversion Configuration | 135](#)
- [Install Junos OS Software on the Satellite Device | 136](#)

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*.

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*.

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, uncalbe the device from the Junos Fusion topology. See *Remove 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

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*, 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*.

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\n\nw" | 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

Junos Fusion Provider Edge Operational Commands

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request chassis device-mode satellite

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Syntax

```
request chassis device-mode satellite package-name
```


Description

Manually install satellite software onto a switch before interconnecting the switch as a satellite device into a Junos Fusion.

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 ["Configuring Junos Fusion Provider Edge" on page 52](#) or [Configuring or Expanding a Junos Fusion Enterprise](#) before manually installing satellite software.

This command is entered from a standalone device before it is configured into a satellite device in a Junos Fusion.

Options

package-name The URL to the satellite software package.

Required Privilege Level

system-control

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
```

Release Information

Command introduced in Junos OS Release 14.1X53-D16.

RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 52](#)

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

request chassis satellite disable

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Syntax

```
request chassis satellite disable  
  <device-alias alias-name>  
  <fpc-slot fpc-slot>
```

Description

Disable the specified satellite device from the Junos Fusion.

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.

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 *request chassis satellite install* command to install Junos OS onto your satellite device before removing it from the Junos Fusion. See [Removing a Satellite Device from a Junos Fusion](#).

You can reenable a satellite device that was disabled using this command using the *request chassis satellite enable* command.

Options

- device-alias** *alias-name* Disable the satellite device with the specified alias name from the Junos Fusion.
- fpc** *fpc-slot* Disable the satellite device with the specified FPC slot identifier from the Junos Fusion.

Required Privilege Level

system-control

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
```

Release Information

Command introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

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

request chassis satellite enable

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Syntax

```
request chassis satellite enable  
  <device-alias alias-name>  
  <fpc-slot fpc-slot>
```

Description

Enable the specified device as a satellite device in a Junos Fusion.

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.

Options

device-alias <i>alias-name</i>	Enable the satellite device with the specified alias name in the Junos Fusion.
fpc <i>fpc-slot</i>	Enable the device with the specified FPC slot ID as a satellite device in the Junos Fusion.

Required Privilege Level

system-control

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
```

Release Information

Command introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

[Configuring or Expanding a Junos Fusion Enterprise](#)
[Configuring Junos Fusion Provider Edge](#) | 52

request chassis satellite file-copy

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- Required Privilege Level | 148
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Syntax

```
request chassis satellite file-copy [remote | local] <source-URL> <destination-URL>
```

Description

Copy a file between a satellite device and an aggregation device in a Junos Fusion.

Options

local	Indicate that the file-copy from satellite-device has been initiated by a local user.
remote	Indicate that the file-copy from satellite-device has been initiated by a remote user.
<i>source-URL</i>	<p>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 <i>sdslot-id-number</i> at the beginning of the <i>source-URL</i>. For example, enter <i>sd101:/var/tmp/filename.txt</i> 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>
<i>destination-URL</i>	<p>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 <i>sdslot-id-number</i> at the beginning of the <i>destination-URL</i>. For example, enter <i>sd101:/var/tmp/</i> to specify the /var/tmp directory on the satellite device using FPC slot ID number 101 as the <i>source-URL</i>.</p>

Required Privilege Level

system-control

Sample Output

request chassis satellite file-copy

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

Release Information

Command introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

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

[Configuring Junos Fusion Provider Edge](#) | 52

request chassis satellite install

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Syntax

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

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

<i>package-name</i>	Specify the URL to the Junos OS image to install onto the satellite device.
<i>fpc fpc-slot</i>	Install the Junos OS software onto the satellite device with the specified FPC slot ID in the Junos Fusion.
<i>device-alias device-alias</i>	Install the Junos OS software onto the satellite device with the alias name in the Junos Fusion.
<i>no-confirm</i>	(Optional) Install the Junos OS software onto the satellite device immediately without further confirmation prompting.

Required Privilege Level

system-control

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
```

Release Information

Command introduced in Junos OS Release 14.2R3.

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[Configuring Junos Fusion Provider Edge](#) | 52

request chassis satellite interface

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Syntax

```
request chassis satellite interface interface-name  
device-mode satellite
```

Description

Change the device mode for a device.

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.

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 ["Configuring Junos Fusion Provider Edge" on page 52](#) or [Configuring or Expanding a Junos Fusion Enterprise](#).

Options

interface-name 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.

Required Privilege Level

system-control

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
```

Release Information

Command introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 52](#)

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

request chassis satellite login

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Syntax

```
request chassis satellite login  
  <fpc-slot fpc-slot>  
  <interface-name interface-name>
```

Description

Log in to the satellite device from the aggregation device.

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.

Options

fpc <i>fpc-slot</i>	Log in to the satellite device with the specified FPC slot ID.
interface-name <i>interface-name</i>	Log in to the satellite device connected to the specified interface. The <i>interface-name</i> is the cascade port on the aggregation device.

Required Privilege Level

system-control

Sample Output

request chassis satellite login fpc-slot 101

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

Release Information

Command introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

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request chassis satellite reboot

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Syntax

```
request chassis satellite reboot  
  <fpc-slot fpc-slot>  
  <range range>
```

Description

Reboot the satellite device or devices from the aggregation device in a Junos Fusion.

Options

fpc *fpc-slot* Reboot the satellite device with the specified FPC slot identifier.

range *range* Reboot all satellite devices in a range of FPC slot identifiers.

For instance, you can reboot the satellite devices using FPC slot identifiers 101, 102, and 103 by entering a *range* of 101-103.

Required Privilege Level

system-control

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
```

Release Information

Command introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

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

[Configuring Junos Fusion Provider Edge](#) | 52

request chassis satellite restart

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Syntax

```
request chassis satellite restart
    [fpc-slot fpc-slot | range range]
    <process-name>
```

Description

Restart a process on a satellite device or devices from the aggregation device in a Junos Fusion.

You would typically restart a process in a Junos Fusion for troubleshooting or debugging purposes.

This command is intended for use by expert users for debugging purposes.

Options

- | | |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>fpc fpc-slot</i> | Restart the specified process on the satellite device in the specified FPC slot ID only. |
| <i>range</i> | Restart the process on the satellite devices in the specified range of FPC slot IDs only.

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 101-103. |
| <i>process-name</i> | Restart the specified process on the specified FPC slot ID or range of FPC slot IDs. |

Required Privilege Level

system-control

Release Information

Command introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

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

[Configuring Junos Fusion Provider Edge](#) | 52

request chassis satellite shell-command

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Syntax

```
request chassis satellite shell-command  
  [fpc-slot fpc-slot | range ]  
  <remote-command>
```

Description

Run a UNIX shell command for a satellite device from the aggregation device in a Junos Fusion.

Options

fpc <i>fpc-slot</i>	Run the shell command on the satellite device using the specified FPC slot identifier only.
<i>range</i>	<p>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 101-103.</p>
<i>remote-command</i>	Specify the UNIX shell command to run on the satellite device or devices.

Required Privilege Level

system-control

Release Information

Command introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

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

[Configuring Junos Fusion Provider Edge](#) | 52

request system software add (Junos OS)

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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>

```

Description

Install a software package or bundle on the device.

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.

When you are upgrading to a different release of Junos OS, you usually use the `validate` option on this command. The `validate` option checks the candidate software against the current configuration of the device to ensure they are compatible. (Validate is the default behavior when the software package being added is a different release.) However, there are circumstances under which you cannot validate the running configuration in this way. One such circumstance is when you are upgrading to Junos OS with upgraded FreeBSD from Junos OS based on FreeBSD 6.1. Another such circumstance is when you are updating between different releases of Junos OS with upgraded FreeBSD, and the newest version of FreeBSD uses system calls that are not available in earlier versions of FreeBSD.

Therefore, you cannot use the `validate` option when upgrading to Junos Release 21.2R1, because this release runs on FreeBSD 12; previous releases with upgraded FreeBSD run either FreeBSD 10 or 11.

If you are upgrading between releases that cannot use direct validation, you need to specify one of the following on the `request system software add` operational mode command when you upgrade:

- The `no-validate` option—this option does not validate the software package against the current configuration. Therefore, the current configuration might fail once you upgrade the system. Choose this option for the first time you upgrade a system to the newer version.
- The `validate-on-host` option—this option validates the software package by comparing it to the running configuration on a remote Junos OS host. Be sure to choose a host that you have already upgraded to the newer version of software.
- The `validate-on-routing-engine` option—(for systems with redundant REs) this option validates the software package by comparing it to the running configuration on a Routing Engine in the same chassis. Use this option when you have already upgraded the other Routing Engine to the newer version.

For information on valid filename and URL formats, see [Format for Specifying Filenames and URLs in Junos OS CLI Commands](#).

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.

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](#).

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.

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.

In Junos OS, *package-name* can be either 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***.
- 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 <i>alias-name</i>	(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 <i>number</i>	<p>(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.</p> <p>Replace <i>number</i> with the following values depending on the LCC configuration:</p> <ul style="list-style-type: none"> • 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix. • 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix. • 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix. • 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
member <i>member-id</i>	(MX Series routers only) (Optional) Install a software package on the specified Virtual Chassis member. Replace <i>member-id</i> with a value of 0 or 1.
partition	(QFX3500 switches only) (Optional) Format and repartition the media before installation.
satellite <i>slot-id</i>	(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 <i>number</i>	(TX Matrix Plus routers only) (Optional) Install a software package or bundle on a Routing Engine on a TX Matrix Plus router. Replace <i>number</i> with 0.
no-copy	(Optional) Install a software package or bundle, but do not save copies of the package or bundle files.
no-validate	<p>(Optional) When loading a software package or bundle with a different release, suppress the default behavior of the <code>validate</code> option.</p> <p>To upgrade to Junos OS Release 21.2R1, you cannot use the <code>validate</code> option. Instead, choose one of the following options:</p> <ul style="list-style-type: none"> • <code>no-validate</code> • <code>validate-on-host</code> • <code>validate-on-routing-engine</code> <p>Software packages from unidentified providers cannot be loaded. To authorize providers, include the <code>provider-id</code> statement at the <code>[edit system extensions provider]</code> hierarchy level.</p>
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 [<i>package-name1</i><i>package-name2</i>]	<p>(Mixed EX4200 and EX4500 Virtual Chassis, M Series, MX Series, and T Series routers only) (Optional) Install multiple packages at same time:</p> <ul style="list-style-type: none"> • 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 <i>package-name</i> 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 21 *Understanding Software in a Junos Fusion Enterprise*, and *Managing Satellite Software Upgrade Groups in a Junos Fusion*.

upgrade-with- config

(Optional) Install one or more configuration files.

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.

To upgrade to Junos OS Release 21.2R1, you cannot use the validate option. Instead, choose one of the following options:

- no-validate
- validate-on-host
- validate-on-routing-engine

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*.

<code>validate-on-host hostname</code>	(Optional) Validate the software package by comparing it to the running configuration on a remote Junos OS host. Specify a host, replacing <i>hostname</i> 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 <code>user@hostname</code> .
<code>validate-on- routing-engine routing-engine</code>	(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 <i>routing-engine</i> 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.

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 primary Routing Engine, all the T640 primary 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 primary Routing Engine, all the T1600 or T4000 primary 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

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 ...
```

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 add no-validate (SRX Series device)

```
user@host> request system software add /var/tmp/junos-
srxsme-20.4I-20200810_dev_common.0.0833.tgz no-copy no-validate
Formatting alternate root (/dev/ad0s2a)...
/dev/ad0s2a: 600.0MB (1228732 sectors) block size 16384, fragment size 2048
      using 4 cylinder groups of 150.00MB, 9600 blks, 19200 inodes.
super-block backups (for fsck -b #) at:
32, 307232, 614432, 921632
Installing package '/altroot/cf/packages/install-tmp/junos-20.4I-20200810_dev_common.0.0833' ...
Verified junos-boot-srxsme.tgz signed by PackageDevelopmentECP256_2020 method ECDSA256+SHA256
Verified junos-srxsme-domestic signed by PackageDevelopmentECP256_2020 method ECDSA256+SHA256
Verified manifest signed by PackageDevelopmentECP256_2020 method ECDSA256+SHA256

WARNING:      The software that is being installed has limited support.
WARNING:      Run 'file show /etc/notices/unsupported.txt' for details.

JUNOS 20.4I-20200810_dev_common.0.0833 will become active at next reboot
WARNING: A reboot is required to load this software correctly
WARNING:      Use the 'request system reboot' command
WARNING:      when software installation is complete
Saving state for rollback ...

user@host> request system software add /var/tmp/junos-srxsme-19.4R1.3.tgz no-copy no-validate
WARNING: Package junos-19.4R1.3 version 19.4R1.3 is not compatible with current loader
WARNING: Automatic recovering loader, please wait ...
Upgrading Loader...
#####
Verifying the loader image... OK
WARNING: The new boot firmware will take effect when the system is rebooted.
WARNING: Loader recover finish.
Formatting alternate root (/dev/ad0s1a)...
/dev/ad0s1a: 598.5MB (1225692 sectors) block size 16384, fragment size 2048
      using 4 cylinder groups of 149.62MB, 9576 blks, 19200 inodes.
super-block backups (for fsck -b #) at:
```

```

32, 306464, 612896, 919328
Installing package '/altroot/cf/packages/install-tmp/junos-19.4R1.3' ...
Verified junos-boot-srxsme-19.4R1.3.tgz signed by PackageProductionEc_2019 method
ECDSA256+SHA256
Verified junos-srxsme-19.4R1.3-domestic signed by PackageProductionEc_2019 method
ECDSA256+SHA256
Verified junos-boot-srxsme-19.4R1.3.tgz signed by PackageProductionEc_2019 method
ECDSA256+SHA256 V
erified junos-srxsme-19.4R1.3-domestic signed by PackageProductionEc_2019 method ECDSA256+SHA256
JUNOS 19.4R1.3 will become active at next reboot
WARNING: A reboot is required to load this software correctly
WARNING: Use the 'request system reboot' command
WARNING: when software installation is complete Saving state for rollback ...

```

request system software add (SRX Series device)

```

user@host> request system software add /var/tmp/junos-srxsme-19.4R2.3.tgz
WARNING: Package junos-19.4R2.3 version 19.4R2.3 is not compatible with this system.
WARNING: Please install a package with veloadr support, 20.3 or higher.

```

Release Information

Command introduced before Junos OS Release 7.4.

best-effort-load and unlink options added in Junos OS Release 7.4.

sfc option introduced in Junos OS Release 9.6 for the TX Matrix Plus router.

set *[package-name1package-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.

On EX Series switches, the set *[package-name1package-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-name1package-name2package-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.

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.

RELATED DOCUMENTATION

<i>Format for Specifying Filenames and URLs in Junos OS CLI Commands</i>
request system software rollback (Junos OS) 181
request system storage cleanup (Junos OS) 187
<i>Installing Software Packages on QFX Series Devices (Junos OS)</i>
<i>Upgrading Software on a QFabric System</i>
<i>Managing Satellite Software Upgrade Groups in a Junos Fusion</i>
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request system software delete (Junos OS)

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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]>
```

Description

Use this command to remove a software package or bundle from the device.



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 device.

Options

software-package

Software package or bundle name. You can see this software package name by using the `show system software` command. Type the software package name explicitly and do not use the tab key to auto-complete the command.

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

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.

<i>sfc number</i>	(TX Matrix Plus routers only) (Optional) Remove an extension or upgrade package from the TX Matrix Plus router. Replace <i>number</i> with 0.
<i>upgrade-group [all upgrade-group-name]</i>	<p>(Junos Fusion only) Delete the satellite software image association with the specified satellite software upgrade group.</p> <p>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.</p>
<i>version version-string</i>	(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

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]
```

```
...
```

Release Information

Command introduced before Junos OS Release 7.4.

sfc option introduced in Junos OS Release 9.6 for the TX Matrix Plus router.

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.

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

RELATED DOCUMENTATION

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[request system software rollback \(Junos OS\) | 181](#)

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request system software rollback (Junos OS)

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Syntax

```
request system software rollback
```

Syntax (EX Series Switches)

```
request system software rollback
<all-members>
<local>
<member member-id>
<reboot>
```

Syntax (TX Matrix Router)

```
request system software rollback
<lcc number | scc>
<reboot>
```

Syntax (TX Matrix Plus Router)

```
request system software rollback
<lcc number | sfc number>
<reboot>
```

Syntax (MX Series Router)

```
request system software rollback
<all-members>
<device-alias alias-name>
<local>
<member member-id>
<reboot>
<satellite slot-id>
<upgrade-group [all | upgrade-group-name]>
```

Description

Use this command to revert 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.

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	<p>(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.</p> <p>Replace <i>number</i> with the following values depending on the LCC configuration:</p> <ul style="list-style-type: none"> • 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix. • 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix. • 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix. • 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
local	(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 <i>member-id</i> with a value from 0 through 9. For an MX Series Virtual Chassis, replace <i>member-id</i> with a value of 0 or 1.
none	For all versions of Junos OS up to and including Junos OS 11.4, revert to the set of software as of the last successful <code>request system software add</code> . 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.

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 <i>slot-id</i>	(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 <i>number</i>	(TX Matrix Plus routers only) (Optional) Attempt to roll back to the previous set of packages on the TX Matrix Plus router. Replace <i>number</i> with 0.
upgrade-group [all <i>upgrade-group-name</i>]	(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.

Required Privilege Level

maintenance

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 pppoeed ...
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

```

Release Information

Command introduced before Junos OS Release 7.4.

sfc option introduced in Junos OS Release 9.6 for the TX Matrix Plus router.

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.

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](#).

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request system storage cleanup (Junos OS)

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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
<dry-run>
<no-confirm>
<re0 | re1 | routing-engine (backup | both | local | master | other)>
```

Description

Use this command to free storage space on the router or switch by rotating log files and proposing a list of files for deletion. On a QFabric system, you can delete debug files located on individual devices or on the entire QFabric system.

Options

all-members	(EX4200 switches and MX Series routers only) (Optional) Delete files on the Virtual Chassis primary Routing Engine only. 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 (<i>UUID</i> <i>serial number</i> all)	(QFabric systems only) (Optional) Delete files located on individual QFabric system devices or on the entire QFabric system.
director-group <i>name</i>	(QFabric systems only) (Optional) Delete files on the director group.
dry-run	(Optional) List files proposed for deletion (without deleting them).
infrastructure <i>name</i>	(QFabric systems only) (Optional) Delete files on the fabric control Routing Engine and fabric manager Routing Engine.

interconnect-device <i>name</i>	(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 <i>member-id</i>	(EX4200 switches and MX Series routers only) (Optional) Delete files on the specified member of the Virtual Chassis configuration. For EX4200 switches, replace <i>member-id</i> with a value from 0 through 9. For an MX Series Virtual Chassis, replace <i>member-id</i> with a value of 0 or 1.
name-tag <i>name-tag</i>	(QFabric systems only) (Optional) Delete debug files that match a specific regular expression.
node-group <i>name</i>	(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 <i>name</i>	(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))	<p>(Optional) Request operation on system storage on RE0, RE1, or on specified Routing Engine by these classifications: backup, both, local, primary, or other.</p> <p>When Routing Engine is specified, the below message is shown before listing the files and deleting them.</p> <div data-bbox="535 1308 1383 1461" data-label="Text"> <pre>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)</pre> </div>
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 <i>slot-id</i> device-alias <i>alias-name</i>]	(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

Output Fields

[Table 6 on page 191](#) describes the output fields for the `request system storage cleanup` command. Output fields are listed in the approximate order in which they appear.

Table 6: request system storage cleanup Output Fields

Field Name	Field Description
List of files to delete:	Shows list of files available for deletion.
Size	Size of the core-dump file.
Date	Last core-dump file modification date and time.
Name	Name of the core-dump file.
Directory to delete:	Shows list of directories available for deletion.
Repository scope:	Repository where core-dump files and log files are stored. The core-dump files are located in the core repository, and the log files are located in the log repository. The default Repository scope is shared since both the core and log repositories are shared by all of the QFabric system devices.
Repository head:	Name of the top-level repository location.
Repository name:	Name of the repository: core or log.

Table 6: request system storage cleanup Output Fields (Continued)

Field Name	Field Description
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 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/dcf-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/rtsdb/if-rtsdb

```

request system storage cleanup interconnect-device device-name (QFabric Systems)

```

user@switch> request system storage cleanup interconnect IC
rel:

```

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-rtsdb/env.lck
12.0K	Nov 7 15:41	/var/tmp/if-rtsdb/env.mem
132.0K	Nov 7 15:55	/var/tmp/if-rtsdb/shm_usr1.mem
2688.0K	Nov 7 15:41	/var/tmp/if-rtsdb/shm_usr2.mem
2048.0K	Nov 7 15:41	/var/tmp/if-rtsdb/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/rtsdb/if-rtsdb


```
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-rtsdb/env.lck
	12.0K	Nov 8 17:09	/var/tmp/if-rtsdb/env.mem
	2688.0K	Nov 8 17:09	/var/tmp/if-rtsdb/shm_usr1.mem
	132.0K	Nov 8 17:09	/var/tmp/if-rtsdb/shm_usr2.mem
	2048.0K	Nov 8 17:09	/var/tmp/if-rtsdb/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/rtsdb/if-rtsdb

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-rtsdb/env.lck
12.0K Nov 7 17:39 /var/tmp/if-rtsdb/env.mem
2688.0K Nov 7 17:39 /var/tmp/if-rtsdb/shm_usr1.mem
132.0K Nov 7 17:40 /var/tmp/if-rtsdb/shm_usr2.mem
2048.0K Nov 7 17:39 /var/tmp/if-rtsdb/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/livekcore.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.0.1039.05122011234415.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

```

Release Information

Command introduced in Junos OS Release 7.4.

dry-run option introduced in Junos OS Release 7.6.

satellite option introduced in Junos OS Release 14.2R3.

no-confirm and (re0 | re1 | routing-engine (backup | both | local | master | other)) options introduced in Junos OS 17.3R1.

show chassis alarms

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Syntax

```
show chassis alarms
```

Syntax (MX Series Routers)

```
show chassis alarms  
<all-members>
```

```
<local>
<member member-id>
```

Syntax (SRX1500, SRX4100, and SRX4200)

```
show chassis alarms
1 alarms currently active
Alarm time          Class  Description
2020-02-28 10:07:16 CST  Major  FPC0: PEM 0 Not Present
```

Syntax (SRX4600)

```
show chassis alarms
node0:
-----
2 alarms currently active
Alarm time Class Description
2020-10-08 19:42:06 UTC Major FPC 0 BITS CPLD Version Mismatch
2020-10-08 19:42:06 UTC Minor PEM 1 Not Present
```

Syntax (SRX5400)

```
show chassis alarms
1 alarms currently active
Alarm time          Class  Description
2021-04-16 17:21:02 PDT  Major  Too Few AC PEMs
```

Syntax (TX Matrix Routers)

```
show chassis alarms
<lcc number | scc>
```

Syntax (TX Matrix Plus Routers)

```
show chassis alarms
<lcc number | sfc number>
```

Syntax (MX104, MX2010, MX2020, and MX2008 Universal Routing Platforms)

```
show chassis alarms
<satellite [slot-id slot-id]>
```

Syntax (MX10003, MX204, MX10008, OCX Series, PTX Series, ACX Series, EX9251, and EX9253)

```
show chassis alarms
```

Syntax (QFX Series)

```
show chassis alarms
<interconnect-device name>
<node-device name>
```

Description

Display information about the conditions that have been configured to trigger alarms. In Junos, the chassis alarms are different from the system alarms (viewed by using the `show system alarms` command). The system alarms indicate a missing rescue configuration or software license, where valid. For more information, see [Alarm Overview](#).

Options

- | | |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| none | Display information about the conditions that have been configured to trigger alarms. |
| all-members | (MX Series routers only) (Optional) Display information about alarm conditions for all the member routers of the Virtual Chassis configuration. |

interconnect-device <i>name</i>	(QFabric systems only) (Optional) Display information about alarm conditions for the Interconnect device.
lcc <i>number</i>	<p>(TX Matrix router and TX Matrix Plus router only) (Optional) Line-card chassis number.</p> <p>Replace <i>number</i> with the following values depending on the LCC configuration:</p> <ul style="list-style-type: none"> • 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix. • 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix. • 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix. • 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
local	(MX Series routers only) (Optional) Display information about alarm conditions for the local Virtual Chassis member.
member <i>member-id</i>	(MX Series routers only) (Optional) Display information about alarm conditions for the specified member of the Virtual Chassis configuration. Replace <i>member-id</i> variable with a value of 0 or 1.
node-device <i>name</i>	(QFabric systems only) (Optional) Display information about alarm conditions for the Node device.
satellite [slot-id <i>slot-id</i>]	(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 <i>number</i>	(TX Matrix Plus router only) (Optional) Show information about the respective TX Matrix Plus router, which is the switch-fabric chassis. Replace <i>number</i> 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

Output Fields

[Table 7 on page 211](#) lists the output fields for the `show chassis alarms` command. Output fields are listed in the approximate order in which they appear.

Table 7: 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: Minor or Major.

Table 7: show chassis alarms Output Fields (Continued)

Field Name	Field Description
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 (MX Series)

In Junos OS Release 21.4R1 and later, an alarm is displayed on MX Series devices for PFE reset errors.

You may see the following reset PFE error messages, in show chassis alarms output:

```
user@host> show chassis alarms

3 alarms currently active
Alarm time          Class Description
2021-01-04 11:20:42 PST Major FPC 0 PFE 0 reset initiated
2021-01-04 11:09:42 PST Major Too Few AC PEMs
2021-01-04 11:09:42 PST Major PEM Invalid AC Configuration
```

After PFE reset, the alarm is cleared.

```
user@host> show chassis alarms
2 alarms currently active
Alarm time          Class  Description
2021-01-04 11:09:42 PST  Major  Too Few AC PEMs
2021-01-04 11:09:42 PST  Major  PEM Invalid AC Configuration
```

NOTE: Please use the command `run request chassis fpc slot <slot> pfe-instance <pfe-instance> restart` for manual reset of a PFE in disabled state.

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-P1A)

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-P1A)

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 primary.

```
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 primary, 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 primary, 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 primary just gained primary role. When the primary has just gained primary role, 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 alarms (ACX710 Router)

```
user@host> show chassis alarms
Alarm time          Class Description
2011-01-23 21:42:46 PST Major PTP Local Clock OOS
2011-01-23 21:42:46 PST Major PTP No Foreign Master
2011-01-23 21:42:46 PST Major Chassis Loss of all Equipment Clock Synch References
2011-01-23 21:42:46 PST Major Chassis Loss of Equipment Clock Synch Reference 1
2011-01-23 21:42:46 PST Major Chassis Loss of Equipment Clock Synch Reference 2
2011-01-23 21:42:46 PST Major Equipment Clock QL Below Threshold
2011-01-23 21:42:46 PST Major TOD Input A Signal Fail
2011-01-23 21:42:46 PST Major 1PPS lost
2011-01-23 21:42:46 PST Major SyncE Port incompatible Media Type
```

show chassis alarms (MX10008, MX10016, PTX10008, PTX10016, QFX10008,QFX10016) (Junos OS Release)

Starting Junos OS Evolved Release 21.2R1, if PEM or FET Failure detected, a major alarm is raised, and the identified PSM will shutdown or raise alarms as per predefined configuration in the `set chassis thermal-events fet-failure-check` command.

For FET failure detection and action, the `show chassis alarm` output displays a major alarm and information if PSM is shutdown.

For example, for the `show chassis` configuration:

```
user@root> show chassis thermal-health-check
{
    fet-failure-check;
    action-onfail auto-shutdown;
}
```

The output is displayed as follows:

```
user@root> show chassis alarms

Alarm time          Class Description
```



```
2007-04-10 02:33:11 PDT Minor No Redundant Power for System
2007-04-10 02:33:08 PDT Minor PDU 1 PSM 4 Thermal Check brought it Down
2007-04-10 02:33:08 PDT Major PDU 1 PSM 4 Not OK
2007-04-10 02:33:08 PDT Minor PDU 0 PSM 4 Thermal Check brought it Down
2007-04-10 02:33:08 PDT Major PDU 0 PSM 4 Not OK
2007-04-10 02:32:03 PDT Minor PDU 1 PSM 3 Thermal Check brought it Down
2007-04-10 02:32:03 PDT Major PDU 1 PSM 3 Not OK
...
...
```

Release Information

Command introduced before Junos OS Release 7.4.

sfc option introduced in Junos OS Release 9.6 for the TX Matrix Plus router.

satellite option introduced in Junos OS Release 14.2R3 for Junos Fusion.

Command introduced in Junos OS Release 18.2R1 for EX9253 Switches and MX10008 Universal Routing Platforms.

RELATED DOCUMENTATION

No Link Title

[Configuring an RMON Alarm Entry and Its Attributes](#)

[Chassis Conditions That Trigger Alarms](#)

show chassis environment

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Syntax (T320, T640, T1600, and T4000 Routers)

```
show chassis environment
<cb cb-slot-number>
<feb feb-slot-number>
<fpc fpc-slot-number>
<fpm>
<pem pem-slot-number>
<routing-engine re-slot-number>
<scg scg-slot-number>
<sib sib-slot-number>
```

Syntax (TX Matrix Routers)

```
show chassis environment
<lcc number | scc>
```

Syntax (TX Matrix Plus Routers)

```
show chassis environment
<cb cb-slot-number>
<cip cip-slot-number>
<fpc fpc-slot-number>
<fpm>
<lcc number>
<pem pem-slot-number>
<routing-engine re-slot-number>
<scg scg-slot-number>
< sfc number>
<sib sib-slot-number>
```

Syntax (MX Series Routers)

```
show chassis environment
<all-members>
<local>
<member member-id>
```

Syntax (MX104 Universal Routing Platforms)

```
show chassis environment
<cb>
<pem pem-slot-number>
<routing-engine re-slot-number>
```

Syntax (MX150 Router Appliance)

```
show chassis environment
<pem pem-slot-number>
<routing-engine re-slot-number>
```

Syntax (MX2010, MX2020, and MX2008 Universal Routing Platforms)

```
show chassis environment
<adc adc-slot-number>
<all-members>
<cb cb-slot-number>
<fan fantray-slot-number>
<fpc fpc-slot-number>
<fpm>
<local>
<member member-id>
<monitored>
<psm psm-slot-number>
<routing-engine re-slot-number>
<sfb sfb-slot-number>
<satellite [fpc-slot slot-id |device-alias alias-name]>
```

Syntax (MX10003 and MX204 Universal Routing Platforms)

```
show chassis environment
<cb cb-slot-number>
<fpc fpc-slot-number>
<pem pem-slot-number>
<routing-engine re-slot-number>
```

Syntax (EX8200 Switches)

```
show chassis environment
<all-members>
<cb cb-slot-number>
<fpc fpc-slot-number>
```

```

<local>
<member member-id>
<psu psu-slot-number>
<routing-engine re-slot-number>

```

Syntax (EX Series Switches except EX8200)

```

show chassis environment
<all-members>
<fpc fpc-slot-number>
<local>
<member member-id>
<power-supply-unit>
<routing-engine>
<satellite [fpc-slot slot-id | device-alias alias-name]>

```

Syntax (QFX Series)

```

show chassis environment
<cb slot-number <interconnect-device name>>
<fpc slot-number <interconnect-device name>>
<interconnect-device name <slot-number>
<node-device name>
<pem slot-number (interconnect-device name slot-number) | (node-device name)>
<routing-engine name <interconnect-device name slot-number>>

```

Syntax (OCX Series)

```

show chassis environment

```

Syntax (PTX Series Packet Transport Routers)

```

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>

```

Syntax (ACX Series Universal Metro Routers, ACX7509)

```

show chassis environment
<cb cb-slot-number>
<feb feb-slot-number>
<pem pem-slot-number>
<routing-engine re-slot-number>

```

Syntax (ACX5048 and ACX5096 Routers)

```

show chassis environment
<fpc slot-number>
<pem>
<routing-engine>

```

Syntax (ACX500 Routers)

```

show chassis environment
<cb cb-slot-number>
<routing-engine re-slot-number>

```

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-P1A) 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 <i>adc-slot-number</i>	(MX2010, MX2020, and MX2008 routers only) (Optional) Display chassis environmental information for the adapter cards. For MX2020 routers, replace <i>adc-slot-number</i> with a value from 0 through 19. For MX2010 and MX2008 routers, replace <i>adc-slot-number</i> with a value from 0 through 9.
cb <i>cb-slot-number</i>	(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 <i>cb-slot</i> with 0 or 1.
feb <i>feb-slot-number</i>	(ACX Series Universal Metro Routers, ACX7509 routers only) (Optional) Display chassis environmental information for the FEB.
cip <i>cip-slot-number</i>	(TX Matrix Plus routers only) (Optional) Display chassis environmental information for the Connection Interface Panel (CIP). Replace the <i>cip-slot-number</i> variable with a value of 0 or 1.
cb interconnect-device <i>name</i>	(QFabric systems only) (Optional) Display chassis environmental information for the Control Board on an Interconnect device.
ccg <i>ccg-slot-number</i>	(PTX Series only) (Optional) Display chassis environmental information for the Centralized Clock Generator. Replace <i>cb-slot</i> with a value of 0 or 1.
fan <i>fantray-slot-number</i>	(MX2010, MX2020, and MX2008 routers only) (Optional) Display chassis environmental information for the fan trays. Replace <i>fantray-slot-number</i> with a value from 0 through 3.

fpc <i>fpc-slot</i>	(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 <i>fpc-slot</i> with a value from 0 through 9. For MX2020 routers, replace <i>fpc-slot</i> with a value from 0 through 19. For information about FPC numbering, see <i>show chassis environment fpc</i> . 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 <i>fpc-slot</i> 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 <i>name</i>	(QFabric systems only) (Optional) Display chassis environmental information for the Interconnect device.
lcc <i>number</i>	<p>(TX Matrix routers and TX Matrix Plus routers only) (Optional) Line-card chassis number.</p> <p>Replace <i>number</i> with the following values depending on the LCC configuration:</p> <ul style="list-style-type: none"> • 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix. • 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix. • 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix. • 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
local	(MX Series routers and EX Series switches only) (Optional) Display chassis environmental information for the local Virtual Chassis member.
member <i>member-id</i>	(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 <i>name</i>	(QFabric systems only) (Optional) Display chassis environmental information for the Node device.
pdu <i>pdu-slot-number</i>	(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 <i>pem-slot-number</i>	(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 <i>show chassis environment pem</i> .
psm <i>psm-slot-number</i>	(MX2010, MX2020, and MX2008 routers only) (Optional) Display chassis environmental information for the power supply module. For MX2020 routers, replace <i>psm-slot-number</i> with a value from 0 through 17. For MX2010 and MX2008 routers, replace <i>psm-slot-number</i> with a value from 0 through 8.
psu <i>psu-slot-number</i>	(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. For QFX5700 with Junos EVO, details about CPU and memory utilization are also displayed for RCB slot 0 and slot 1.
routing-engine <i>re-slot-number</i>	(Optional) Display chassis environmental information for the specified Routing Engine. For information about the options, see <i>show chassis environment routing-engine</i> .
satellite [<i>fpc-slot slot-id</i>] device-alias <i>alias-name</i>	(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 <i>sfb-slot-number</i>	(MX2010, MX2020, and MX2008 routers only) (Optional) Display chassis environmental information for the switch fabric board. Replace <i>sfb-slot-number</i> with a value from 0 through 7.
sfc <i>number</i>	(TX Matrix Plus routers only) (Optional) Display chassis environmental information about the respective TX Matrix Plus router (switch-fabric chassis). Replace <i>number</i> variable with 0.
sib <i>sib-slot-number</i>	(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

Output Fields

[Table 8 on page 240](#) lists the output fields for the `show chassis environment` command. Output fields are listed in the approximate order in which they appear.

Table 8: show chassis environment Output Fields

Field Name	Field Description
Class	<p>Information about the category or class of chassis component:</p> <ul style="list-style-type: none"> • Power: Power information: <ul style="list-style-type: none"> • (M5, M10, M20, and M40 routers and EX Series switches only) Power supply status: OK, Testing, (during initial power-on), Failed, or Absent. • (M7i, M10i, M40e, M120, M160, M320, and T Series routers and EX Series switches only) Power Entry Modules status: OK, Testing, (during initial power-on), Check, Failed, or Absent. • (PTX Series only) Power information is reported in PDU or PSM combinations. The status is: OK, Testing, (during initial power-on), Check, Failed, or Absent. • Temp: Temperature of air flowing through the chassis in degrees Celsius (C) and Fahrenheit (F). <ul style="list-style-type: none"> • 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. • EX2200 switches have a side-to-rear cooling system. The Local Intake temperature is measured by the sensor on the right side of the chassis, and the Remote Intake temperature is measured by the sensor on the left side of the chassis. • Pic: On ACX4000 routers, multiple temperature channels on a MIC. The status is: OK and the Measurement is in degrees Celsius (C) and Fahrenheit (F). • Fan: Fan status: OK, Testing (during initial power-on), Failed, or Absent. <p>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. Measurement indicates actual fan RPM (PTX and MX2010, MX2020, and MX2008 Routers only).</p> • Misc: Information about other components of the chassis. <ul style="list-style-type: none"> • On some routers, this field indicates the status of one or more additional components.

Table 8: show chassis environment Output Fields *(Continued)*

Field Name	Field Description
	<ul style="list-style-type: none"> On the M40e, M160, and M320 router, Misc includes CIP (Connector Interface Panel). OK indicates that the CIP is present. Absent indicates that the CIP is not present. On T Series routers, Misc includes CIP and SPMB (Switch Processor Mezzanine Board). OK indicates that the CIP or SPMB is present. Absent indicates that the CIP or SPMB is not present. On PTX Series Packet Transport Routers, Misc includes the SPMB (Switch Processor Mezzanine Board). The SPMB is located on the control boards. OK indicates that the control board is present. Absent indicates that the control board is not present.
Item	<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 8: show chassis environment Output Fields (Continued)

Field Name	Field Description
Status	<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"> • OK: The fans are operational. • Testing: The fans are being tested during initial power-on. • Failed: The fans have failed or the fans are not spinning. • Absent: The fan tray is not installed. <p>If the Class is Power, the power supply status can be:</p> <ul style="list-style-type: none"> • OK: The power component is operational. • Testing: The power component is being tested during initial power-on. • Check: There is insufficient power---that is, fewer than the minimum required feeds are connected. • Failed: The inputs leads have failed. • Absent: The power component is not installed.
Measurement	<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
      Routing Engine 1      Testing
Fans  Rear Fan              OK          Spinning at normal speed
      Front Upper Fan       OK          Spinning at normal speed
      Front Middle Fan      OK          Spinning at normal speed
      Front Bottom Fan      OK          Spinning at normal speed
Misc  Craft Interface       OK

```

show chassis environment (M40 Router)

```

user@host> show chassis environment
Class Item                Status      Measurement
Power Power Supply A       OK
      Power Supply B       Absent
Temp  FPC 3                 OK          24 degrees C / 75 degrees F
      FPC 6                 OK          26 degrees C / 78 degrees F
      SCB                   OK          26 degrees C / 78 degrees F
      Backplane @ A1        OK          28 degrees C / 82 degrees F
      Backplane @ A2        OK          23 degrees C / 73 degrees F
      Routing Engine         OK          26 degrees C / 78 degrees F
Fans  Top Impeller          OK          Spinning at normal speed
      Bottom impeller       OK          Spinning at normal speed
      Rear Left Fan         OK          Spinning at normal speed
      Rear Center Fan       OK          Spinning at normal speed
      Rear Right Fan        OK          Spinning at normal speed
Misc  Craft Interface       OK

```


show chassis environment (M40e Router)

```

user@host> show chassis environment
Class Item                Status      Measurement
Power PEM 0               OK
      PEM 1               Absent
Temp  PCG 0               OK          44 degrees C / 111 degrees F
      PCG 1               OK          47 degrees C / 116 degrees F
      Routing Engine 0    OK          40 degrees C / 104 degrees F
      Routing Engine 1    OK          37 degrees C / 98 degrees F
      MCS 0               OK          45 degrees C / 113 degrees F
      MCS 1               OK          42 degrees C / 107 degrees F
      SFM 0 SPP           OK          40 degrees C / 104 degrees F
      SFM 0 SPR           OK          44 degrees C / 111 degrees F
      SFM 1 SPP           OK          43 degrees C / 109 degrees F
      SFM 1 SPR           OK          45 degrees C / 113 degrees F
      FPC 0               OK          38 degrees C / 100 degrees F
      FPC 1               OK          40 degrees C / 104 degrees F
      FPC 2               OK          38 degrees C / 100 degrees F
      FPC 4               OK          34 degrees C / 93 degrees F
      FPC 5               OK          43 degrees C / 109 degrees F
      FPC 6               OK          41 degrees C / 105 degrees F
      FPC 7               OK          43 degrees C / 109 degrees F
      FPM CMB             OK          28 degrees C / 82 degrees F
      FPM Display         OK          28 degrees C / 82 degrees F
Fans  Rear Bottom Blower  OK          Spinning at normal speed
      Rear Top Blower     OK          Spinning at normal speed
      Front Top Blower    OK          Spinning at normal speed
      Fan Tray Rear Left  OK          Spinning at normal speed
      Fan Tray Rear Right OK          Spinning at normal speed
      Fan Tray Front Left OK          Spinning at normal speed
      Fan Tray Front Right OK         Spinning at normal speed
Misc  CIP                 OK

```

show chassis environment (M120 Router)

```

user@host> show chassis environment
Class Item                Status      Measurement
Temp  PEM 0               OK

```

	PEM 1	OK	
	Routing Engine 0	OK	43 degrees C / 109 degrees F
	Routing Engine 1	OK	44 degrees C / 111 degrees F
	CB 0 Intake	OK	33 degrees C / 91 degrees F
	CB 0 Exhaust A	OK	36 degrees C / 96 degrees F
	CB 0 Exhaust B	OK	35 degrees C / 95 degrees F
	CB 1 Intake	OK	34 degrees C / 93 degrees F
	CB 1 Exhaust A	OK	38 degrees C / 100 degrees F
	CB 1 Exhaust B	OK	35 degrees C / 95 degrees F
	FEB 3 Intake	OK	35 degrees C / 95 degrees F
	FEB 3 Exhaust A	OK	37 degrees C / 98 degrees F
	FEB 3 Exhaust B	OK	39 degrees C / 102 degrees F
	FEB 4 Intake	OK	33 degrees C / 91 degrees F
	FEB 4 Exhaust A	OK	39 degrees C / 102 degrees F
	FEB 4 Exhaust B	OK	36 degrees C / 96 degrees F
	FPC 2 Exhaust A	OK	32 degrees C / 89 degrees F
	FPC 2 Exhaust B	OK	31 degrees C / 87 degrees F
	FPC 3 Exhaust A	OK	32 degrees C / 89 degrees F
	FPC 3 Exhaust B	OK	33 degrees C / 91 degrees F
	FPC 4 Exhaust A	OK	32 degrees C / 89 degrees F
	FPC 4 Exhaust B	OK	30 degrees C / 86 degrees F
Fans	Front Top Tray Fan 1	OK	Spinning at normal speed
	Front Top Tray Fan 2	OK	Spinning at normal speed
	Front Top Tray Fan 3	OK	Spinning at normal speed
	Front Top Tray Fan 4	OK	Spinning at normal speed
	Front Top Tray Fan 5	OK	Spinning at normal speed
	Front Top Tray Fan 6	OK	Spinning at normal speed
	Front Top Tray Fan 7	OK	Spinning at normal speed
	Front Top Tray Fan 8	OK	Spinning at normal speed
	Front Bottom Tray Fan 1	OK	Spinning at normal speed
	Front Bottom Tray Fan 2	OK	Spinning at normal speed
	Front Bottom Tray Fan 3	OK	Spinning at normal speed
	Front Bottom Tray Fan 4	OK	Spinning at normal speed
	Front Bottom Tray Fan 5	OK	Spinning at normal speed
	Front Bottom Tray Fan 6	OK	Spinning at normal speed
	Front Bottom Tray Fan 7	OK	Spinning at normal speed
	Front Bottom Tray Fan 8	OK	Spinning at normal speed
	Rear Top Tray Fan 1	OK	Spinning at normal speed
	Rear Top Tray Fan 2	OK	Spinning at normal speed
	Rear Top Tray Fan 3	OK	Spinning at normal speed
	Rear Top Tray Fan 4	OK	Spinning at normal speed
	Rear Top Tray Fan 5	OK	Spinning at normal speed
	Rear Top Tray Fan 6	OK	Spinning at normal speed

Rear Top Tray Fan 7	OK	Spinning at normal speed
Rear Top Tray Fan 8	OK	Spinning at normal speed
Rear Bottom Tray Fan 1	OK	Spinning at normal speed
Rear Bottom Tray Fan 2	OK	Spinning at normal speed
Rear Bottom Tray Fan 3	OK	Spinning at normal speed
Rear Bottom Tray Fan 4	OK	Spinning at normal speed
Rear Bottom Tray Fan 5	OK	Spinning at normal speed
Rear Bottom Tray Fan 6	OK	Spinning at normal speed
Rear Bottom Tray Fan 7	OK	Spinning at normal speed
Rear Bottom Tray Fan 8	OK	Spinning at normal speed

show chassis environment (M160 Router)

```
user@host> show chassis environment
```

Class	Item	Status	Measurement
Power	PEM 0	OK	PEM 1 Absent
Temp	PCG 0	OK	45 degrees C / 113 degrees F
	PCG 1	Absent	
	Routing Engine 0	OK	35 degrees C / 95 degrees F
	Routing Engine 1	Absent	
	MCS 0	OK	50 degrees C / 122 degrees F
	SFM 0 SPP	OK	47 degrees C / 116 degrees F
	SFM 0 SPR	OK	49 degrees C / 120 degrees F
	SFM 1 SPP	OK	50 degrees C / 122 degrees F
	SFM 1 SPR	OK	50 degrees C / 122 degrees F
	SFM 2 SPP	OK	51 degrees C / 123 degrees F
	SFM 2 SPR	OK	52 degrees C / 125 degrees F
	SFM 3 SPP	OK	52 degrees C / 125 degrees F
	SFM 3 SPR	OK	48 degrees C / 118 degrees F
	FPC 0	OK	45 degrees C / 113 degrees F
	FPC 6	OK	43 degrees C / 109 degrees F
	FPM CMB	OK	31 degrees C / 87 degrees F
	FPM Display	OK	33 degrees C / 91 degrees F
Fans	Rear Bottom Blower	OK	Spinning at normal speed
	Rear Top Blower	OK	Spinning at normal speed
	Front Top Blower	OK	Spinning at normal speed
	Fan Tray Rear Left	OK	Spinning at normal speed
	Fan Tray Rear Right	OK	Spinning at normal speed
	Fan Tray Front Left	OK	Spinning at normal speed
	Fan Tray Front Right	OK	Spinning at normal speed

Misc	CIP	OK
------	-----	----

show chassis environment (M320 Router)

```

user@host> show chassis environment

```

Class	Item	Status	Measurement
Temp	PEM 0	Absent	
	PEM 1	Absent	
	PEM 2	OK	
	PEM 3	OK	
	Routing Engine 0	OK	33 degrees C / 91 degrees F
	Routing Engine 1	OK	32 degrees C / 89 degrees F
	CB 0	OK	36 degrees C / 96 degrees F
	CB 1	OK	36 degrees C / 96 degrees F
	SIB 0	OK	38 degrees C / 100 degrees F
	SIB 1	OK	29 degrees C / 84 degrees F
	SIB 2	OK	38 degrees C / 100 degrees F
	SIB 3	OK	41 degrees C / 105 degrees F
	FPC 0 Intake	OK	28 degrees C / 82 degrees F
	FPC 0 Exhaust	OK	40 degrees C / 104 degrees F
	FPC 1 Intake	OK	29 degrees C / 84 degrees F
	FPC 1 Exhaust	OK	39 degrees C / 102 degrees F
	FPC 2 Intake	OK	28 degrees C / 82 degrees F
	FPC 2 Exhaust	OK	38 degrees C / 100 degrees F
	FPC 3 Intake	OK	28 degrees C / 82 degrees F
	FPC 3 Exhaust	OK	39 degrees C / 102 degrees F
	FPC 6 Intake	OK	27 degrees C / 80 degrees F
	FPC 6 Exhaust	OK	39 degrees C / 102 degrees F
	FPC 7 Intake	OK	27 degrees C / 80 degrees F
	FPC 7 Exhaust	OK	42 degrees C / 107 degrees F
	FPM GBUS	OK	30 degrees C / 86 degrees F
Fan	Top Left Front fan	OK	Spinning at normal speed
	Top Right Rear fan	OK	Spinning at normal speed
	Top Right Front fan	OK	Spinning at normal speed
	Top Left Rear fan	OK	Spinning at normal speed
	Bottom Left Front fan	OK	Spinning at normal speed
	Bottom Right Rear fan	OK	Spinning at normal speed
	Bottom Right Front fan	OK	Spinning at normal speed
	Bottom Left Rear fan	OK	Spinning at normal speed
	Rear Fan 1 (TOP)	OK	Spinning at normal speed

Rear Fan 2	OK	Spinning at normal speed
Rear Fan 3	OK	Spinning at normal speed
Rear Fan 4	OK	Spinning at normal speed
Rear Fan 5	OK	Spinning at normal speed
Rear Fan 6	OK	Spinning at normal speed
Rear Fan 7 (Bottom)	OK	Spinning at normal speed
Misc CIP	OK	

show chassis environment (MX150)

```
user@host> 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
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
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)

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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)

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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
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)

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Class	Item	Status	Measurement
Temp	PSM 0	OK	7 degrees C / 44 degrees F
	PSM 1	OK	7 degrees C / 44 degrees F
	PSM 2	OK	7 degrees C / 44 degrees F
	PSM 3	OK	6 degrees C / 42 degrees F
	PSM 4	OK	6 degrees C / 42 degrees F
	PSM 5	OK	6 degrees C / 42 degrees F
	PSM 6	OK	6 degrees C / 42 degrees F
	PSM 7	OK	7 degrees C / 44 degrees F
	PSM 8	OK	7 degrees C / 44 degrees F
	PDM 0	OK	
	PDM 1	Absent	
	CB 0 IntakeA-Zone0	OK	14 degrees C / 57 degrees F
	CB 0 IntakeB-Zone1	OK	7 degrees C / 44 degrees F
	CB 0 IntakeC-Zone0	OK	22 degrees C / 71 degrees F
	CB 0 ExhaustA-Zone0	OK	14 degrees C / 57 degrees F
	CB 0 ExhaustB-Zone1	OK	9 degrees C / 48 degrees F
	CB 0 TCBC-Zone0	OK	11 degrees C / 51 degrees F
	CB 1 IntakeA-Zone0	OK	9 degrees C / 48 degrees F
	CB 1 IntakeB-Zone1	OK	5 degrees C / 41 degrees F
	CB 1 IntakeC-Zone0	OK	20 degrees C / 68 degrees F
	CB 1 ExhaustA-Zone0	OK	12 degrees C / 53 degrees F
	CB 1 ExhaustB-Zone1	OK	7 degrees C / 44 degrees F
	CB 1 TCBC-Zone0	OK	10 degrees C / 50 degrees F
	SPMB 0 Intake	OK	5 degrees C / 41 degrees F

SPMB 1 Intake	OK	4 degrees C / 39 degrees F
Routing Engine 0	OK	9 degrees C / 48 degrees F
Routing Engine 0 CPU	OK	9 degrees C / 48 degrees F
Routing Engine 1	OK	6 degrees C / 42 degrees F
Routing Engine 1 CPU	OK	6 degrees C / 42 degrees F
SFB 0 Intake-Zone0	OK	26 degrees C / 78 degrees F
SFB 0 Exhaust-Zone1	OK	17 degrees C / 62 degrees F
SFB 0 IntakeA-Zone0	OK	16 degrees C / 60 degrees F
SFB 0 IntakeB-Zone1	OK	11 degrees C / 51 degrees F
SFB 0 Exhaust-Zone0	OK	18 degrees C / 64 degrees F
SFB 0 SFB-XF2-Zone1	OK	25 degrees C / 77 degrees F
SFB 0 SFB-XF1-Zone0	OK	23 degrees C / 73 degrees F
SFB 0 SFB-XF0-Zone0	OK	33 degrees C / 91 degrees F
SFB 1 Intake-Zone0	OK	27 degrees C / 80 degrees F
SFB 1 Exhaust-Zone1	OK	15 degrees C / 59 degrees F
SFB 1 IntakeA-Zone0	OK	20 degrees C / 68 degrees F
SFB 1 IntakeB-Zone1	OK	10 degrees C / 50 degrees F
SFB 1 Exhaust-Zone0	OK	19 degrees C / 66 degrees F
SFB 1 SFB-XF2-Zone1	OK	26 degrees C / 78 degrees F
SFB 1 SFB-XF1-Zone0	OK	27 degrees C / 80 degrees F
SFB 1 SFB-XF0-Zone0	OK	32 degrees C / 89 degrees F
SFB 2 Intake-Zone0	OK	21 degrees C / 69 degrees F
SFB 2 Exhaust-Zone1	OK	13 degrees C / 55 degrees F
SFB 2 IntakeA-Zone0	OK	18 degrees C / 64 degrees F
SFB 2 IntakeB-Zone1	OK	9 degrees C / 48 degrees F
SFB 2 Exhaust-Zone0	OK	16 degrees C / 60 degrees F
SFB 2 SFB-XF2-Zone1	OK	24 degrees C / 75 degrees F
SFB 2 SFB-XF1-Zone0	OK	21 degrees C / 69 degrees F
SFB 2 SFB-XF0-Zone0	OK	26 degrees C / 78 degrees F
SFB 4 Intake-Zone0	OK	28 degrees C / 82 degrees F
SFB 4 Exhaust-Zone1	OK	16 degrees C / 60 degrees F
SFB 4 IntakeA-Zone0	OK	18 degrees C / 64 degrees F
SFB 4 IntakeB-Zone1	OK	11 degrees C / 51 degrees F
SFB 4 Exhaust-Zone0	OK	19 degrees C / 66 degrees F
SFB 4 SFB-XF2-Zone1	OK	27 degrees C / 80 degrees F
SFB 4 SFB-XF1-Zone0	OK	27 degrees C / 80 degrees F
SFB 4 SFB-XF0-Zone0	OK	32 degrees C / 89 degrees F
SFB 5 Intake-Zone0	OK	22 degrees C / 71 degrees F
SFB 5 Exhaust-Zone1	OK	14 degrees C / 57 degrees F
SFB 5 IntakeA-Zone0	OK	18 degrees C / 64 degrees F
SFB 5 IntakeB-Zone1	OK	10 degrees C / 50 degrees F
SFB 5 Exhaust-Zone0	OK	17 degrees C / 62 degrees F
SFB 5 SFB-XF2-Zone1	OK	22 degrees C / 71 degrees F

SFB 5 SFB-XF1-Zone0	OK	29 degrees C / 84 degrees F
SFB 5 SFB-XF0-Zone0	OK	27 degrees C / 80 degrees F
SFB 6 Intake-Zone0	OK	27 degrees C / 80 degrees F
SFB 6 Exhaust-Zone1	OK	13 degrees C / 55 degrees F
SFB 6 IntakeA-Zone0	OK	19 degrees C / 66 degrees F
SFB 6 IntakeB-Zone1	OK	10 degrees C / 50 degrees F
SFB 6 Exhaust-Zone0	OK	20 degrees C / 68 degrees F
SFB 6 SFB-XF2-Zone1	OK	24 degrees C / 75 degrees F
SFB 6 SFB-XF1-Zone0	OK	32 degrees C / 89 degrees F
SFB 6 SFB-XF0-Zone0	OK	33 degrees C / 91 degrees F
SFB 7 Intake-Zone0	OK	25 degrees C / 77 degrees F
SFB 7 Exhaust-Zone1	OK	13 degrees C / 55 degrees F
SFB 7 IntakeA-Zone0	OK	14 degrees C / 57 degrees F
SFB 7 IntakeB-Zone1	OK	8 degrees C / 46 degrees F
SFB 7 Exhaust-Zone0	OK	17 degrees C / 62 degrees F
SFB 7 SFB-XF2-Zone1	OK	21 degrees C / 69 degrees F
SFB 7 SFB-XF1-Zone0	OK	21 degrees C / 69 degrees F
SFB 7 SFB-XF0-Zone0	OK	33 degrees C / 91 degrees F
FPC 0 Intake	OK	13 degrees C / 55 degrees F
FPC 0 Exhaust A	OK	13 degrees C / 55 degrees F
FPC 0 Exhaust B	OK	14 degrees C / 57 degrees F
FPC 0 LU 0 TSen	OK	28 degrees C / 82 degrees F
FPC 0 LU 0 Chip	OK	25 degrees C / 77 degrees F
FPC 0 LU 1 TSen	OK	28 degrees C / 82 degrees F
FPC 0 LU 1 Chip	OK	27 degrees C / 80 degrees F
FPC 0 LU 2 TSen	OK	28 degrees C / 82 degrees F
FPC 0 LU 2 Chip	OK	19 degrees C / 66 degrees F
FPC 0 LU 3 TSen	OK	28 degrees C / 82 degrees F
FPC 0 LU 3 Chip	OK	23 degrees C / 73 degrees F
FPC 0 XM 0 TSen	OK	28 degrees C / 82 degrees F
FPC 0 XM 0 Chip	OK	33 degrees C / 91 degrees F
FPC 0 XM 1 TSen	OK	28 degrees C / 82 degrees F
FPC 0 XM 1 Chip	OK	26 degrees C / 78 degrees F
FPC 0 PLX Switch TSen	OK	28 degrees C / 82 degrees F
FPC 0 PLX Switch Chip	OK	26 degrees C / 78 degrees F
FPC 1 Intake	OK	10 degrees C / 50 degrees F
FPC 1 Exhaust A	OK	24 degrees C / 75 degrees F
FPC 1 Exhaust B	OK	28 degrees C / 82 degrees F
FPC 1 LU 0 TSen	OK	22 degrees C / 71 degrees F
FPC 1 LU 0 Chip	OK	31 degrees C / 87 degrees F
FPC 1 LU 1 TSen	OK	22 degrees C / 71 degrees F
FPC 1 LU 1 Chip	OK	21 degrees C / 69 degrees F
FPC 1 LU 2 TSen	OK	22 degrees C / 71 degrees F

FPC 1 LU 2 Chip	OK	25 degrees C / 77 degrees F
FPC 1 LU 3 TSen	OK	22 degrees C / 71 degrees F
FPC 1 LU 3 Chip	OK	33 degrees C / 91 degrees F
FPC 1 XM 0 TSen	OK	22 degrees C / 71 degrees F
FPC 1 XM 0 Chip	OK	30 degrees C / 86 degrees F
FPC 1 XF 0 TSen	OK	22 degrees C / 71 degrees F
FPC 1 XF 0 Chip	OK	37 degrees C / 98 degrees F
FPC 1 PLX Switch TSen	OK	22 degrees C / 71 degrees F
FPC 1 PLX Switch Chip	OK	22 degrees C / 71 degrees F
FPC 2 Intake	OK	9 degrees C / 48 degrees F
FPC 2 Exhaust A	OK	10 degrees C / 50 degrees F
FPC 2 Exhaust B	OK	10 degrees C / 50 degrees F
FPC 2 LU 0 TSen	OK	26 degrees C / 78 degrees F
FPC 2 LU 0 Chip	OK	25 degrees C / 77 degrees F
FPC 2 LU 1 TSen	OK	26 degrees C / 78 degrees F
FPC 2 LU 1 Chip	OK	26 degrees C / 78 degrees F
FPC 2 LU 2 TSen	OK	26 degrees C / 78 degrees F
FPC 2 LU 2 Chip	OK	17 degrees C / 62 degrees F
FPC 2 LU 3 TSen	OK	26 degrees C / 78 degrees F
FPC 2 LU 3 Chip	OK	22 degrees C / 71 degrees F
FPC 2 XM 0 TSen	OK	26 degrees C / 78 degrees F
FPC 2 XM 0 Chip	OK	34 degrees C / 93 degrees F
FPC 2 XM 1 TSen	OK	26 degrees C / 78 degrees F
FPC 2 XM 1 Chip	OK	26 degrees C / 78 degrees F
FPC 2 PLX Switch TSen	OK	26 degrees C / 78 degrees F
FPC 2 PLX Switch Chip	OK	20 degrees C / 68 degrees F
FPC 3 Intake	OK	12 degrees C / 53 degrees F
FPC 3 Exhaust A	OK	16 degrees C / 60 degrees F
FPC 3 Exhaust B	OK	26 degrees C / 78 degrees F
FPC 3 LU 0 TSen	OK	23 degrees C / 73 degrees F
FPC 3 LU 0 Chip	OK	26 degrees C / 78 degrees F
FPC 3 LU 1 TSen	OK	23 degrees C / 73 degrees F
FPC 3 LU 1 Chip	OK	27 degrees C / 80 degrees F
FPC 3 LU 2 TSen	OK	23 degrees C / 73 degrees F
FPC 3 LU 2 Chip	OK	22 degrees C / 71 degrees F
FPC 3 LU 3 TSen	OK	23 degrees C / 73 degrees F
FPC 3 LU 3 Chip	OK	21 degrees C / 69 degrees F
FPC 3 MQ 0 TSen	OK	15 degrees C / 59 degrees F
FPC 3 MQ 0 Chip	OK	18 degrees C / 64 degrees F
FPC 3 MQ 1 TSen	OK	15 degrees C / 59 degrees F
FPC 3 MQ 1 Chip	OK	20 degrees C / 68 degrees F
FPC 3 MQ 2 TSen	OK	15 degrees C / 59 degrees F
FPC 3 MQ 2 Chip	OK	17 degrees C / 62 degrees F

FPC 3 MQ 3 TSen	OK	15 degrees C / 59 degrees F
FPC 3 MQ 3 Chip	OK	16 degrees C / 60 degrees F
FPC 4 Intake	OK	11 degrees C / 51 degrees F
FPC 4 Exhaust A	OK	22 degrees C / 71 degrees F
FPC 4 Exhaust B	OK	28 degrees C / 82 degrees F
FPC 4 LU 0 TSen	OK	22 degrees C / 71 degrees F
FPC 4 LU 0 Chip	OK	33 degrees C / 91 degrees F
FPC 4 LU 1 TSen	OK	22 degrees C / 71 degrees F
FPC 4 LU 1 Chip	OK	21 degrees C / 69 degrees F
FPC 4 LU 2 TSen	OK	22 degrees C / 71 degrees F
FPC 4 LU 2 Chip	OK	26 degrees C / 78 degrees F
FPC 4 LU 3 TSen	OK	22 degrees C / 71 degrees F
FPC 4 LU 3 Chip	OK	33 degrees C / 91 degrees F
FPC 4 XM 0 TSen	OK	22 degrees C / 71 degrees F
FPC 4 XM 0 Chip	OK	30 degrees C / 86 degrees F
FPC 4 XF 0 TSen	OK	22 degrees C / 71 degrees F
FPC 4 XF 0 Chip	OK	37 degrees C / 98 degrees F
FPC 4 PLX Switch TSen	OK	22 degrees C / 71 degrees F
FPC 4 PLX Switch Chip	OK	23 degrees C / 73 degrees F
FPC 5 Intake	OK	12 degrees C / 53 degrees F
FPC 5 Exhaust A	OK	12 degrees C / 53 degrees F
FPC 5 Exhaust B	OK	12 degrees C / 53 degrees F
FPC 5 LU 0 TSen	OK	27 degrees C / 80 degrees F
FPC 5 LU 0 Chip	OK	28 degrees C / 82 degrees F
FPC 5 LU 1 TSen	OK	27 degrees C / 80 degrees F
FPC 5 LU 1 Chip	OK	27 degrees C / 80 degrees F
FPC 5 LU 2 TSen	OK	27 degrees C / 80 degrees F
FPC 5 LU 2 Chip	OK	19 degrees C / 66 degrees F
FPC 5 LU 3 TSen	OK	27 degrees C / 80 degrees F
FPC 5 LU 3 Chip	OK	22 degrees C / 71 degrees F
FPC 5 XM 0 TSen	OK	27 degrees C / 80 degrees F
FPC 5 XM 0 Chip	OK	36 degrees C / 96 degrees F
FPC 5 XM 1 TSen	OK	27 degrees C / 80 degrees F
FPC 5 XM 1 Chip	OK	26 degrees C / 78 degrees F
FPC 5 PLX Switch TSen	OK	27 degrees C / 80 degrees F
FPC 5 PLX Switch Chip	OK	24 degrees C / 75 degrees F
FPC 6 Intake	OK	12 degrees C / 53 degrees F
FPC 6 Exhaust A	OK	17 degrees C / 62 degrees F
FPC 6 Exhaust B	OK	28 degrees C / 82 degrees F
FPC 6 LU 0 TSen	OK	24 degrees C / 75 degrees F
FPC 6 LU 0 Chip	OK	29 degrees C / 84 degrees F
FPC 6 LU 1 TSen	OK	24 degrees C / 75 degrees F
FPC 6 LU 1 Chip	OK	30 degrees C / 86 degrees F

FPC 6 LU 2 TSen	OK	24 degrees C / 75 degrees F
FPC 6 LU 2 Chip	OK	24 degrees C / 75 degrees F
FPC 6 LU 3 TSen	OK	24 degrees C / 75 degrees F
FPC 6 LU 3 Chip	OK	22 degrees C / 71 degrees F
FPC 6 MQ 0 TSen	OK	16 degrees C / 60 degrees F
FPC 6 MQ 0 Chip	OK	19 degrees C / 66 degrees F
FPC 6 MQ 1 TSen	OK	16 degrees C / 60 degrees F
FPC 6 MQ 1 Chip	OK	20 degrees C / 68 degrees F
FPC 6 MQ 2 TSen	OK	16 degrees C / 60 degrees F
FPC 6 MQ 2 Chip	OK	17 degrees C / 62 degrees F
FPC 6 MQ 3 TSen	OK	16 degrees C / 60 degrees F
FPC 6 MQ 3 Chip	OK	16 degrees C / 60 degrees F
FPC 7 Intake	OK	10 degrees C / 50 degrees F
FPC 7 Exhaust A	OK	10 degrees C / 50 degrees F
FPC 7 Exhaust B	OK	11 degrees C / 51 degrees F
FPC 7 LU 0 TSen	OK	26 degrees C / 78 degrees F
FPC 7 LU 0 Chip	OK	26 degrees C / 78 degrees F
FPC 7 LU 1 TSen	OK	26 degrees C / 78 degrees F
FPC 7 LU 1 Chip	OK	29 degrees C / 84 degrees F
FPC 7 LU 2 TSen	OK	26 degrees C / 78 degrees F
FPC 7 LU 2 Chip	OK	19 degrees C / 66 degrees F
FPC 7 LU 3 TSen	OK	26 degrees C / 78 degrees F
FPC 7 LU 3 Chip	OK	24 degrees C / 75 degrees F
FPC 7 XM 0 TSen	OK	26 degrees C / 78 degrees F
FPC 7 XM 0 Chip	OK	34 degrees C / 93 degrees F
FPC 7 XM 1 TSen	OK	26 degrees C / 78 degrees F
FPC 7 XM 1 Chip	OK	32 degrees C / 89 degrees F
FPC 7 PLX Switch TSen	OK	26 degrees C / 78 degrees F
FPC 7 PLX Switch Chip	OK	22 degrees C / 71 degrees F
FPC 8 Intake	OK	10 degrees C / 50 degrees F
FPC 8 Exhaust A	OK	22 degrees C / 71 degrees F
FPC 8 Exhaust B	OK	28 degrees C / 82 degrees F
FPC 8 LU 0 TSen	OK	20 degrees C / 68 degrees F
FPC 8 LU 0 Chip	OK	33 degrees C / 91 degrees F
FPC 8 LU 1 TSen	OK	20 degrees C / 68 degrees F
FPC 8 LU 1 Chip	OK	23 degrees C / 73 degrees F
FPC 8 LU 2 TSen	OK	20 degrees C / 68 degrees F
FPC 8 LU 2 Chip	OK	26 degrees C / 78 degrees F
FPC 8 LU 3 TSen	OK	20 degrees C / 68 degrees F
FPC 8 LU 3 Chip	OK	33 degrees C / 91 degrees F
FPC 8 XM 0 TSen	OK	20 degrees C / 68 degrees F
FPC 8 XM 0 Chip	OK	29 degrees C / 84 degrees F
FPC 8 XF 0 TSen	OK	20 degrees C / 68 degrees F

FPC 8 XF 0 Chip	OK	38 degrees C / 100 degrees F
FPC 8 PLX Switch TSen	OK	20 degrees C / 68 degrees F
FPC 8 PLX Switch Chip	OK	24 degrees C / 75 degrees F
FPC 9 Intake	OK	11 degrees C / 51 degrees F
FPC 9 Exhaust A	OK	11 degrees C / 51 degrees F
FPC 9 Exhaust B	OK	11 degrees C / 51 degrees F
FPC 9 LU 0 TSen	OK	25 degrees C / 77 degrees F
FPC 9 LU 0 Chip	OK	24 degrees C / 75 degrees F
FPC 9 LU 1 TSen	OK	25 degrees C / 77 degrees F
FPC 9 LU 1 Chip	OK	26 degrees C / 78 degrees F
FPC 9 LU 2 TSen	OK	25 degrees C / 77 degrees F
FPC 9 LU 2 Chip	OK	16 degrees C / 60 degrees F
FPC 9 LU 3 TSen	OK	25 degrees C / 77 degrees F
FPC 9 LU 3 Chip	OK	21 degrees C / 69 degrees F
FPC 9 XM 0 TSen	OK	25 degrees C / 77 degrees F
FPC 9 XM 0 Chip	OK	32 degrees C / 89 degrees F
FPC 9 XM 1 TSen	OK	25 degrees C / 77 degrees F
FPC 9 XM 1 Chip	OK	25 degrees C / 77 degrees F
FPC 9 PLX Switch TSen	OK	25 degrees C / 77 degrees F
FPC 9 PLX Switch Chip	OK	21 degrees C / 69 degrees F
ADC 0 Intake	OK	12 degrees C / 53 degrees F
ADC 0 Exhaust	OK	20 degrees C / 68 degrees F
ADC 0 ADC-XF1	OK	26 degrees C / 78 degrees F
ADC 0 ADC-XF0	OK	32 degrees C / 89 degrees F
ADC 1 Intake	OK	11 degrees C / 51 degrees F
ADC 1 Exhaust	OK	21 degrees C / 69 degrees F
ADC 1 ADC-XF1	OK	24 degrees C / 75 degrees F
ADC 1 ADC-XF0	OK	31 degrees C / 87 degrees F
ADC 2 Intake	OK	14 degrees C / 57 degrees F
ADC 2 Exhaust	OK	21 degrees C / 69 degrees F
ADC 2 ADC-XF1	OK	28 degrees C / 82 degrees F
ADC 2 ADC-XF0	OK	34 degrees C / 93 degrees F
ADC 3 Intake	OK	13 degrees C / 55 degrees F
ADC 3 Exhaust	OK	19 degrees C / 66 degrees F
ADC 3 ADC-XF1	OK	24 degrees C / 75 degrees F
ADC 3 ADC-XF0	OK	31 degrees C / 87 degrees F
ADC 4 Intake	OK	9 degrees C / 48 degrees F
ADC 4 Exhaust	OK	22 degrees C / 71 degrees F
ADC 4 ADC-XF1	OK	28 degrees C / 82 degrees F
ADC 4 ADC-XF0	OK	35 degrees C / 95 degrees F
ADC 5 Intake	OK	12 degrees C / 53 degrees F
ADC 5 Exhaust	OK	22 degrees C / 71 degrees F
ADC 5 ADC-XF1	OK	28 degrees C / 82 degrees F

	ADC 5 ADC-XF0	OK	34 degrees C / 93 degrees F
	ADC 6 Intake	OK	11 degrees C / 51 degrees F
	ADC 6 Exhaust	OK	21 degrees C / 69 degrees F
	ADC 6 ADC-XF1	OK	26 degrees C / 78 degrees F
ADC 6	ADC-XF0	OK	35 degrees C / 95 degrees F
	ADC 7 Intake	OK	14 degrees C / 57 degrees F
	ADC 7 Exhaust	OK	22 degrees C / 71 degrees F
	ADC 7 ADC-XF1	OK	26 degrees C / 78 degrees F
	ADC 7 ADC-XF0	OK	34 degrees C / 93 degrees F
	ADC 8 Intake	OK	14 degrees C / 57 degrees F
	ADC 8 Exhaust	OK	21 degrees C / 69 degrees F
	ADC 8 ADC-XF1	OK	24 degrees C / 75 degrees F
	ADC 8 ADC-XF0	OK	31 degrees C / 87 degrees F
	ADC 9 Intake	OK	10 degrees C / 50 degrees F
	ADC 9 Exhaust	OK	22 degrees C / 71 degrees F
	ADC 9 ADC-XF1	OK	28 degrees C / 82 degrees F
	ADC 9 ADC-XF0	OK	36 degrees C / 96 degrees F
Fans	Fan Tray 0 Fan 1	OK	3480 RPM
	Fan Tray 0 Fan 2	OK	3480 RPM
	Fan Tray 0 Fan 3	OK	3480 RPM
	Fan Tray 0 Fan 4	OK	3360 RPM
	Fan Tray 0 Fan 5	OK	3360 RPM
	Fan Tray 0 Fan 6	OK	3480 RPM
	Fan Tray 1 Fan 1	OK	3360 RPM
	Fan Tray 1 Fan 2	OK	3360 RPM
	Fan Tray 1 Fan 3	OK	3360 RPM
	Fan Tray 1 Fan 4	OK	3480 RPM
	Fan Tray 1 Fan 5	OK	3480 RPM
	Fan Tray 1 Fan 6	OK	3480 RPM
	Fan Tray 2 Fan 1	OK	3360 RPM
	Fan Tray 2 Fan 2	OK	3360 RPM
	Fan Tray 2 Fan 3	OK	3480 RPM
	Fan Tray 2 Fan 4	OK	3480 RPM
	Fan Tray 2 Fan 5	OK	3360 RPM
	Fan Tray 2 Fan 6	OK	3480 RPM
	Fan Tray 3 Fan 1	OK	3360 RPM
	Fan Tray 3 Fan 2	OK	3360 RPM
	Fan Tray 3 Fan 3	OK	3480 RPM
	Fan Tray 3 Fan 4	OK	3480 RPM
	Fan Tray 3 Fan 5	OK	3480 RPM
	Fan Tray 3 Fan 6	OK	3360 RPM

show chassis environment (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)

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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

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	FPC 0 Top	OK	38 degrees C / 100 degrees F
	FPC 0 Bottom	OK	32 degrees C / 89 degrees F
	FPC 1 Top	OK	38 degrees C / 100 degrees F
	FPC 1 Bottom	OK	33 degrees C / 91 degrees F
	FPC 2 Top	OK	36 degrees C / 96 degrees F
	FPC 2 Bottom	OK	31 degrees C / 87 degrees F
	FPM GBUS	OK	26 degrees C / 78 degrees F
	FPM Display	OK	29 degrees C / 84 degrees F
Fans	Top Left Front fan	OK	Spinning at normal speed
	Top Left Middle fan	OK	Spinning at normal speed
	Top Left Rear fan	OK	Spinning at normal speed
	Top Right Front fan	OK	Spinning at normal speed
	Top Right Middle fan	OK	Spinning at normal speed
	Top Right Rear fan	OK	Spinning at normal speed
	Bottom Left Front fan	OK	Spinning at normal speed
	Bottom Left Middle fan	OK	Spinning at normal speed
	Bottom Left Rear fan	OK	Spinning at normal speed
	Bottom Right Front fan	OK	Spinning at normal speed
	Bottom Right Middle fan	OK	Spinning at normal speed
	Bottom Right Rear fan	OK	Spinning at normal speed
	Rear Tray Top fan	OK	Spinning at normal speed
	Rear Tray Second fan	OK	Spinning at normal speed
	Rear Tray Middle fan	OK	Spinning at normal speed
	Rear Tray Fourth fan	OK	Spinning at normal speed
	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> 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
	Routing Engine 0 CPU	OK	41 degrees C / 105 degrees F
	Routing Engine 1 CPU	OK	40 degrees C / 104 degrees F
Temp	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
FPC 3 EA3 Temp Sensor	OK	54 degrees C / 129 degrees F
FPC 3 EA3_XR0 Temp Sensor	OK	57 degrees C / 134 degrees F
FPC 3 EA3_XR1 Temp Sensor	OK	56 degrees C / 132 degrees F
FPC 3 EA4 Temp Sensor	OK	68 degrees C / 154 degrees F
FPC 3 EA4_XR0 Temp Sensor	OK	71 degrees C / 159 degrees F
FPC 3 EA4_XR1 Temp Sensor	OK	70 degrees C / 158 degrees F
FPC 3 EA5 Temp Sensor	OK	55 degrees C / 131 degrees F
FPC 3 EA5_XR0 Temp Sensor	OK	58 degrees C / 136 degrees F
FPC 3 EA5_XR1 Temp Sensor	OK	58 degrees C / 136 degrees F
FPC 3 EA0_HMC0 Logic die	OK	69 degrees C / 156 degrees F
FPC 3 EA0_HMC0 DRAM botm	OK	66 degrees C / 150 degrees F
FPC 3 EA0_HMC1 Logic die	OK	70 degrees C / 158 degrees F
FPC 3 EA0_HMC1 DRAM botm	OK	67 degrees C / 152 degrees F
FPC 3 EA0_HMC2 Logic die	OK	69 degrees C / 156 degrees F
FPC 3 EA0_HMC2 DRAM botm	OK	66 degrees C / 150 degrees F
FPC 3 EA1_HMC0 Logic die	OK	67 degrees C / 152 degrees F
FPC 3 EA1_HMC0 DRAM botm	OK	64 degrees C / 147 degrees F
FPC 3 EA1_HMC1 Logic die	OK	64 degrees C / 147 degrees F
FPC 3 EA1_HMC1 DRAM botm	OK	61 degrees C / 141 degrees F
FPC 3 EA1_HMC2 Logic die	OK	64 degrees C / 147 degrees F
FPC 3 EA1_HMC2 DRAM botm	OK	61 degrees C / 141 degrees F
FPC 3 EA2_HMC0 Logic die	OK	74 degrees C / 165 degrees F
FPC 3 EA2_HMC0 DRAM botm	OK	71 degrees C / 159 degrees F
FPC 3 EA2_HMC1 Logic die	OK	76 degrees C / 168 degrees F
FPC 3 EA2_HMC1 DRAM botm	OK	73 degrees C / 163 degrees F
FPC 3 EA2_HMC2 Logic die	OK	74 degrees C / 165 degrees F
FPC 3 EA2_HMC2 DRAM botm	OK	71 degrees C / 159 degrees F
FPC 3 EA3_HMC0 Logic die	OK	69 degrees C / 156 degrees F
FPC 3 EA3_HMC0 DRAM botm	OK	66 degrees C / 150 degrees F

	FPC 3 EA3_HMC1 Logic die	OK	68 degrees C / 154 degrees F
	FPC 3 EA3_HMC1 DRAM botm	OK	65 degrees C / 149 degrees F
	FPC 3 EA3_HMC2 Logic die	OK	68 degrees C / 154 degrees F
	FPC 3 EA3_HMC2 DRAM botm	OK	65 degrees C / 149 degrees F
	FPC 3 EA4_HMC0 Logic die	OK	81 degrees C / 177 degrees F
	FPC 3 EA4_HMC0 DRAM botm	OK	78 degrees C / 172 degrees F
	FPC 3 EA4_HMC1 Logic die	OK	80 degrees C / 176 degrees F
	FPC 3 EA4_HMC1 DRAM botm	OK	77 degrees C / 170 degrees F
	FPC 3 EA4_HMC2 Logic die	OK	81 degrees C / 177 degrees F
	FPC 3 EA4_HMC2 DRAM botm	OK	78 degrees C / 172 degrees F
	FPC 3 EA5_HMC0 Logic die	OK	68 degrees C / 154 degrees F
	FPC 3 EA5_HMC0 DRAM botm	OK	65 degrees C / 149 degrees F
	FPC 3 EA5_HMC1 Logic die	OK	70 degrees C / 158 degrees F
	FPC 3 EA5_HMC1 DRAM botm	OK	67 degrees C / 152 degrees F
	FPC 3 EA5_HMC2 Logic die	OK	69 degrees C / 156 degrees F
	FPC 3 EA5_HMC2 DRAM botm	OK	66 degrees C / 150 degrees F
Power	PEM 0	OK	29 degrees C / 84 degrees F
	PEM 1	OK	27 degrees C / 80 degrees F
	PEM 2	OK	30 degrees C / 86 degrees F
	PEM 3	Check	
	PEM 4	Check	
	PEM 5	Check	
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
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> 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 EA0_HMC0 Logic die	OK	77 degrees C / 170 degrees F
	FPC 0 EA0_HMC0 DRAM botm	OK	74 degrees C / 165 degrees F
	FPC 0 EA0_HMC1 Logic die	OK	81 degrees C / 177 degrees F
	FPC 0 EA0_HMC1 DRAM botm	OK	78 degrees C / 172 degrees F
	FPC 0 EA0 Chip	OK	94 degrees C / 201 degrees F
	FPC 0 EA0-XR0 Chip	OK	64 degrees C / 147 degrees F
	FPC 0 EA0-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	

lcc0-re0:

Class	Item	Status	Measurement
Temp	PEM 0	OK	29 degrees C / 84 degrees F
	PEM 1	Absent	
	SCG 0	OK	35 degrees C / 95 degrees F
	SCG 1	Absent	
	Routing Engine 0	OK	39 degrees C / 102 degrees F
	Routing Engine 1	OK	36 degrees C / 96 degrees F
	CB 0	OK	32 degrees C / 89 degrees F
	CB 1	OK	32 degrees C / 89 degrees F
	SIB 0	OK	40 degrees C / 104 degrees F
	SIB 0 (B)	OK	51 degrees C / 123 degrees F
	FPC 0 Top	OK	45 degrees C / 113 degrees F
	FPC 0 Bottom	OK	31 degrees C / 87 degrees F
	FPC 1 Top	OK	34 degrees C / 93 degrees F
	FPC 1 Bottom	OK	31 degrees C / 87 degrees F
	FPM GBUS	OK	30 degrees C / 86 degrees F
	FPM Display	OK	34 degrees C / 93 degrees F
Fans	Top Left Front fan	OK	Spinning at normal speed
	Top Left Middle fan	OK	Spinning at normal speed
	Top Left Rear fan	OK	Spinning at normal speed
	Top Right Front fan	OK	Spinning at normal speed
	Top Right Middle fan	OK	Spinning at normal speed
	Top Right Rear fan	OK	Spinning at normal speed
	Bottom Left Front fan	OK	Spinning at normal speed
	Bottom Left Middle fan	OK	Spinning at normal speed
	Bottom Left Rear fan	OK	Spinning at normal speed
	Bottom Right Front fan	OK	Spinning at normal speed
	Bottom Right Middle fan	OK	Spinning at normal speed
	Bottom Right Rear fan	OK	Spinning at normal speed
	Rear Tray Top fan	OK	Spinning at normal speed
	Rear Tray Second fan	OK	Spinning at normal speed

```

Rear Tray Third fan  OK      Spinning at normal speed
Rear Tray Fourth fan OK      Spinning at normal speed
Rear Tray Fifth fan  OK      Spinning at normal speed
Rear Tray Sixth fan  OK      Spinning at normal speed
Rear Tray Seventh fan OK      Spinning at normal speed
Rear Tray Bottom fan OK      Spinning at normal speed
Misc CIP              OK
  SPMB 0              OK
  SPMB 1              OK

```

```
lcc2-re0:
```

```

-----
Class Item              Status      Measurement
Temp PEM 0              OK          29 degrees C / 84 degrees F
      PEM 1              Absent
      SCG 0              OK          32 degrees C / 89 degrees F
      SCG 1              Absent
      Routing Engine 0   OK          31 degrees C / 87 degrees F
      Routing Engine 1   OK          32 degrees C / 89 degrees F
      CB 0               OK          30 degrees C / 86 degrees F
      SIB 0              OK          38 degrees C / 100 degrees F
      SIB 0 (B)          OK          49 degrees C / 120 degrees F
      FPC 0 Top           OK          45 degrees C / 113 degrees F
      FPC 0 Bottom        OK          33 degrees C / 91 degrees F
      FPC 1 Top           OK          37 degrees C / 98 degrees F
      FPC 1 Bottom        OK          33 degrees C / 91 degrees F
      FPM GBUS            OK          30 degrees C / 86 degrees F
      FPM Display         OK          34 degrees C / 93 degrees F
Fans  Top Left Front fan OK          Spinning at normal speed
      Top Left Middle fan OK          Spinning at normal speed
...

```

show chassis environment (T1600 Router)

```

user@host> show chassis environment
Class Item              Status      Measurement
Temp PEM 0              OK          27 degrees C / 80 degrees F
      PEM 1              Absent
      SCG 0              OK          31 degrees C / 87 degrees F
      SCG 1              OK          35 degrees C / 95 degrees F
      Routing Engine 0   OK          30 degrees C / 86 degrees F

```

	Routing Engine 1	OK	30 degrees C / 86 degrees F
	CB 0	OK	31 degrees C / 87 degrees F
	CB 1	OK	31 degrees C / 87 degrees F
	SIB 0	OK	41 degrees C / 105 degrees F
	SIB 0 (B)	OK	34 degrees C / 93 degrees F
	SIB 1	OK	0 degrees C / 32 degrees F
	SIB 1 (B)	OK	0 degrees C / 32 degrees F
	SIB 2	OK	0 degrees C / 32 degrees F
	SIB 2 (B)	OK	0 degrees C / 32 degrees F
	SIB 3	OK	0 degrees C / 32 degrees F
	SIB 3 (B)	OK	0 degrees C / 32 degrees F
	SIB 4	OK	0 degrees C / 32 degrees F
	SIB 4 (B)	OK	0 degrees C / 32 degrees F
	FPC 0 Top	OK	49 degrees C / 120 degrees F
	FPC 0 Bottom	OK	50 degrees C / 122 degrees F
	FPC 1 Top	OK	48 degrees C / 118 degrees F
	FPC 1 Bottom	OK	49 degrees C / 120 degrees F
	FPM GBUS	OK	27 degrees C / 80 degrees F
	FPM Display	OK	30 degrees C / 86 degrees F
Fans	Top Left Front fan	OK	Spinning at normal speed
	Top Left Middle fan	OK	Spinning at normal speed
	Top Left Rear fan	OK	Spinning at normal speed
	Top Right Front fan	OK	Spinning at normal speed
	Top Right Middle fan	OK	Spinning at normal speed
	Top Right Rear fan	OK	Spinning at normal speed
	Bottom Left Front fan	OK	Spinning at normal speed
	Bottom Left Middle fan	OK	Spinning at normal speed
	Bottom Left Rear fan	OK	Spinning at normal speed
	Bottom Right Front fan	OK	Spinning at normal speed
	Bottom Right Middle fan	OK	Spinning at normal speed
	Bottom Right Rear fan	OK	Spinning at normal speed
	Rear Tray Top fan	OK	Spinning at normal speed
	Rear Tray Second fan	OK	Spinning at normal speed
	Rear Tray Third fan	OK	Spinning at normal speed
	Rear Tray Fourth fan	OK	Spinning at normal speed
	Rear Tray Fifth fan	OK	Spinning at normal speed
	Rear Tray Sixth fan	OK	Spinning at normal speed
	Rear Tray Seventh fan	OK	Spinning at normal speed
	Rear Tray Bottom fan	OK	Spinning at normal speed
Misc	CIP	OK	
	SPMB 0	OK	
	SPMB 1	OK	

show chassis environment (TX Matrix Plus Router)

```
user@host> show chassis environment
```

```
-----
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

```

```
lcc0-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	

lcc0-re0:

Class	Item	Status	Measurement
Temp	PEM 0	OK	29 degrees C / 84 degrees F
	PEM 1	Check	29 degrees C / 84 degrees F
	SCG 0	OK	32 degrees C / 89 degrees F
	SCG 1	OK	33 degrees C / 91 degrees F
	Routing Engine 0	OK	32 degrees C / 89 degrees F
	Routing Engine 0 CPU	OK	51 degrees C / 123 degrees F
	Routing Engine 1	OK	32 degrees C / 89 degrees F
	Routing Engine 1 CPU	OK	49 degrees C / 120 degrees F

	CB 0	OK	34 degrees C / 93 degrees F
	CB 1	OK	34 degrees C / 93 degrees F
	SIB 0	OK	39 degrees C / 102 degrees F
	SIB 0 (B)	Absent	
	SIB 1	OK	39 degrees C / 102 degrees F
	SIB 1 (B)	Absent	
	SIB 2	OK	39 degrees C / 102 degrees F
	SIB 2 (B)	Absent	
	FPC 4 Top	OK	43 degrees C / 109 degrees F
	FPC 4 Bottom	OK	43 degrees C / 109 degrees F
	FPC 7 Fan Intake	OK	35 degrees C / 95 degrees F
	FPC 7 Fan Exhaust	OK	50 degrees C / 122 degrees F
	FPC 7 PMB	OK	50 degrees C / 122 degrees F
	FPC 7 LMB0	OK	55 degrees C / 131 degrees F
	FPC 7 LMB1	OK	49 degrees C / 120 degrees F
	FPC 7 LMB2	OK	39 degrees C / 102 degrees F
	FPC 7 PFE1 LU2	OK	55 degrees C / 131 degrees F
	FPC 7 PFE1 LU0	OK	45 degrees C / 113 degrees F
	FPC 7 PFE0 LU0	OK	62 degrees C / 143 degrees F
	FPC 7 XF1	OK	52 degrees C / 125 degrees F
	FPC 7 XF0	OK	61 degrees C / 141 degrees F
	FPC 7 XM1	OK	39 degrees C / 102 degrees F
	FPC 7 XM0	OK	56 degrees C / 132 degrees F
	FPC 7 PFE0 LU1	OK	60 degrees C / 140 degrees F
	FPC 7 PFE0 LU2	OK	55 degrees C / 131 degrees F
	FPC 7 PFE1 LU1	OK	41 degrees C / 105 degrees F
	FPM GBUS	OK	24 degrees C / 75 degrees F
	FPM Display	OK	28 degrees C / 82 degrees F
Fans	Top Left Front fan	OK	Spinning at normal speed
	Top Left Middle fan	OK	Spinning at normal speed
	Top Left Rear fan	OK	Spinning at normal speed
	Top Right Front fan	OK	Spinning at normal speed
	Top Right Middle fan	OK	Spinning at normal speed
	Top Right Rear fan	OK	Spinning at normal speed
	Bottom Left Front fan	OK	Spinning at normal speed
	Bottom Left Middle fan	OK	Spinning at normal speed
	Bottom Left Rear fan	OK	Spinning at normal speed
	Bottom Right Front fan	OK	Spinning at normal speed
	Bottom Right Middle fan	OK	Spinning at normal speed
	Bottom Right Rear fan	OK	Spinning at normal speed
	Rear Tray fan 1 (Top)	OK	Spinning at normal speed
	Rear Tray fan 2	OK	Spinning at normal speed
	Rear Tray fan 3	OK	Spinning at normal speed

	Rear Tray fan 4	OK	Spinning at normal speed
	Rear Tray fan 5	OK	Spinning at normal speed
	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
Misc	CIP	OK	
	SPMB 0	OK	
	SPMB 1	OK	

show chassis environment (EX4200 Standalone Switch)

```

user@switch> show chassis environment
Class Item                               Status      Measurement
Power FPC 0 Power Supply 0              OK
      FPC 0 Power Supply 1              Absent
Temp  FPC 0 CPU                          OK          41 degrees C / 105 degrees F
      FPC 0 EX-PFE1                     OK          42 degrees C / 107 degrees F
      FPC 0 EX-PFE2                     OK          46 degrees C / 114 degrees F
      FPC 0 GEPHY Front Left             OK          25 degrees C / 77 degrees F
      FPC 0 GEPHY Front Right            OK          27 degrees C / 80 degrees F
      FPC 0 Uplink Conn                  OK          29 degrees C / 84 degrees F
Fans  FPC 0 Fan 1                        OK          Spinning at normal speed
      FPC 0 Fan 2                        OK          Spinning at normal speed
      FPC 0 Fan 3                        OK          Spinning at normal speed

```

show chassis environment (EX8216 Switch)

```

user@switch> show chassis environment
Class Item                               Status      Measurement
Power PSU 0                             OK
      PSU 1                             OK
      PSU 2                             OK

```

	PSU 3	Check	
	PSU 4	Absent	
	PSU 5	Absent	
Temp	CB 0 Intake	OK	23 degrees C / 73 degrees F
	CB 0 Exhaust	OK	26 degrees C / 78 degrees F
	CB 1 Intake	OK	22 degrees C / 71 degrees F
	CB 1 Exhaust	OK	25 degrees C / 77 degrees F
	FPC 4 Intake	OK	49 degrees C / 120 degrees F
	FPC 4 Exhaust	OK	59 degrees C / 138 degrees F
	SIB 5 Intake	OK	25 degrees C / 77 degrees F
	SIB 5 Exhaust	OK	35 degrees C / 95 degrees F
	SIB 6 Intake	OK	25 degrees C / 77 degrees F
	SIB 6 Exhaust	OK	38 degrees C / 100 degrees F
Fans	Top Fan 1	OK	Spinning at normal speed
	Top Fan 2	OK	Spinning at normal speed
	Top Fan 3	OK	Spinning at normal speed
	Top Fan 4	OK	Spinning at normal speed
	Top Fan 5	OK	Spinning at normal speed
	Top Fan 6	OK	Spinning at normal speed
	Top Fan 7	OK	Spinning at normal speed
	Top Fan 8	OK	Spinning at normal speed
	Top Fan 9	OK	Spinning at normal speed
	Bottom Fan 1	OK	Spinning at normal speed
	Bottom Fan 2	OK	Spinning at normal speed
	Bottom Fan 3	OK	Spinning at normal speed
	Bottom Fan 4	OK	Spinning at normal speed
	Bottom Fan 5	OK	Spinning at normal speed
	Bottom Fan 6	OK	Spinning at normal speed
	Bottom Fan 7	OK	Spinning at normal speed
	Bottom Fan 8	OK	Spinning at normal speed
	Bottom Fan 9	OK	Spinning at normal speed

show chassis environment (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	

```

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	

```
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

```

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

```

...

```

```
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> 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 (ACX7509)

```
user@host> show chassis environment feb
```

```
FEB 0 status:
```

State	Online	
Q2C0	Die Temperature 0	32 degrees C / 89 degrees F
Q2C0	Die Temperature 1	33 degrees C / 91 degrees F
Q2C0	Die Temperature 2	31 degrees C / 87 degrees F
Q2C0	Die Temperature 3	32 degrees C / 89 degrees F
Q2C0	Die Temperature 4	31 degrees C / 87 degrees F
Q2C0	HBM Temperature	32 degrees C / 89 degrees F
Q2C1	Die Temperature 0	35 degrees C / 95 degrees F
Q2C1	Die Temperature 1	33 degrees C / 91 degrees F
Q2C1	Die Temperature 2	34 degrees C / 93 degrees F
Q2C1	Die Temperature 3	33 degrees C / 91 degrees F
Q2C1	Die Temperature 4	34 degrees C / 93 degrees F
Q2C1	HBM Temperature	33 degrees C / 91 degrees F

Intake Rear Left Temp	28 degrees C / 82 degrees F
PEX8725 PCIe Temp	42 degrees C / 107 degrees F
Intake Rear Right Temp	24 degrees C / 75 degrees F
Exhaust Rear Right Temp	29 degrees C / 84 degrees F
Q2C0 Diode Temp	44 degrees C / 111 degrees F
Exhaust Rear Left Temp	30 degrees C / 86 degrees F
Q2C1 Diode Temp	46 degrees C / 114 degrees F
HotSwap0 Temp	24 degrees C / 75 degrees F
HotSwap1 Temp	25 degrees C / 77 degrees F
FPGA_VDD1V0 Temp	34 degrees C / 93 degrees F
PCIe_VDD0V9 Temp	41 degrees C / 105 degrees F
J2VDDIO_1P8 Temp	30 degrees C / 86 degrees F
VDD3V3 Temp	28 degrees C / 82 degrees F
VDD5V0 Temp	29 degrees C / 84 degrees F
VDD2V5 Temp	32 degrees C / 89 degrees F
J2TVDD_1P2 Temp	36 degrees C / 96 degrees F
Q2C0-J2HBMVDD0C_1P2 Temp	31 degrees C / 87 degrees F
Q2C1-J2HBMVDD0C_1P2 Temp	34 degrees C / 93 degrees F
Q2C0 Core Rail 1 Temp	34 degrees C / 93 degrees F
Q2C0 Pwr Reg Intrnl Temp	29 degrees C / 84 degrees F
Q2C1 Core Rail 0 Temp	37 degrees C / 98 degrees F
Q2C0 Core Rail 0 Temp	38 degrees C / 100 degrees F
Q2C1 Core Rail 1 Temp	35 degrees C / 95 degrees F
Q2C1 Pwr Reg Intrnl Temp	29 degrees C / 84 degrees F
Power 1	
BIAS3V3	3288 mV
FPGA_VDD1V2	1214 mV
FPGA_VDD3V3	3320 mV
PFE0_J2HBMVDD_2P5	2528 mV
PFE0_J2PHYVDDC_0P88	892 mV
PFE0_J2PLLVDD_1P8	1822 mV
PFE1_J2HBMVDD_2P5	2524 mV
PFE1_J2PHYVDDC_0P88	894 mV
PFE1_J2PLLVDD_1P8	1824 mV
VDDCLK_3V3	3304 mV
Power 2	
PFE0_J2PLLAVDD_1P8	1794 mV
PFE0_J2PLLVDD_0P8	838 mV
PFE1_J2PLLAVDD_1P8	1802 mV
PFE1_J2PLLVDD_0P8	836 mV
Power 3	
Hotswap 0, 12V0	11955 mV
Power 4	

Hotswap 1, 12V0	11982 mV
Power 5	
PFE0_J2TRVDD_0P8	835 mV
PFE0_J2VDDC_0P82	820 mV
Power 6	
PFE1_J2TRVDD_0P8	835 mV
PFE1_J2VDDC_0P82	820 mV
Power 7	
J2VDDIO_1P8	1795 mV
Power 8	
VDD5V0	4961 mV
Power 9	
VDD2V5	2494 mV
Power 10	
VDD3V3	3295 mV
Power 11	
PCIE_VDD0V9	906 mV
Power 12	
J2TVDD_1P2	1274 mV
Power 13	
FPGA_VDD1V0	991 mV
Power 14	
PFE1_J2HBMVDDOC_1P2	1196 mV
Power 15	
PFE0_J2HBMVDDOC_1P2	1196 mV
Bus Revision	19

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		

Release Information

Command introduced before Junos OS Release 7.4.

sfc option introduced for the TX Matrix Plus router in Junos OS Release 9.6.

monitored option added in Junos OS Release 12.1x48 for PTX Series Packet Transport Routers.

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.

RELATED DOCUMENTATION

[show chassis environment adc](#)

[show chassis environment cb](#)

[show chassis environment ccg](#)

[show chassis environment cip](#)

show chassis environment fpc

[show chassis environment fpm](#)

[show chassis environment lcc](#)

[show chassis environment mcs](#)

[show chassis environment monitored](#)

[show chassis environment pcg](#)

[show chassis environment pdu](#)

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show chassis environment fpc

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Syntax

```
show chassis environment fpc  
<slot>
```

Syntax (TX Matrix and TX Matrix Plus Routers)

```
show chassis environment fpc
<lcc number>
<slot>
```

Syntax (MX Series Routers)

```
show chassis environment fpc
<slot>
<all-members>
<local>
<member member-id>
```

Syntax (MX2010, MX10003, MX204, MX2008, and MX10008, OCX Series, PTX3000, PTX10008 devices and Junos OS Evolved platforms)

```
show chassis environment fpc
<slot>
```

Syntax (MX2020 Universal Routing Platforms)

```
show chassis environment fpc
<slot>
<satellite [fpc-slot slot-id |device-alias alias-name]
```

Syntax (QFX Series)

```
show chassis environment fpc
<fpc-slot>
interconnect-device name
```

Description

(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).

Options

none	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.
all-members	(MX Series routers only) (Optional) Display environmental information for the FPCs in all the members of the Virtual Chassis configuration.
interconnect-device <i>name</i>	(QFabric systems only) (Optional) Display chassis environmental information for the Interconnect device.
lcc <i>number</i>	<p>(TX Matrix router and TX Matrix Plus router only) (Optional) Line-card chassis number.</p> <p>Replace <i>number</i> with the following values depending on the LCC configuration:</p> <ul style="list-style-type: none"> • 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix. • 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix. • 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix. • 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
local	(MX Series routers only) (Optional) Display environmental information for the FPCs in the local Virtual Chassis member.
member <i>member-id</i>	(MX Series routers only) (Optional) Display environmental information for the FPCs in the specified member of the Virtual Chassis configuration. Replace <i>member-id</i> 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

Output Fields

[Table 9 on page 354](#) lists the output fields for the `show chassis environment fpc` command. Output fields are listed in the approximate order in which they appear.

Table 9: show chassis environment fpc Output Fields

Field Name	Field Description
State	<p>Status of the FPC:</p> <ul style="list-style-type: none"> • Unknown—FPC is not detected by the router. • Empty—No FPC is present. • Present—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. • Ready—FPC is in intermediate or transition state. • Announce online—Intermediate state during which the FPC is coming up but not yet online, and the chassis manager acknowledges the chassisd FPC online initiative. • Online—FPC is online and running. • Offline—FPC is powered down. • Diagnostics—FPC is set to operate in diagnostics mode.

Table 9: show chassis environment fpc Output Fields (Continued)

Field Name	Field Description
Temperature	(M40e and M160 routers and QFX Series only) Temperature of the air flowing past the FPC.
PMB Temperature	(PTX Series only) Temperature of the air flowing past the PMB (bottom of the FPC). The PTX5000 Packet Transport Router with FPC2-PTX-P1A include multiple temperatures for PMB (TEMP0 and TEMP1).
PMB CPU Temperature	(PTX5000 Packet Transport Router with FPC2-PTX-P1A only) Temperature of the air flowing past the PMB CPU.
Temperature Intake	(M320 routers, MX2010 routers, MX2020 routers, MX2008 routers, and PTX Series only) Temperature of the air flowing into the chassis.
Temperature Top	(T Series routers only) Temperature of the air flowing past the top of the FPC.
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. The PTX Series Packet Transport Routers, and the MX2010, MX2020, and MX2008 routers include exhaust temperatures for multiple zones (Exhaust A and Exhaust 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.

Table 9: show chassis environment fpc Output Fields (Continued)

Field Name	Field Description
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-zl2105        3300 mV
  AS-VDD1V8-zl2006         1805 mV
  AS-VDD2V5-zl2006         2505 mV
  AS-AVDD1V0-zl2004         998 mV
  AS-PCIE_1V0-zl2004         999 mV
  AS-VDD3V3-zl2004         3303 mV
  AS-VDD_1V5A-zl2004        1497 mV
  AS-VDD_1V5B-zl2004        1497 mV
  AS-LU0_1V0-zl2004         998 mV
  AS-LU1_1V0-zl2004        1003 mV
  AS-MQ0_1V0-zl2004         998 mV
  AS-MQ1_1V0-zl2004         998 mV
  AS-LU2_1V0-zl2004         997 mV
  AS-LU3_1V0-zl2004        1001 mV
  AS-MQ2_1V0-zl2004         996 mV
  AS-MQ3_1V0-zl2004         994 mV
  AS-PMB_1V1-zl2006        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 TSen45 degrees C / 113 degrees F
  Temperature PLX Switch Chip47 degrees C / 116 degrees F

```

Power

MPC-BIAS3V3-z12105	3300 mV
MPC-VDD3V3-z16100	3294 mV
MPC-VDD2V5-z16100	2505 mV
MPC-VDD1V8-z12004	1796 mV
MPC-AVDD1V0-z12004	991 mV
MPC-VDD1V2-z16100	1196 mV
MPC-VDD1V5A-z12004	1491 mV
MPC-VDD1V5B-z12004	1492 mV
MPC-XF_0V9-z12004	996 mV
MPC-PCIE_1V0-z16100	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_0V9-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 TSen38 degrees C / 100 degrees F
Temperature XL 0 XR2 0 Chip60 degrees C / 140 degrees F
Temperature XL 0 XR2 1 TSen38 degrees C / 100 degrees F
Temperature XL 0 XR2 1 Chip60 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 TSen30 degrees C / 86 degrees F
Temperature XL 1 XR2 0 Chip50 degrees C / 122 degrees F
Temperature XL 1 XR2 1 TSen30 degrees C / 86 degrees F
Temperature XL 1 XR2 1 Chip50 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 TSen42 degrees C / 107 degrees F
Temperature PCIe Switch Chip22 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_0V9-vt1527mb	950 mV
MPC-EA1_0V9-vt1527mb	950 mV
MPC-EA2_0V9-vt1527mb	925 mV
MPC-EA3_0V9-vt1527mb	924 mV
MAX20751-1V0	1020 mV
MAX20731-0V9	891 mV
MAX20751-EA0-AVDD1V0	1000 mV
MAX20731-EA0-1V2	1189 mV
MAX20731-EA0-HMC-1V2	1182 mV
MAX20731-EA0-0V906	899 mV
MAX20731-EA0-HMC-0V9	891 mV
MAX20751-EA1-AVDD1V0	1000 mV
MAX20731-EA1-1V2	1189 mV
MAX20731-EA1-HMC-1V2	1182 mV
MAX20731-EA1-0V906	899 mV
MAX20731-EA1-HMC-0V9	889 mV
MAX20751-EA2-AVDD1V0	1000 mV
MAX20731-EA2-1V2	1186 mV
MAX20731-EA2-HMC-1V2	1193 mV
MAX20731-EA2-0V906	899 mV
MAX20731-EA2-HMC-0V9	889 mV
MAX20751-EA3-AVDD1V0	1000 mV
MAX20731-EA3-1V2	1186 mV
MAX20731-EA3-HMC-1V2	1193 mV
MAX20731-EA3-0V906	897 mV
MAX20731-EA3-HMC-0V9	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 HBM0	74 degrees C / 165 degrees F
Temperature ZT0 HBM1	74 degrees C / 165 degrees F
Temperature ZT1 HBM0	74 degrees C / 165 degrees F
Temperature ZT1 HBM1	75 degrees C / 167 degrees F
Temperature ZT2 HBM0	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 Sensor56 degrees C / 132 degrees F
  FPC 0 Exhaust-B Temp Sensor44 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_PFPL	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_PFPL	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

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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
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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 TEMP0 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 Sensor 41 degrees C / 105 degrees F
 FPC 5 Exhaust-B Temp Sensor 41 degrees C / 105 degrees F
 FPC 5 Exhaust-C Temp Sensor 42 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 Sensor 40 degrees C / 104 degrees F
 FPC 6 Exhaust-B Temp Sensor 40 degrees C / 104 degrees F
 FPC 6 Exhaust-C Temp Sensor 40 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 Sensor37 degrees C / 98 degrees F
FPC 1 Exhaust-B Temp Sensor36 degrees C / 96 degrees F
FPC 1 Exhaust-C Temp Sensor36 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 Sensor	34 degrees C / 93 degrees F
FPC 3 Exhaust-C Temp Sensor	33 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 LCPUCPU 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 Sensor	34 degrees C / 93 degrees F
FPC 6 Exhaust-B Temp Sensor	35 degrees C / 95 degrees F
FPC 6 Exhaust-C Temp Sensor	35 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 Sensor	37 degrees C / 98 degrees F

FPC 8 Exhaust-B Temp Sensor 37 degrees C / 98 degrees F
 FPC 8 Exhaust-C Temp Sensor 37 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 Sensor 51 degrees C / 123 degrees F
 FPC 9 Exhaust-B Temp Sensor 52 degrees C / 125 degrees F
 FPC 9 Exhaust-C Temp Sensor 48 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
  PIC0 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

```

Release Information

Command introduced before Junos OS Release 7.4.

satellite option introduced in Junos OS Release 14.2R3.

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](#)

show chassis environment pem

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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, MX10008, OCX Series, EX9251, and EX9253 devices)

```
show chassis environment pem
<slot>
```

Syntax (QFX Series)

```
show chassis environment pem
<slot (interconnect-device name slot ) | (node-device name)>
```

Description

Display Power Entry Module (PEM) environmental status information.

NOTE: 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.

Options

none	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.
all-members	(MX Series routers only) (Optional) Display environmental information about the PEMs in all the member routers of the Virtual Chassis configuration.
interconnect-device <i>name</i>	(QFabric systems only) (Optional) Display chassis environmental information about the PEMs in the Interconnect device.
lcc <i>number</i>	(TX Matrix router and TX Matrix Plus router only) (Optional) Line-card chassis number. Replace <i>number</i> 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 <i>member-id</i>	(MX Series routers only) (Optional) Display environmental information about the PEM in the specified member of the Virtual Chassis configuration. Replace <i>member-id</i> with a value of 0 or 1.
node-device <i>name</i>	(QFabric systems only) (Optional) Display chassis environmental information about the PEMs in the Node device.
satellite [<i>fpc-slot slot-id</i> <i>device-alias alias-name</i>]	(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 <i>slot</i> with 0 or 1.

Required Privilege Level

view

Output Fields

[Table 10 on page 435](#) lists the output fields for the `show chassis environment pem` command. Output fields are listed in the approximate order in which they appear.

Table 10: 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.
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. (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
  Voltage:
    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
  Voltage:
    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
IC1 1
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`.

Release Information

Command introduced before Junos OS Release 7.4.

`satellite` option introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

| [show chassis hardware](#)

show chassis environment routing-engine

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Syntax

```
show chassis environment routing-engine  
<slot>
```

Syntax (TX Matrix Routers)

```
show chassis environment routing-engine  
<lcc number | scc>  
<slot>
```

Syntax (TX Matrix Plus Routers)

```
show chassis environment routing-engine  
<lcc number | sfc number>  
<slot>
```

Syntax (MX104, MX2010, MX2020, MX10003, MX204, and MX2008 Universal Routing Platforms)

```
show chassis environment routing-engine  
<slot>  
<satellite [fpc-slot slot-id |device-alias alias-name]
```

Syntax (MX Series and PTX Series Devices)

```
show chassis environment routing-engine  
<slot>  
<all-members>  
<local>  
<member member-id>
```

Syntax (QFX Series and OCX Series)

```
show chassis environment routing-engine
interconnect-device name
```

Syntax (EX9251 and EX9253 Switches; ACX500, ACX5048 and ACX5096 Routers)

```
show chassis environment routing-engine
```

Description

Display Routing Engine environmental status information.

Options

none	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.
all-members	(MX Series routers only) (Optional) Display environmental information about the Routing Engines in all member routers in the Virtual Chassis configuration.
interconnect-device <i>name</i>	(QFabric systems only) (Optional) Display environmental information about the Routing Engines for the Interconnect device.
lcc <i>number</i>	<p>—(TX Matrix router and TX Matrix Plus router only) (Optional) Line-card chassis number.</p> <p>Replace <i>number</i> with the following values depending on the LCC configuration:</p> <ul style="list-style-type: none">• 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.• 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.

- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

local	(MX Series routers only) (Optional) Display environmental information about the Routing Engines in the local Virtual Chassis member.
member <i>member-id</i>	(MX Series routers only) (Optional) Display environmental information about the Routing Engines in the specified member in the Virtual Chassis configuration. Replace <i>member-id</i> with the value of 0 or 1.
satellite [fpc-slot <i>slot-id</i> device- alias <i>alias-name</i>]	(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 <i>slot</i> with 0 or 1. On M5, M7i, M10, and M40 routers, replace <i>slot</i> with 0. On EX3200 and EX4200 standalone switches, replace <i>slot</i> with 0. On EX4200 switches in a Virtual Chassis configuration and on EX8208 and EX8216 switches, replace <i>slot</i> with 0 or 1. On the QFX3500 and QFX5700, there is only one Routing Engine, so you do not need to specify the slot number. On PTX Series Packet Transport Routers, replace <i>slot</i> with 0 or 1.

Required Privilege Level

view

Output Fields

Table 11 on page 455 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 11: 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"> • Online Primary—Routing Engine is online, operating as Primary. • Online Standby—Routing Engine is online, operating as Standby. • Offline—Routing Engine is offline.
Temperature	Temperature of the air flowing past the Routing Engines
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
  CPU Temperature       42 degrees C / 107 degrees F
Routing Engine 1 status:
  State                Online Standby
  CPU Temperature       34 degrees C / 93 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

```

Release Information

Command introduced before Junos OS Release 7.4.

sfc option introduced in Junos OS Release 9.6 for the TX Matrix Plus router.

RELATED DOCUMENTATION

[request chassis routing-engine master](#)

show chassis routing-engine

show chassis firmware

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- [Syntax \(MX Series Routers\) | 463](#)
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Syntax

```
show chassis firmware
```

Syntax (TX Matrix Routers)

```
show chassis firmware  
<lcc number | scc>
```

Syntax (TX Matrix Plus Routers)

```
show chassis firmware  
<lcc number | sfc number>
```

Syntax (MX Series Routers)

```
show chassis firmware  
<all-members>  
<local>  
<member member-id>
```

Syntax (MX104, MX204, MX2010, MX2020, MX10003, and MX2008 Universal Routing Platforms)

```
show chassis firmware  
<satellite [slot-id slot-id | device-alias alias-name]>
```

Syntax (QFX Series)

```
show chassis firmware  
interconnect-device name  
node-device name
```

Syntax (ACX5048 and ACX5096 Routers)

```
show chassis firmware  
interconnect-device name  
node-device name
```

Syntax (EX Series Switches)

```
show chassis firmware
<detail>
<satellite [slot-id slot-id |device-alias alias-name]>
```

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 <i>name</i>	(QFabric systems) (Optional) Display the version levels of the firmware running on the Interconnect device.
lcc <i>number</i>	(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 <i>member-id</i>	(MX Series routers only) (Optional) Display the version levels of the firmware running for the specified member of the Virtual Chassis configuration. Replace <i>member-id</i> 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 <i>alias-name</i>]	(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 <i>number</i>	(TX Matrix Plus router only) (Optional) Display version levels for the firmware on the TX Matrix Plus router (or switch-fabric chassis). Replace <i>number</i> 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

Output Fields

Table 12 on page 466 lists the output fields for the show chassis firmware command. Output fields are listed in the approximate order in which they appear.

Table 12: show chassis firmware Output Fields

Field Name	Field Description
Part	(MX Series, MX2010, MX2020, and MX2008 routers) Chassis part name.
Type	(MX Series, MX2010, MX2020, and MX2008 routers) Type of firmware: On routers: ROM or O/S. On switches: uboot or loader.
Version	(MX Series, MX2010, MX2020, and MX2008 routers) Version of firmware running on the chassis part.
FPC	(<i>detail</i> option only) Number of FPC. For a standalone switch, the value is 0. For a Virtual Chassis configuration, value in the range of 0-9; refers to the member ID assigned to the switch.
AFEB	(MX104 routers) Version of the compact Forwarding Engine Board.
Boot	(<i>detail</i> option only) Version of the SYSPLD.
PoE	(<i>detail</i> option only) Version of the PoE firmware.
PFE- <number>	(<i>detail</i> option only) Version of the Packet Forwarding Engine used in the switch.
PHY-	(<i>detail</i> option only) Version of the physical layer device (PHY) used in the switch.
microcode	(<i>detail</i> option only) Microcode of the physical layer devices (PHY) used in the switch.
uboot	(<i>detail</i> option only) Version of the u-boot used in the switch.
loader	(<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 (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
	O/S	Version 4.0I1 by usera on 2000-02-29 11:56
FPC 2	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 (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
	O/S	Version 12.3-20130415.0 by userb on 2013-
FPC 15	ROM	Juniper ROM Monitor Version 10.0b39
	O/S	Version 12.3-20130415.0 by userb on 2013-
FPC 16	ROM	Juniper ROM Monitor Version 10.0b39
	O/S	Version 12.3-20130415.0 by userb on 2013-
FPC 17	ROM	Juniper ROM Monitor Version 10.0b39
	O/S	Version 12.3-20130415.0 by userb on 2013-
FPC 18	ROM	Juniper ROM Monitor Version 10.0b39
	O/S	Version 12.3-20130415.0 by userb on 2013-
FPC 19	ROM	Juniper ROM Monitor Version 10.0b39
	O/S	Version 12.3-20130415.0 by userb on 2013-
SPMB 0	ROM	Juniper ROM Monitor Version 12.1b1
	O/S	Version 12.3-20130415.0 by userb on 2013-
SPMB 1	ROM	Juniper ROM Monitor Version 12.1b1
	O/S	Version 12.3-20130415.0 by userb on 2013-

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	Juniper ROM Monitor Version 12.1b1
	O/S	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	U-Boot 1.1.6 (Feb 6 2008 - 11:27:42)
	loader	FreeBSD/PowerPC U-Boot bootstrap loader 2.1
FPC 1	uboot	U-Boot 1.1.6 (Feb 6 2008 - 11:27:42)
	loader	FreeBSD/PowerPC U-Boot bootstrap loader 2.1
FPC 2	uboot	U-Boot 1.1.6 (Feb 6 2008 - 11:27:42)
	loader	FreeBSD/PowerPC U-Boot bootstrap loader 2.1

show chassis firmware (EX8200 Switch)

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

Part	Type	Version
FPC 0	U-Boot	U-Boot 1.1.6 (Mar 25 2009 - 06:13:12) 2.4.0
	loader	FreeBSD/PowerPC U-Boot bootstrap loader 2.2
FPC 3	U-Boot	U-Boot 1.1.6 (Dec 4 2009 - 13:17:34) 3.1.0
	loader	FreeBSD/PowerPC U-Boot bootstrap loader 2.2

FPC 5	U-Boot loader	U-Boot 1.1.6 (Mar 25 2009 - 06:13:12) 2.4.0 FreeBSD/PowerPC U-Boot bootstrap loader 2.2
FPC 7	U-Boot loader	U-Boot 1.1.6 (Feb 6 2009 - 05:31:46) 2.4.0 FreeBSD/PowerPC U-Boot bootstrap loader 2.2
Routing Engine 0	U-Boot loader	U-Boot 1.1.6 (Mar 25 2009 - 06:13:12) 2.4.0 FreeBSD/PowerPC U-Boot bootstrap loader 2.2
Routing Engine 1	U-Boot loader	U-Boot 1.1.6 (Mar 25 2009 - 06:13:12) 2.4.0 FreeBSD/PowerPC U-Boot bootstrap loader 2.2

show chassis firmware (EX9200 Switch)

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

Part	Type	Version
FPC 2	ROM	Juniper ROM Monitor Version 11.4b2
	O/S	Version 14.1I20140312_0741 by userd o
FPC 3	ROM	Juniper ROM Monitor Version 10.4b1
	O/S	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
	RE-FPGA	301
FPC	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-rel:

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-rel:

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-rel:

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-rel:

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

```


SPMB 1	O/S	Version 9.6-20090507.0 by userb on 2009-0
	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    U-Boot 1.1.6 (Sep 15 2010 - 02:11:11) 1.0.5
                  loader    FreeBSD/MIPS U-Boot bootstrap loader 0.1
```

show chassis firmware (PTX1000 Packet Transport Routers)

```
user@host> show chassis firmware
Part           Type      Version
FPC 0
                  U-Boot    ***
                  loader    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
                U-Boot    Bank A: U-Boot 2011.12-gfbea47a (Feb 26 2016 - 22:56:52)
                CTRL FPGA 4.1
```

	PORT FPGA	2.0
FPC 5	U-Boot	Bank A: U-Boot 2011.12-gfbea47a (Feb 26 2016 - 22:56:52)
	CTRL FPGA	3.1
	PORT FPGA	2.0
FPC 6	U-Boot	Bank B: U-Boot 2011.12-gfbea47a (Feb 26 2016 - 22:56:52)
	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    U-Boot 1.1.6 (May 10 2011 - 04:52:59) 1.1.1
                   loader    FreeBSD/MIPS U-Boot bootstrap loader 0.1
Routing Engine 1    U-Boot    U-Boot 1.1.6 (May 10 2011 - 04:52:59) 1.1.1
                   loader    FreeBSD/MIPS U-Boot bootstrap loader 0.1
```

show chassis firmware (ACX2000 Universal 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              U-Boot 1.1.6 (Aug 21 2011 - 01:45:26)  1.0.0
  loader              FreeBSD/arm U-Boot loader 1.0

```

show chassis firmware (MX Routers with Media Services Blade [MSB])

```

user@switch> show chassis firmware
Part          Type      Version
FPC 1         ROM       Juniper ROM Monitor Version 12.1b1
              O/S       Version 12.2I21 by 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
              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 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

Release Information

Command introduced before Junos OS Release 7.4.

sfc option introduced in Junos OS Release 9.6 for the TX Matrix Plus router.

Command introduced for EX8200 switches in Junos OS Release 10.2 for EX Series switches.

satellite option introduced in Junos OS Release 14.2R3.

show chassis fan

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Syntax

```
show chassis fan
```

Syntax (MX Series Routers)

```
show chassis fan  
<all-members>  
<local>  
<member member-id>
```

Syntax (MX104, MX204, MX2010, MX2020, MX2008, and MX10003 Universal Routing Platform)

```
show chassis fan
<satellite [slot-id slot-id | device-alias alias-name]>
```

Syntax (QFX Series)

```
show chassis fan
<interconnect-device name>
```

Syntax (TX Matrix Router)

```
show chassis fan
<lcc number | scc>
```

Syntax (TX Matrix Plus Router)

```
show chassis fan
<lcc number | sfc number>
```

Description

(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.

Options

- | | |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| all-members | (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 <i>member-id</i>	(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 <i>member-id</i> variable with a value 0 or 1.
interconnect-device <i>name</i>	(QFX3000-G QFabric systems only) (Optional) Display information about the fan tray and fans for the specified QFX3008-I Interconnect device.
lcc <i>number</i>	<p>(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.</p> <p>Replace <i>number</i> with the following values depending on the LCC configuration:</p> <ul style="list-style-type: none"> • 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix. • 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix. • 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix. • 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
satellite [slot-id <i>slot-id</i> device-alias <i>alias-name</i>]	(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 <i>number</i>	(TX Matrix Plus routers only) (Optional) Display information about the fan tray and fans for the TX Matrix Plus router (switch-fabric chassis). Replace <i>number</i> variable with 0.

Required Privilege Level

view

Output Fields

Table 13 on page 485 lists the output fields for the `show chassis fan` command. Output fields are listed in the approximate order in which they appear.

Table 13: show chassis fan Output Fields

Field Name	Field Description
Item	Fan item identifier.
Status	<p>Status of the fan:</p> <ul style="list-style-type: none"> • OK—Fan is running properly and within the normal range. • Check—Fan is in Check state because of some fault or alarm condition.
RPM	(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).
% RPM	(PTX10003, MX2010 routers, MX2020 routers, MX2008 routers, and PTX Series Packet Transport Routers only) Percentage of the fan speed being used.
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"> • Spinning at high speed • Spinning at intermediate speed • Spinning at normal speed • Spinning at low speed (except EX Series switches) <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 (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

lcc2-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	

lcc0-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

lcc2-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 (MX150)

```
user@host > 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 > 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 > 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 (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 > 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> 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

Release Information

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.

satellite option introduced in Junos OS Release 14.2R3.

Command output introduced for Junos OS Evolved Release 19.1R1.

show chassis hardware

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Syntax

```
show chassis hardware
<detail | extensive>
<clei-models>
<models>
```

Syntax (EX Series, MX104, MX204, MX2010, MX2020, MX10003, MX10008, and MX2008 Universal Routing Platforms)

```
show chassis hardware
<clei-models>
<detail | extensive>
<models>
<satellite [slot-id slot-id | device-alias alias-name]>
```

Syntax (TX Matrix Router)

```
show chassis hardware
<clei-models>
<detail | extensive>
<models>
<lcc number / scc>
```

Syntax (TX Matrix Plus Router)

```
show chassis hardware
<clei-models>
<detail | extensive>
<models>
<lcc number / sfc number>
```

Syntax (MX Series Routers)

```
show chassis hardware
<detail | extensive>
<clei-models>
<models>
<all-members>
<local>
<member member-id>
```


Syntax (QFX Series)

```
show chassis hardware
<detail | extensive>
<clei-models>
<interconnect-device name>
<node-device name>
<models>
```

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.

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 <i>name</i>	(QFabric systems only) (Optional) Display hardware-specific information for the Interconnect device.
lcc <i>number</i>	<p>(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.</p> <p>Replace <i>number</i> with the following values depending on the LCC configuration:</p> <ul style="list-style-type: none"> • 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix. • 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix. • 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix. • 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
local	(MX Series routers only) (Optional) Display hardware-specific information for the local Virtual Chassis members.

member <i>member-id</i>	(MX Series routers and EX Series switches) (Optional) Display hardware-specific information for the specified member of the Virtual Chassis configuration. Replace <i>member-id</i> 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 <i>name</i>	(QFabric systems only) (Optional) Display hardware-specific information for the Node device.
satellite [<i>slot-id slot-id</i> <i>device-alias alias-name</i>]	(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 <i>number</i>	(TX Matrix Plus router only) (Optional) Display hardware information for the TX Matrix Plus router (switch-fabric chassis). Replace <i>number</i> variable with 0.

Additional Information

The `show chassis hardware detail` command now displays DIMM information for the following Routing Engines, as shown in [Table 14 on page 504](#).

Table 14: 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

Output Fields

[Table 15 on page 505](#) lists the output fields for the `show chassis hardware` command. Output fields are listed in the approximate order in which they appear.

Table 15: show chassis hardware Output Fields

Field Name	Field Description	Level of Output
Item	Show information about the device hardware.	All levels
Version	Revision level of the chassis component.	All levels
Part number	Part number of the chassis component.	All levels
Serial number	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
Assb ID or Assembly ID	(extensive keyword only) Identification number that describes the FRU hardware.	extensive
Assembly Version	(extensive keyword only) Version number of the FRU hardware.	extensive
Assembly Flags	(extensive keyword only) Flags.	extensive
FRU model number	(clei-models, extensive, and models keyword only) Model number of the FRU hardware component.	none specified

Table 15: show chassis hardware Output Fields *(Continued)*

Field Name	Field Description	Level of Output
CLEI code	(clei-models and extensive 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
EEPROM Version	ID EEPROM version used by the hardware component: 0x00 (version 0), 0x01 (version 1), or 0x02 (version 2).	extensive

Table 15: show chassis hardware Output Fields (*Continued*)

Field Name	Field Description	Level of Output
Description	<p>Brief description of the hardware item:</p> <ul style="list-style-type: none"> • Type of power supply. • Type of PIC. If the PIC type is not supported on the current software release, the output states Hardware Not Supported. • Type of FPC: FPC Type 1, FPC Type 2, FPC Type 3, FPC Type 4 , or FPC Type0C192. <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"> • 2x FE—Either two built-in Fast Ethernet interfaces (fixed PIM) or dual-port Fast Ethernet PIM • 4x FE—4-port Fast Ethernet ePIM • 1x GE Copper—Copper Gigabit Ethernet ePIM (one 10-Mbps, 100-Mbps, or 1000-Mbps port) • 1x GE SFP—SFP Gigabit Ethernet ePIM (one fiber port) • 2x Serial—Dual-port serial PIM • 2x T1—Dual-port T1 PIM • 2x E1—Dual-port E1 PIM • 2x CT1E1—Dual-port channelized T1/E1 PIM • 1x T3—T3 PIM (one port) • 1x E3—E3 PIM (one port) • 4x BRI S/T—4-port ISDN BRI S/T PIM • 4x BRI U—4-port ISDN BRI U PIM • 1x ADSL Annex A—ADSL 2/2+ Annex A PIM (one port, for POTS) 	All levels

Table 15: show chassis hardware Output Fields (*Continued*)

Field Name	Field Description	Level of Output
	<ul style="list-style-type: none"> • 1x ADSL Annex B—ADSL 2/2+ Annex B PIM (one port, for ISDN) • 2x SHDSL (ATM)—G SHDSL PIM (2-port two-wire module or 1-port four-wire module) • 1x TGM550—TGM550 Telephony Gateway Module (Avaya VoIP gateway module with one console port, two analog LINE ports, and two analog TRUNK ports) • 1x DS1 TIM510—TIM510 E1/T1 Telephony Interface Module (Avaya VoIP media module with one E1 or T1 trunk termination port and ISDN PRI backup) • 4x FXS, 4xFX0, TIM514—TIM514 Analog Telephony Interface Module (Avaya VoIP media module with four analog LINE ports and four analog TRUNK ports) • 4x BRI TIM521—TIM521 BRI Telephony Interface Module (Avaya VoIP media module with four ISDN BRI ports) • Crypto Accelerator Module—For enhanced performance of cryptographic algorithms used in IP Security (IPsec) services • MPC M 16x 10GE—16-port 10-Gigabit Module Port Concentrator that supports SFP+ optical transceivers. (Not on EX Series switches.) • For hosts, the Routing Engine type. • For small form-factor pluggable transceiver (SFP) modules, the type of fiber: LX, SX, LH, or T. • LCD description for EX Series switches (except EX2200 switches). • MPC2—1-port MPC2 that supports two separate slots for MICs. • MPC3E—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. • 100GBASE-LR4, pluggable CFP optics 	

Table 15: show chassis hardware Output Fields (Continued)

Field Name	Field Description	Level of Output
	<ul style="list-style-type: none"> Supports the Enhanced MX Switch Control Board with fabric redundancy and existing SCBs without fabric redundancy. Interoperates with existing MX Series line cards, including Flexible Port Concentrators (FPC), Dense Port Concentrators (DPCs), and Modular Port Concentrators (MPCs). MPC4E—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. LCD description for MX Series routers 	

Sample Output

show chassis hardware (MX10008 Router)

```
user@host> show chassis hardware
```

Hardware inventory:

Item	Version	Part number	Serial number	Description
Chassis			DE538	JNP10008 [MX10008]
Midplane	REV 27	750-054097	ACPD6954	Midplane 8
Routing Engine 0		BUILTIN	BUILTIN	RE X10
Routing Engine 1		BUILTIN	BUILTIN	RE X10 128
CB 0	REV 10	750-079562	CAKF2158	Control Board
CB 1	REV 05	711-065897	CAJG2680	Control Board
FPC 1	REV 04	750-084779	CAKN5706	JNP10K-LC2101
CPU	REV 05	750-073391	CAKJ2864	LC 2101 PMB
PIC 0		BUILTIN	BUILTIN	4xQSFP28 SYNCE
Xcvr 0	REV 01	740-046565	XXL0BQM	QSFP+-40G-SR4
Xcvr 1	REV 01	740-032986	QB350242	QSFP+-40G-SR4
Xcvr 2	REV 01	740-054053	QE408285	QSFP+-4X10G-SR
Xcvr 3	REV 01	740-046565	QF3300Z9	QSFP+-40G-SR4
PIC 1		BUILTIN	BUILTIN	4xQSFP28 SYNCE
Xcvr 0	REV 01	740-067442	QJ2200LD	QSFP+-40G-SR4
Xcvr 1	REV 01	740-038153	APF170500382DP	QSFP+-40G-CU3M

Xcvr 2	REV 01	740-067442	QI4302LC	QSFP+-40G-SR4
PIC 2		BUILTIN	BUILTIN	4xQSFP28 SYNCE
Xcvr 0	REV 01	740-067442	1ACP1335119	QSFP+-40G-SR4
Xcvr 1	REV 01	740-067442	1ACP1313156	QSFP+-40G-SR4
Xcvr 2	REV 01	740-067442	QK050040	QSFP+-40G-SR4
Xcvr 3	REV 01	740-067442	QJ2201BG	QSFP+-40G-SR4
PIC 3		BUILTIN	BUILTIN	4xQSFP28 SYNCE
Xcvr 0	REV 01	740-058734	1ECQ12400CS	QSFP-100GBASE-SR4
Xcvr 1	REV 01	740-046565	QF3300ZX	QSFP+-40G-SR4
Xcvr 2	REV 01	740-061405	1ECQ12510FH	QSFP-100G-SR4-T2
Xcvr 3	REV 01	740-032986	QB491182	QSFP+-40G-SR4
PIC 4		BUILTIN	BUILTIN	4xQSFP28 SYNCE
Xcvr 0	REV 01	740-067442	QJ2200D5	QSFP+-40G-SR4
Xcvr 1	REV 01	740-054053	XXS0L95	QSFP+-4X10G-SR
PIC 5		BUILTIN	BUILTIN	4xQSFP28 SYNCE
Xcvr 0	REV 01	740-054053	QE251550	QSFP+-4X10G-SR
Xcvr 1	REV 01	740-054053	XZB01D5	QSFP+-4X10G-SR
Xcvr 3	REV 01	740-046565	QI1402F9	QSFP+-40G-SR4
FPD Board	REV 07	711-054687	ACPF2896	Front Panel Display
PEM 1	REV 02	740-049388	1EDL62102PR	Power Supply AC
PEM 2	REV 02	740-049388	1EDL60300H2	Power Supply AC
PEM 4	REV 02	740-049388	1EDL603003Z	Power Supply AC
PEM 5	REV 01	740-049388	1EDL339001B	Power Supply AC
FTC 0	REV 14	750-050108	ACNW3344	Fan Controller 8
FTC 1	REV 14	750-050108	ACPE3978	Fan Controller 8
Fan Tray 0	REV 09	760-054372	ACNV5507	Fan Tray 8
Fan Tray 1	REV 09	760-054372	ACNV5371	Fan Tray 8
SFB 0	REV 25	750-050058	ACPH6821	Switch Fabric (SIB) 8
SFB 1				
SFB 2	REV 24	750-050058	ACNZ0641	Switch Fabric (SIB) 8
SFB 3	REV 27	750-050058	ACPH9127	Switch Fabric (SIB) 8
SFB 5	REV 24	750-050058	ACNX7396	Switch Fabric (SIB) 8

show chassis hardware (PTX10008 Router)

```

root@host> show chassis hardware
Hardware inventory:

```

Item	Version	Part number	Serial number	Description
Chassis			DK404	JNP10008 [PTX10008]
Midplane	REV 28	750-054097	ACPP2394	Midplane 8
Routing Engine 0		BUILTIN	BUILTIN	RE-PTX-2X00x4

Routing Engine 1		BUILTIN	BUILTIN	RE-PTX-2X00x4	
CB 0	REV 04	750-068820	ACPT5303	Control Board	
CB 1	REV 04	750-068820	ACPR1627	Control Board	
FPC 6	REV 13	750-068822	ACPB2753	LC1102 - 12C / 36Q /	
14					4X
CPU		BUILTIN	BUILTIN	FPC CPU	
PIC 0		BUILTIN	BUILTIN	12x100GE/36x40GE/	
144x10					GE
Xcvr 0	REV 01	740-067442	XV304N6	QSFP+-40G-SR4	
Xcvr 1	REV 01	740-067442	XV30A5M	QSFP+-40G-SR4	
Xcvr 2	REV 01	740-067442	XV300HC	QSFP+-40G-SR4	
Xcvr 3	REV 01	740-067443	XU20L17	QSFP+-40G-SR4	
Xcvr 4	REV 01	740-067442	XV303XG	QSFP+-40G-SR4	
Xcvr 5	REV 01	740-067443	XV306QC	QSFP+-40G-SR4	
Xcvr 6	REV 01	740-067442	XV303Y7	QSFP+-40G-SR4	
Xcvr 7	REV 01	740-067443	XX60DMR	QSFP+-40G-SR4	
Xcvr 9	REV 01	740-067443	XX60DNY	QSFP+-40G-SR4	
Xcvr 10	REV 01	740-054053	QF4605WF	QSFP+-4X10G-SR	
Xcvr 13	REV 01	740-058734	1ECQ115007D	QSFP-100GBASE-SR4	
Xcvr 15	REV 01	740-046565	QH06035R	QSFP+-40G-SR4	
Xcvr 16	REV 01	740-046565	QH0602KC	QSFP+-40G-SR4	
Xcvr 17	REV 01	740-046565	QH0507PA	QSFP+-40G-SR4	
Xcvr 18	REV 01	740-046565	QH06035M	QSFP+-40G-SR4	
Xcvr 24	REV 01	740-046565	QH0507QL	QSFP+-40G-SR4	
Xcvr 25	REV 01	740-067443	XV20CWP	QSFP+-40G-SR4	
Xcvr 34	REV 01	740-046565	QH06035U	QSFP+-40G-SR4	
Xcvr 35	REV 01	740-067443	XX60DN9	QSFP+-40G-SR4	
FPC 7	REV 41	750-051357	ACPL3446	LC1101 - 30C / 30Q / 96X	
CPU		BUILTIN	BUILTIN	FPC CPU	
PIC 0		BUILTIN	BUILTIN	30x100GE/30x40GE/96x10GE	
Xcvr 0	REV 01	740-067443	XX60DPC	QSFP+-40G-SR4	
Xcvr 1	REV 01	740-054053	QF4605W7	QSFP+-4X10G-SR	
Xcvr 2	REV 01	740-067443	XX60DP8	QSFP+-40G-SR4	
Xcvr 3	REV 01	740-067442	XV30FYM	QSFP+-40G-SR4	
Xcvr 4	REV 01	740-067442	1ACP133406Z	QSFP+-40G-SR4	
Xcvr 5	REV 01	740-067443	XX60DP5	QSFP+-40G-SR4	
Xcvr 8	REV 01	740-046565	QH060355	QSFP+-40G-SR4	
Xcvr 12	REV 01	740-058734	1ECQ115008C	QSFP-100GBASE-SR4	
Xcvr 15	REV 01	740-046565	QH0602KG	QSFP+-40G-SR4	
Xcvr 16	REV 01	740-046565	QH0602LG	QSFP+-40G-SR4	
Xcvr 17	REV 01	740-046565	QH06035S	QSFP+-40G-SR4	
Xcvr 18	REV 01	740-046565	QH0602KS	QSFP+-40G-SR4	
Xcvr 24	REV 01	740-067443	QI2902DP	QSFP+-40G-SR4	

Power Supply 2	REV 02	740-049388	1EDL70200NP	Power Supply AC
Power Supply 3	REV 02	740-049388	1EDL603005C	Power Supply AC
Power Supply 4	REV 02	740-049388	1EDL70200P1	Power Supply AC
Power Supply 5	REV 02	740-049388	1EDL70200B7	Power Supply AC
FTC 0	REV 16	750-050108	ACPK8682	Fan Controller 8
FTC 1	REV 16	750-050108	ACPR9530	Fan Controller 8
Fan Tray 0	REV 10	760-054372	ACPR9509	Fan Tray 8
Fan Tray 1	REV 10	760-054372	ACPV7260	Fan Tray 8
SIB 1	REV 28	750-050058	ACPV6306	Switch Fabric 8
SIB 2	REV 28		ACPR2569	Switch Fabric 8
SIB 3	REV 28	750-05	ACPW7402	Switch Fabric 8
SIB 4	REV 28	750-050058	ACPR2577	Switch Fabric 8
FPD Board	REV 07	711-054687	ACPM4965	Front Panel Display

show chassis hardware (PTX10016 Router Junos OS Evolved Release)

```
user@host> show chassis hardware
```

Hardware inventory:

Item	Version	Part number	Serial number	Description
Chassis			DY814	JNP10016 [PTX10016]
Midplane 0	REV 02	750-085608	BCAW3258	Midplane 16
FPM 0	REV 01	711-086964	BCAR0775	Front Panel Display
PSM 0	Rev 03	740-069994	1F269200046	JNP10K 5500W AC/HVDC Power Supply Unit
PSM 1	Rev 03	740-069994	1F269170144	JNP10K 5500W AC/HVDC Power Supply Unit
PSM 2	REV 02	740-049388	1EDL60300C6	JNP10K 5500W AC/HVDC Power Supply Unit
PSM 3	REV 02	740-049388	1EDL603005X	JNP10K 5500W AC/HVDC Power Supply Unit
PSM 4	REV 02	740-049388	1EDL6170275	JNP10K 5500W AC/HVDC Power Supply Unit
PSM 5	REV 02	740-049388	1EDL61701WD	JNP10K 5500W AC/HVDC Power Supply Unit
Routing Engine 0		BUILTIN	BUILTIN	JNP10K-RE1-E
CB 0	REV 15	750-079562	BCAW3941	Control Board
Routing Engine 1		BUILTIN	BUILTIN	JNP10K-RE1-E
CB 1	REV 15	750-079562	BCAW3942	Control Board
FPC 0	REV 07	750-093524	BCAY8271	JNP10K-LC1201
CPU	REV 14	710-001726	HM1084	FPC CPU
FPC 10	REV 07	750-093524	BCAY8277	JNP10K-LC1201CPU
710-010169	HZ3219		FPC CPU-Enhanced	REV 05
SIB 0	REV 02	750-083426	BCAV7680	SIB-JNP10016
SIB 1	REV 02	750-083426	BCAV7682	SIB-JNP10016
SIB 2	REV 02	750-083426	BCAV7681	SIB-JNP10016
SIB 3	REV 02	750-083426	BCAV7684	SIB-JNP10016
SIB 4	REV 02	750-083426	BCAV7683	SIB-JNP10016

SIB 5	REV 02	750-083426	BCAV7685	SIB-JNP10016
FTC 0	REV 10	750-086270	BCAV0609	Fan Controller 16
Fan Tray 0	REV 02	750-103311	BCAY1793	Fan Tray 16
Fan Tray 1	REV 02	750-103311	BCAY1797	Fan Tray 16

show chassis hardware clei-models (PTX10016 Router)

```
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 (QFX5700 Router)

```
user@host> show chassis hardware
Hardware inventory:
Item                Version      Part number  Serial number  Description
Chassis              EC819       JNP5700     [QFX5700]
....
....
....
Routing Engine 0     BUILTIN     BUILTIN     JNP5700-RCB
Routing Engine 1     BUILTIN     BUILTIN     JNP5700-RCB
CB 0                 REV 15      750-079562  BCAV5526      Control Board
CB 1                 REV 15      750-079562  BCAW0403      Control Board
```

show chassis hardware (SRX5800 Router)

```
user@host> show chassis hardware
show chassis hardware
Hardware inventory:
Item                Version  Part number  Serial number  Description
Chassis              JN1080B50AFA  MX960
Midplane             REV 02      710-013698  CC6226        MX960 Backplane
Fan Extender         REV 02      710-018051  JY5235        Extended Cable Manager
FPM Board            REV 01      710-014974  JS4207        Front Panel Display
PEM 0                Rev 01      740-080280  1F238510008  MX960-UNIVERSAL-HV-PSM
PEM 1                Rev 01      740-080280  1F238510030  MX960-UNIVERSAL-HV-PSM
```

PEM 2	Rev 01	740-080280	1F238510023	MX960-UNIVERSAL-HV-PSM
PEM 3	Rev 01	740-080280	1F238510047	MX960-UNIVERSAL-HV-PSM

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	4XQSFP28 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				T640
Jedec Code:	0x7fb0	EEPROM Version:	0x01	
P/N:	S/N:	
Assembly ID:	0x0507	Assembly Version:	00.00	

```

Date:          00-00-0000      Assembly Flags:    0x00
Version:       .....
ID: Gibson LCC Chassis
Board Information Record:
  Address 0x00: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
I2C Hex Data:
  Address 0x00: 7f b0 01 ff 05 07 00 00 00 00 00 00 00 00 00 00
  Address 0x10: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  Address 0x20: ff ff ff ff ff ff ff ff ff ff ff ff ff 00 00 00 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 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
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      BUILTIN      FPC CPU
PIC 0           BUILTIN      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 hardware (ACX7100-48L)

```
user@host> show chassis hardware
```

Hardware inventory:

Item	Version	Part number	Serial number	Description
Chassis			YW0220320039	JNP7100-48L
[ACX7100-48L]				
PSM 1	REV 04	740-085431	1ED79520221	PSU 1600W AC, Front
to				
Airflow				
Routing Engine 0	REV 04	611-112446	YY0220320013	RE-JNP-7100
CB 0	REV 05	650-113149	YW0220320039	Control Board
FPC 0		BUILTIN	BUILTIN	ACX7100-48L
PIC 0		BUILTIN	BUILTIN	MRATE- 48xSFP56 +
6xQSF				
DD				
Xcvr 0	REV 01	740-068639	1A1M31A311008	SFP28-25G-BASE-SR
Xcvr 1	REV 01	740-030658	AA1230AZYWW	SFP+-10G-USR
Xcvr 2	REV 01	740-031980	AP42G0C	SFP+-10G-SR
Xcvr 3	REV 01	740-031980	ARN2FS9	SFP+-10G-SR
Xcvr 4	REV 01	740-031980	AP4150P	SFP+-10G-SR
Xcvr 5	REV 01	740-031980	123363A01134	SFP+-10G-SR
Xcvr 6	REV 01	740-031980	B11E02539	SFP+-10G-SR
Xcvr 7	REV 01	740-031980	ARQ0WRX	SFP+-10G-SR
Xcvr 12	REV 01	740-031980	193363A00707	SFP+-10G-SR
Xcvr 15	REV 01	740-031980	AMS15RT	SFP+-10G-SR
Xcvr 18	REV 01	740-068639	1A1M31A5370MX	SFP28-25G-BASE-SR
Xcvr 19	REV 01	740-068639	1A1M31A5370MS	SFP28-25G-BASE-SR
Xcvr 21	REV 01	740-068639	1A1M31A5370MW	SFP28-25G-BASE-SR

Back

P56-

Xcvr 22	REV 01	740-068639	1A1M31A5370MT	SFP28-25G-BASE-SR	
Xcvr 43	REV 01	740-031980	CH09KN1H4	SFP+-10G-SR	
Xcvr 44	REV 01	740-031980	AMB0TC1	SFP+-10G-SR	
Xcvr 46	REV 01	740-031980	AP40WQN	SFP+-10G-SR	
Xcvr 47	REV 01	740-031980	APR1BCS	SFP+-10G-SR	
Xcvr 48	REV 01	740-054053	XXH0KH1	QSFP+-4X10G-SR	
Xcvr 49	REV 01	740-058734	1ECQ144605L	QSFP-100GBASE-SR4	
Xcvr 50	REV 01	740-054053	XWP0Q7D	QSFP+-4X10G-SR	
Xcvr 51	REV 01	740-058734	1ECQ144604H	QSFP-100GBASE-SR4	
Xcvr 52	REV 01	740-054053	XXH0KGC	QSFP+-4X10G-SR	
Xcvr 53	REV 01	740-058734	1ECQ144605K	QSFP-100GBASE-SR4	
Fan Tray 0				JNP7100 Fan Tray,	
Front					to
Back Airflow - AFO					
Fan Tray 1				JNP7100 Fan Tray,	
Front					to
Back Airflow - AFO					
Fan Tray 2				JNP7100 Fan Tray,	
Front					to
Back Airflow - AFO					
Fan Tray 3				JNP7100 Fan Tray,	
Front					to
Back Airflow - AFO					
Fan Tray 4				JNP7100 Fan Tray,	
Front					to
Back Airflow - AFO					
Fan Tray 5				JNP7100 Fan Tray,	
Front					to
Back Airflow - AFO					

show chassis hardware (SRX5800)

```
user@host> show chassis hardware
```

Hardware inventory:

Item	Version	Part number	Serial number	Description
Chassis			JN1080B50AFA	MX960
Midplane	REV 02	710-013698	CC6226	MX960 Backplane
Fan Extender	REV 02	710-018051	JY5235	Extended Cable Manager
FPM Board	REV 01	710-014974	JS4207	Front Panel Display
PEM 0	Rev 01	740-080280	1F238510008	SRX5800-UNIVERSAL-HV-PSM

PEM 1	Rev 01	740-080280	1F238510030	SRX5800-UNIVERSAL-HV-PSM
PEM 2	Rev 01	740-080280	1F238510023	SRX5800-UNIVERSAL-HV-PSM
PEM 3	Rev 01	740-080280	1F238510047	SRX5800-UNIVERSAL-HV-PSM

show chassis hardware (PTX10001-36MR) (400G ZR optics)

```
user@host> show chassis hardware
```

CB 0	REV 14	750-079562	CAKY1861	Control Board
FPC 0	REV 02	750-093524	BCAP3538	JNP10K-LC1201
CPU	REV 02	711-072984	BCAL3894	JNP10K-LC1201 PMB Board
PIC 0		BUILTIN	BUILTIN	JNP10K-36QDD-LC-PIC
Xcvr 1	REV 01	740-082823	1G1CZAA41200G	QSFP56-DD-400GBASE-LR8
Xcvr 5	REV 01	740-059437	0000T3610	QSFP28-LPBK
Xcvr 8	REV 01	740-090170	INIBZ8090158A	QSFP56-DD-400G-AOC-30M
Xcvr 12	XXXX	NON-JNPR	L1949D0016	QSFP56-DD-400G-ZR
Xcvr 14	XXXX	NON-JNPR	L1949D0047	QSFP56-DD-400G-ZR

show chassis hardware (PTX10001-36MR) (400G ZR-M)

```
user@host show chassis hardware
```

Hardware inventory:

Item	Version	Part number	Serial number	Description
Chassis			EM436	JNP10001-36MR [PTX10001-36MR]
PSM 0	REV 07	740-073765	1GE29391099	AC AFO 3000W PSU
Routing Engine 0	REV 08	750-100243	BCBH4788	RE-JNP10001-36MR
CB 0	REV 16	750-099260	BCBJ1424	Control Board
FPC 0		BUILTIN	BUILTIN	FPC-JNP10001-36MR
PIC 0		BUILTIN	BUILTIN	8X400GE-MR + 4X100GE-MR
Xcvr 0	REV 01	740-032986	ECX40K80042	QSFP+-40G-SR4
Xcvr 2	REV 01	740-032986	QF4804ZM	QSFP+-40G-SR4
Xcvr 3	REV 01	740-046565	QD190447	QSFP+-40G-SR4
Xcvr 4	REV 01	740-038624	S1810376855-1	QSFP+-40G-CU3M
Xcvr 5	REV 01	740-032986	ECX40K80028	QSFP+-40G-SR4
Xcvr 10	REV 01	740-131169	1T1TZFA70500D	QSFP56-DD-400G-ZR-M
PIC 1		BUILTIN	BUILTIN	8X400GE-MR + 4X100GE-MR
Xcvr 0	REV 01	740-032986	XV303SF	QSFP+-40G-SR4
Xcvr 1	REV 01	740-067442	QI1202B5	QSFP+-40G-SR4
Xcvr 2	XXXX	NON-JNPR	204053396	QSFP56-DD-400G-ZR
Xcvr 4	REV 01	740-061405	1ECQ13150KE	QSFP-100GBASE-SR4-T2
Xcvr 10	REV 01	740-131169	1T1TZFA70500C	QSFP56-DD-400G-ZR-M

PIC 2		BUILTIN	BUILTIN	8X400GE-MR + 4X100GE-MR
Xcvr 0	REV 01	740-032986	QD481959	QSFP+-40G-SR4
Xcvr 1	REV 01	740-038624	C1909242760-1	QSFP+-40G-CU3M
Xcvr 3	REV 01	740-032986	ECX02IC0146	QSFP+-40G-SR4
Xcvr 4	REV 01	740-065631	1ACS12510R3	QSFP28-100G-AOC-3M
Xcvr 5	REV 01	740-065631	1ACS1251023	QSFP28-100G-AOC-3M
Xcvr 9	REV 01	740-061405	1ECQ13150A5	QSFP-100GBASE-SR4-T2
Xcvr 10	XXXX	NON-JNPR	204053387	QSFP56-DD-400G-ZR
Xcvr 11	REV 01	740-038623	MOC14256230865	QSFP+-40G-CU1M
SIB 0		BUILTIN	BUILTIN	SIB-JNP10001-36MR
Fan Tray 0				JNP10001 Fan Tray, Front to Back
Airflow - AF0				
Fan Tray 1				JNP10001 Fan Tray, Front to Back
Airflow - AF0				
Fan Tray 2				JNP10001 Fan Tray, Front to Back
Airflow - AF0				
Fan Tray 3				JNP10001 Fan Tray, Front to Back
Airflow - AF0				
Fan Tray 4				JNP10001 Fan Tray, Front to Back
Airflow - AF0				
Fan Tray 5				JNP10001 Fan Tray, Front to Back
Airflow - AF0				

Release Information

Command introduced before Junos OS Release 7.4.

`models` option introduced in Junos OS Release 8.2.

`sfc` option introduced in Junos OS Release 9.6 for the TX Matrix Plus router.

Information for `disk` and `usb` introduced in Junos OS Release 15.1X53-D60 for QFX10002, QFX10008, and QFX10016 switches.

`pem` detail output added in Junos OS Release 21.4R1 for SRX5800.

NOTE: Routers and routing platforms use the basic syntax, unless otherwise listed. For example, the EX Series has an additional `satellite` parameter available.

RELATED DOCUMENTATION

| [show chassis power](#)

show chassis led satellite

IN THIS SECTION

- [Syntax | 526](#)
- [Description | 526](#)
- [Options | 526](#)
- [Required Privilege Level | 527](#)
- [Output Fields | 527](#)
- [Sample Output | 530](#)
- [Release Information | 531](#)

Syntax

```
show chassis led satellite [slot-id slot-id |device-alias alias-name]
```

Description

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.

Options

none Display the status of the chassis status LEDs of every satellite device in the Junos Fusion.

- slot-id *slot-id*

(Optional) Display the status of the chassis status LEDs of the satellite device using the specified FPC slot identifier in the Junos Fusion. The *slot-id* is the FPC slot ID number.
- device-alias
alias-name

(Optional) Display the status of the chassis status LEDs of the satellite device using the specified alias in the Junos Fusion.

Required Privilege Level

view

Output Fields

Table 16 on page 527 lists the output fields for the show chassis led satellite command. Output fields are listed in the approximate order in which they appear.

Table 16: show chassis led Output Fields

Field Name	Field Description
Beacon LED	<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 Beacon LED output maps to the ID-Identification LED state.</p> <p>For more information, see:</p> <ul style="list-style-type: none">Chassis Status LEDs on a QFX5100 DeviceQFX5110 Chassis Status LEDsQFX5200 Chassis Status LEDs

Table 16: show chassis led Output Fields *(Continued)*

Field Name	Field Description
System LED	<p>Indicates the state of the System (SYS) LED on the satellite device.</p> <p>For more information, see:</p> <ul style="list-style-type: none"> • <i>Chassis Status LEDs on EX4300 Switches</i> • Chassis Status LEDs on a QFX5100 Device • QFX5110 Chassis Status LEDs • QFX5200 Chassis Status LEDs
Master LED	<p>Indicates the state of the Primary (MST) LED on the satellite device.</p> <p>For more information, see:</p> <ul style="list-style-type: none"> • <i>Chassis Status LEDs on EX4300 Switches</i> • Chassis Status LEDs on a QFX5100 Device • QFX5110 Chassis Status LEDs • QFX5200 Chassis Status LEDs
Alarm LED	<p>Indicates the state of the Alarm (ALM) LED on the satellite device.</p> <p>For more information, see:</p> <ul style="list-style-type: none"> • <i>Chassis Status LEDs on EX4300 Switches</i> • Chassis Status LEDs on a QFX5100 Device • QFX5110 Chassis Status LEDs • QFX5200 Chassis Status LEDs

Table 16: show chassis led Output Fields *(Continued)*

Field Name	Field Description
Mgmt Port0 LED	<p>(Applies when QFX5100, QFX5110, and QFX5200 switches are in an satellite device role only) Indicates the state of the management port 0 (em0) 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"> • Management Port LEDs on a QFX5100 Device • QFX5110 Management Port LEDs • QFX5200 Management Port LEDs
Mgmt Port1 LED	<p>(Applies when QFX5100, QFX5110, and QFX5200 switches are in an satellite device role only) Indicates the state of the management port 1(em0) 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"> • Management Port LEDs on a QFX5100 Device • QFX5110 Management Port LEDs • QFX5200 Management Port LEDs
Interface	<p>The interface name on the satellite device.</p> <p>For more information, see:</p> <ul style="list-style-type: none"> • Management Port LEDs on a QFX5100 Device • QFX5110 Management Port LEDs • QFX5200 Management Port LEDs

Table 16: show chassis led Output Fields *(Continued)*

Field Name	Field Description
Status LED	<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"> • <i>Network Port, Built-In QSFP+ Port, Uplink Port, and Uplink Module Port LEDs on EX4300 Switches</i> • Access Port and Uplink Port LEDs on a QFX5100 Device • QFX5110 Network Port LEDs • QFX5200 Access Port and Uplink Port LEDs
Link/Activity LED	<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"> • <i>Network Port, Built-In QSFP+ Port, Uplink Port, and Uplink Module Port LEDs on EX4300 Switches</i> • Access Port and Uplink Port LEDs on a QFX5100 Device • QFX5110 Network Port LEDs • QFX5200 Access Port and Uplink Port LEDs

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	

Release Information

Command introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

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

[Understanding Junos Fusion Provider Edge Components | 5](#)

[Understanding Junos Fusion Enterprise Components](#)

show chassis routing-engine

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- [show chassis routing engine \(QFX5700 Switches\) \(Junos OS Evolved Release\) | 542](#)
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Syntax

```
show chassis routing-engine
<bios | slot>
```

Syntax (ACX Series, PTX Series, and MX104 Universal Routing Platforms.)

```
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 (MX204 and MX10003 Universal Routing Platforms)

```
show chassis routing-engine
<slot>
<bios>
<errors>
```


Syntax (TX Matrix Routers)

```
show chassis routing-engine
<bios | slot>
<lcc number | scc>
```

Syntax (TX Matrix Plus Routers)

```
show chassis routing-engine
<bios | slot>
<lcc number | sfc number>
```

Syntax (Junos OS Evolved)

```
show chassis routing-engine
<slot>
<bios>
<hard-disk-test>
```

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.

hard-disk-test	(Junos OS Evolved only) (Optional) Display the health of the hard disk. Use <code>disk /dev/disk-name</code> status to display the status of a particular disk.
interconnect-device <i>number</i>	(QFabric systems only) (Optional) Display Routing Engine information for a specified Interconnect device.
lcc <i>number</i>	<p>(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.</p> <p>Replace <i>number</i> with the following values depending on the LCC configuration:</p> <ul style="list-style-type: none"> • 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix. • 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix. • 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix. • 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
local	(MX Series routers only) (Optional) Display Routing Engine information for the local Virtual Chassis member.
member <i>member-id</i>	(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 <i>member-id</i> with a value of 0 or 1.
node-device <i>number</i>	(QFabric systems only) (Optional) Display Routing Engine information for a specified Node device.
satellite [slot-id <i>slot-id</i>]device-alias <i>alias-name</i>	(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 <i>number</i>	(TX Matrix Plus routers only) (Optional) Display Routing Engine information for the TX Matrix Plus router (or switch-fabric chassis). Replace <i>number</i> 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

Output Fields

Table 17 on page 536 lists the output fields for the `show chassis routing-engine` command. Output fields are listed in the approximate order in which they appear.

Table 17: 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: Master, Backup, or Disabled.
Election priority	(Systems with multiple Routing Engines) Election priority for the Routing Engine: Master or Backup.
Temperature	Temperature of the air flowing past the Routing Engine.
CPU Temperature	Temperature of the CPU.
DRAM	<p>Total DRAM available to the Routing Engine's processor.</p> <p>NOTE: When the chassis has two Routing Engines, the amount of DRAM should be the same on both. A DRAM size mismatch error can result when the Routing Engines have different amounts of DRAM.</p> <p>Starting with Junos OS Release 12.3R1, the DRAM field displays both available memory and installed memory.</p>

Table 17: show chassis routing-engine Output Fields (*Continued*)

Field Name	Field Description
Memory utilization	<p>Percentage of Routing Engine memory being used.</p> <p>NOTE: 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 Release Information for Junos OS with Upgraded FreeBSD.</p>
CPU utilization	<p>Information about the Routing Engine's CPU utilization:</p> <ul style="list-style-type: none"> • User—Percentage of CPU time being used by user processes. • Background—Percentage of CPU time being used by background processes. • Kernel—Percentage of CPU time being used by kernel processes. • Interrupt—Percentage of CPU time being used by interrupts. • Idle—Percentage of CPU time that is idle.
5 sec CPU Utilization	<p>Information about the Routing Engine's CPU utilization in the past 5 seconds:</p> <ul style="list-style-type: none"> • User—Percentage of CPU time being used by user processes. • Background—Percentage of CPU time being used by background processes. • Kernel—Percentage of CPU time being used by kernel processes. • Interrupt—Percentage of CPU time being used by interrupts. • Idle—Percentage of CPU time that is idle.

Table 17: show chassis routing-engine Output Fields (Continued)

Field Name	Field Description
1 min CPU Utilization	<p>Information about the Routing Engine's CPU utilization in the past 1 minute:</p> <ul style="list-style-type: none"> • User—Percentage of CPU time being used by user processes. • Background—Percentage of CPU time being used by background processes. • Kernel—Percentage of CPU time being used by kernel processes. • Interrupt—Percentage of CPU time being used by interrupts. • Idle—Percentage of CPU time that is idle.
5 min CPU Utilization	<p>Information about the Routing Engine's CPU utilization in the past 5 minutes:</p> <ul style="list-style-type: none"> • User—Percentage of CPU time being used by user processes. • Background—Percentage of CPU time being used by background processes. • Kernel—Percentage of CPU time being used by kernel processes. • Interrupt—Percentage of CPU time being used by interrupts. • Idle—Percentage of CPU time that is idle.
15 min CPU Utilization	<p>Information about the Routing Engine's CPU utilization in the past 15 minutes:</p> <ul style="list-style-type: none"> • User—Percentage of CPU time being used by user processes. • Background—Percentage of CPU time being used by background processes. • Kernel—Percentage of CPU time being used by kernel processes. • Interrupt—Percentage of CPU time being used by interrupts. • Idle—Percentage of CPU time that is idle.
Model	Routing Engine model number.
Serial ID	(Systems with multiple Routing Engines) Identification number of the Routing Engine in this slot.

Table 17: show chassis routing-engine Output Fields *(Continued)*

Field Name	Field Description
Start time	Time at which the Routing Engine started running.
Uptime	How long the Routing Engine has been running.
Routing Engine BIOS Version	BIOS version being run by the Routing Engine.

Table 17: 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"> • power cycle/failure—Halt of the Routing Engine using the halt 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 request system halt 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. • watchdog—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. • reset-button reset—(Not available on the EX Series switch) Reboot due to pressing of the reset button on the Routing Engine. • power-button hard power off—Reboot due to pressing of the power button on the chassis. A powering down of the software also occurs if you enter the request system power-off command. You can enter this command to power down the chassis or specific Routing Engines; you can then restart the software. • misc hardware reason—Reboot due to miscellaneous hardware reasons. • thermal shutdown—Reboot due to the router or switch reaching a critical temperature at which point it is unsafe to continue operations. • hard disk failure—Reboot due to a hard disk or solid-state drive (SSD) failure. • reset from debugger—Reboot due to reset from the debugger. • chassis control reset—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 restart chassis-control command. • bios auto recovery reset—Reboot due to a BIOS auto-recovery reset. • could not be determined—Reboot due to an undetermined reason.

Table 17: show chassis routing-engine Output Fields (*Continued*)

Field Name	Field Description
	<ul style="list-style-type: none"> Router rebooted after a normal shutdown—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 request system reboot command. You can enter this command to reboot the chassis or specific Routing Engines. Low battery detected This reason is displayed if the Routing Engine is powered down due to detection of low battery and powered back when battery is charged. Catastrophic error This reason is displayed if the Routing Engine is powered down due to catastrophic error (for example, link failure between FPC line card and PFE(packet forwarding engine)) and powered back. <p>QFX5700 displays the following additional reboot reasons:</p> <ul style="list-style-type: none"> FPGA reset Reboot due to FPGA reset. MSMI error/hw misc Reboot due to hardware MSMI (Microsoft Mail Connector interchange) Service Returned Service-Specific error. swizzle reset Reboot due to swizzle reset, power off and turning back on. PCH cold reset Reboot due to complete removal of power and restart of Intel PCH (Platform Controller Hub). software reboot Reboot of system due to software reboot process. Straight to s5 reset Reboot due to system in S5 state and does not retain memory state. iTCO watchdog Linux TCO hardware watchdog reboots the system automatically when there is a systems pause.
Load averages	Routing Engine load averages for the last 1, 5, and 15 minutes.

Sample Output

The sample outputs for show chassis routing engine are as follows:

show chassis routing engine (QFX5700 Switches) (Junos OS Evolved Release)

```

user@switch> show chassis routing-engine
Routing Engine status:
  Slot 0:
    Current state      Master
    Election priority  Master
    Temperature        35 degrees C / 95 degrees F
    CPU temperature     39 degrees C / 102 degrees F
    DRAM                25825 MB (31566 MB installed)
    Memory utilization  18 percent
    5 sec CPU utilization:
      User              2 percent
      Background        0 percent
      Kernel            2 percent
      Interrupt         0 percent
      Idle              94 percent
    1 min CPU utilization:
      User              2 percent
      Background        0 percent
      Kernel            2 percent
      Interrupt         0 percent
      Idle              94 percent
    5 min CPU utilization:
      User              2 percent
      Background        0 percent
      Kernel            2 percent
      Interrupt         0 percent
      Idle              94 percent
    15 min CPU utilization:
      User              2 percent
      Background        0 percent
      Kernel            2 percent
      Interrupt         0 percent
      Idle              94 percent
    Model              QFX5700-RE
    Serial ID          BUILTIN
    Start time 2021-06-09 02:50:08 PDT
    Uptime 42 minutes, 48 seconds
    Load averages: 1 minute 5 minute 15 minute

```

1.48 1.71 1.83

Last reboot reason power cycle

Release Information

Command introduced before Junos OS Release 7.4.

sfc option introduced in Junos OS Release in 9.6 for the TX Matrix Plus router.

5 sec CPU Utilization, 1 min CPU Utilization, 5 min CPU Utilization, and 15 min CPU Utilization output fields introduced in Junos OS Release 11.3R1.

satellite option introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

- [request chassis routing-engine master](#)
- [Configuring Routing Engine Redundancy](#)
- [Switching the Global Primary and Backup Roles in a Virtual Chassis Configuration](#)

show chassis satellite

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Syntax

```
show chassis satellite
[device-alias device-alias | fpc-slot fpc-slot | cluster cluster-name]
[brief | detail | extensive | terse]
<since time>
```

Description

Display the status of the satellite device connections in a Junos Fusion.

Options

none	(Same as brief) Display satellite device connection information
device-alias <i>device-alias</i>	(Optional) Display satellite device connection information for the satellite device using the specified device alias only.
fpc-slot <i>fpc-slot</i>	(Optional) Display satellite device connection information for the satellite device using the specified FPC slot number only.
cluster <i>cluster-name</i>	(Optional) Display satellite device connection information for the satellite devices in the specified satellite device cluster only.
brief detail extensive terse	(Optional) Display the specified level of output.
since <i>time</i>	<p>(Optional) Display the satellite devices that have been added to the Junos Fusion on or after a certain date or time, in <i>YYYY-MM-DD.HH:MM:SS</i> 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 2015-12-22 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 2015-12-22.11:01:00 as the <i>time</i>.</p>

Required Privilege Level

view

Output Fields

Table 18 on page 545 lists the output fields for the `show chassis satellite` command. Output fields are listed in the approximate order in which they appear.

Table 18: show chassis satellite Output Fields

Field Name	Field Description	Level of Output
Fields for Interface		
Alias	<p>The satellite device's alias.</p> <p>The satellite device's alias is configured using the set chassis satellite-management fpc slot-id alias alias statement.</p>	<p>brief</p> <p>extensive</p> <p>none</p>
Slot	<p>The slot number of the satellite device.</p> <p>The slot number can be configured using the set chassis satellite-management fpc slot-id statement..</p>	<p>brief</p> <p>terse</p> <p>extensive</p> <p>none</p>

Table 18: show chassis satellite Output Fields (*Continued*)

Field Name	Field Description	Level of Output
Device State	<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"> • Online—the satellite device is online and active. This is the satellite device state during normal operating procedure. • Offline—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. • Present—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. • Rebooting—the satellite device is rebooting. • Disable—the satellite device has been disabled. • Misconfig—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. • Miswire—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 show chassis satellite detail to gather more information on the issue when the device state is Miswire. <p>Other less common device states include:</p> <ul style="list-style-type: none"> • ModeChanging—the device is converting from a standalone device to a satellite device, or from a satellite device to a standalone device. 	<p>brief</p> <p>terse</p> <p>extensive</p> <p>none</p>

Table 18: show chassis satellite Output Fields *(Continued)*

Field Name	Field Description	Level of Output
	<ul style="list-style-type: none"> • ModeChangeFail—the mode change operation failed. • MinorUpgradeOn—A minor satellite software upgrade is in progress. • MajorUpgradeOn—A major satellite software upgrade is in progress. • Upgrade-pending—the satellite device is waiting for a satellite software upgrade. • ProvSessionDn—the provisioning session is down. • ReconcileState—the satellite provisioning daemon has restarted and is reconciling the satellite device state. 	
Cascade Ports	<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</p> <p>extensive</p> <p>none</p>

Table 18: show chassis satellite Output Fields (*Continued*)

Field Name	Field Description	Level of Output
Port State	<p>The state of the cascade port on the aggregation device.</p> <p>Port states include:</p> <ul style="list-style-type: none"> • online—the cascade port is online and active. This is the port state during normal operating procedure. • txUpRxDn—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. • miswire—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 show chassis satellite detail to gather more information on the issue when the device state is Miswire. • present—The cascade port recognized the satellite device and is up. • misconfig—the cascade port is assigned, but this interface is not working correctly due to a misconfiguration. • down—the cascade port is down. • offline—the satellite device was previously recognized from this interface, but is no longer present. • absent—the cascade port is configured but no satellite device is detected on the interface. 	<p>brief</p> <p>extensive</p> <p>none</p>

Table 18: show chassis satellite Output Fields (Continued)

Field Name	Field Description	Level of Output
Extended Ports Total	<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>
Extended Ports Up	The number of active extended ports.	<p>brief</p> <p>none</p> <p>terse</p>
Model	The hardware model of the satellite device.	terse
Version	The version of satellite device software running on the satellite device.	terse
Satellite Alias	<p>The satellite device's alias.</p> <p>The satellite device's alias is configured using the set chassis satellite-management fpc slot-id alias alias statement.</p>	detail
FPC slot	<p>The FPC slot number of the satellite device.</p> <p>The slot number can be configured using the set chassis satellite-management fpc slot-id statement.</p>	detail
Operational State	<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
Product Model	The hardware model of the satellite device.	detail

Table 18: show chassis satellite Output Fields (Continued)

Field Name	Field Description	Level of Output
Product Family	The product family of the satellite device.	detail
Serial number	The serial number of the satellite device.	detail
System ID	The system ID of the satellite device. The system ID is also the satellite device's MAC address.	detail
Software package version	The satellite software version running on the satellite device.	detail
Host software version	The host operating system software version running on the satellite device.	detail
Management Address	<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
UFD config state	Uplink failure detection configuration state.	detail
Minimum link	Uplink failure detection minimum active uplink port setting.	detail

Table 18: show chassis satellite Output Fields (Continued)

Field Name	Field Description	Level of Output
Holdddown timer (seconds)	Uplink failure detection holdddown timer setting, in seconds.	detail
UFD operational state	Uplink failure detection operational state.	detail
Candidate uplink interfaces (pic/port)	Uplink failure detection candidate uplink interfaces.	detail
Extended Ports	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
When	The date and time of the event.	extensive
Event	The event.	extensive
Action	The actions that resulted from the event.	extensive

Fields for Cascade interfaces

Interface Name	The name of the cascade interface on the aggregation device.	detail
State	The state of the cascade interface.	detail

Table 18: show chassis satellite Output Fields (Continued)

Field Name	Field Description	Level of Output
Uplink Interface	The name of the uplink interface on the satellite device.	detail
Adjacency state	The adjacency state of the cascade to uplink interface link.	detail
Last transition	The amount of time that has passed since the last transition of the cascade to uplink interface link.	detail
Adjacency down count (Interface Name)	The number of times the cascade to uplink interface link has gone into the down state.	detail
RX Packet	The number of packets received on the cascade interface.	detail
Last received packet	The amount of time that has passed since the last packet was received on the cascade interface.	detail
Peer adjacency information	The amount of time that has passed since the last peer adjacency transition.	detail
Adjacency down count (Peer adjacency information)	The number of times the cascade to uplink interface link has gone into the down state.	detail
Last down cause	The cause of the last adjacency failure.	detail

Table 18: show chassis satellite Output Fields (Continued)

Field Name	Field Description	Level of Output
SDPD restart detected	The number of times that the satellite device protocol process has restarted.	detail

Fields for Process information

Process Name	The name of the process.	detail
PID	The process identification number of the process.	detail
State	The current state of the process.	detail
Number of restart detected	The number of times the process has restarted.	detail
Uptime	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 xe-0/3/0	online online	9/2
qfx5100-24q-02	101	Online	xe-0/0/2 xe-0/3/1	online online	20/12
qfx5100-24q-03	102	Online	xe-0/0/3 xe-0/3/2	online online	16/6
qfx5100-24q-04	103	Online	xe-0/0/4 xe-0/3/3	online online	16/4
qfx5100-24q-05	104	Online	xe-0/0/5	online	13/3

qfx5100-24q-06	105	Online	xe-0/3/4	online	24/15
			xe-0/0/6	online	
			xe-0/3/5	online	
qfx5100-24q-07	106	Online	xe-0/0/7	online	24/15
			xe-0/3/6	online	
qfx5100-24q-08	107	Online	xe-0/0/8	online	21/12
			xe-0/3/7	online	
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
```

		Device	Cascade	Port	Extended Ports
Alias	Slot	State	Ports	State	Total/Up
ex4300-22	101	Online	xe-0/0/2	online	20/12
			xe-0/3/1	online	

Sample Output

show chassis satellite terse

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

		Device	Extended Ports	
Slot	State	Model	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,
Holddown 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>

```

Release Information

Command introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

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

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show chassis satellite extended-port

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Syntax

```
show chassis satellite extended-port interface-name
<fpc-slot fpc-slot>
<interface-name interface-name>
[brief | detail | extensive | terse]
<since time>
```

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 <i>fpc-slot</i>	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 <i>interface-name</i>	Display extended port status information for the extended port interface only.
history	Display extended port history.
statistics	Display extended port statistics.
since <i>time</i>	<p>(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 <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 <i>time</i>. For instance, 2015-12-22.</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, 2015-12-22.11:01:00.</p>

Required Privilege Level

view

Output Fields

[Table 19 on page 561](#) 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 19: show chassis satellite extended-port Output Fields

Field Name	Field Description	Level of Output
Fields for Interface		
Name	The interface name of the extended port.	brief terse detail extensive none
State	The state of the extended port.	brief terse detail extensive none
Rx Request State	The receive request state of the extended port.	brief terse detail extensive none
Tx Request State	The transmit request state of the extended port.	brief terse detail extensive none
Admin State	The administrative state of the extended port.	brief terse detail extensive none
Op State	The operational state of the extended port.	brief terse detail extensive none

Table 19: show chassis satellite extended-port Output Fields (Continued)

Field Name	Field Description	Level of Output
IFD Idx	The internal interface index.	brief terse detail extensive none
PCID	The port's E-channel identifier (ECID), abbreviated as PCID.	brief terse detail extensive none
When	The date and time of the event.	detail extensive
Event	The event.	detail extensive
Action	The actions that resulted from the event.	detail 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	Tx State	Admin/Op Request	IFD State	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

Release Information

Command introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

- [Configuring or Expanding a Junos Fusion Enterprise](#)
- [Configuring Junos Fusion Provider Edge | 52](#)

show chassis satellite interface

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- Release Information | 571

Syntax

```
show chassis satellite interface
<interface-name>
```

```
[ brief | detail | extensive ]
<since time>
```

Description

Display the status of the cascade ports as well as the internal satellite interfaces in a Junos Fusion.

You might see **sd** interfaces in the output of this command. These are internal interfaces for the Junos Fusion.

Options

- interface-name*** Specify the name of the interface.
- none** (Same as **brief**) Display aggregation device interface information.
- brief | detail | extensive** (Optional) Display the specified level of output.
- since *time*** (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 *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*. 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

Output Fields

[Table 20 on page 566](#) lists the output fields for the `show chassis satellite interface` command. Output fields are listed in the approximate order in which they appear.

Table 20: show chassis satellite interface Output Fields

Field Name	Field Description	Level of Output
Fields for Interface		
Interface	The interface name.	brief detail extensive none
State	The state of the interface.	brief detail extensive none
Type	The type of interface.	brief detail extensive none
DF-Role	<p>(Junos Fusion Data Center with EVPN-VXLAN architecture) The designated forwarder (DF) role:</p> <ul style="list-style-type: none"> • NA—Not applicable. • NON-DF—This aggregation device is not the designated forwarder for the satellite device • DF—This aggregation device is the designated forwarder for the satellite device. 	brief detail extensive none
Provisioned Addresses	<p>The provisioned IP addresses for the Junos Fusion.</p> <p>This information is primarily useful for debugging purposes by expert users.</p>	detail extensive

Table 20: show chassis satellite interface Output Fields (Continued)

Field Name	Field Description	Level of Output
Operational Addresses	The operational IP addresses for the Junos Fusion. This information is primarily useful for debugging purposes by expert users.	detail extensive
When	The date and time of the event.	detail extensive
Event	The event.	detail extensive
Action	The actions that resulted from the event.	detail 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

Release Information

Command introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

Configuring or Expanding a Junos Fusion Enterprise
Configuring Junos Fusion Provider Edge 52

show chassis satellite neighbor

IN THIS SECTION

- [Syntax | 572](#)
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- [Required Privilege Level | 573](#)
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Syntax

```
show chassis satellite neighbor  
[interface-name]  
[ brief | detail | extensive | terse]  
<since time>
```

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*. 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

Output Fields

[Table 21 on page 573](#) lists the output fields for the `show chassis satellite neighbor` command. Output fields are listed in the approximate order in which they appear.

Table 21: show chassis satellite neighbor Output Fields

Field Name	Field Description	Level of Output
Fields for Interface		
Interface	<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</p> <p>terse</p> <p>detail</p> <p>extensive</p> <p>none</p>
State	The state of the interface.	<p>brief</p> <p>terse</p> <p>detail</p> <p>extensive</p> <p>none</p>

Table 21: show chassis satellite neighbor Output Fields (Continued)

Field Name	Field Description	Level of Output
Port Info	<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>	brief terse detail extensive none
System Name	<p>The system name, or alias, of the satellite device.</p> <p>The satellite device's alias is configured using the set chassis satellite-management fpc slot-id alias alias statement.</p>	brief terse detail extensive none
Model	The hardware model of the satellite device.	brief terse detail extensive none
SW Version	The version of satellite software running on the satellite device.	brief terse detail extensive none
Adjacency up-down transition count	The number of times that the adjacency has transitioned between up and down.	brief detail extensive
Last transition	The last transition of the adjacency state.	brief detail extensive
Device Serial Number	The serial number of the satellite device.	brief detail extensive

Table 21: show chassis satellite neighbor Output Fields (Continued)

Field Name	Field Description	Level of Output
Chassis ID	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.	brief detail extensive
Device Family Name	The device family name.	brief detail extensive
Version Sequence Number	The version sequence number.	brief detail extensive
System Description	A plain-text description of the hardware and software currently running on the satellite device.	brief detail extensive
Build date	The date and time that the satellite software was built.	brief detail extensive
Hello interval	The current hello interval configuration.	brief detail extensive
Satellite hello interval	The current satellite device hello interval configuration.	brief detail extensive
Local-end (Local assigned primary address)	The local-end cascade port IP address.	brief detail extensive

Table 21: show chassis satellite neighbor Output Fields (Continued)

Field Name	Field Description	Level of Output
Remote-end (Local assigned primary address)	The remote-end uplink port IP address.	brief detail extensive
Cause (Adjacency Down History)	The cause of the last adjacency down event.	brief detail extensive
Timestamp (Adjacency Down History)	The date and time of the last adjacency down event.	brief detail extensive
Information (Adjacency Down History)	Information related to the last adjacency down event.	brief detail extensive
When	The date and time of the event.	detail extensive
Event	The event.	detail extensive
Action	The actions that resulted from the event.	detail 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				

Release Information

Command introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

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

[Configuring Junos Fusion Provider Edge](#) | 52

show chassis satellite software

IN THIS SECTION

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Syntax

```
show chassis satellite software  
[ brief | detail ]
```

Description

Display information related to the satellite software in the Junos Fusion.

Options

- none** (Same as **brief**) Display satellite device software information.
- brief | detail** (Optional) Display the specified level of output.

Required Privilege Level

view

Output Fields

Table 22 on page 580 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 software Output Fields

Field Name	Field Description	Level of Output
Fields for Interface		
Version	The versions of satellite software that are installed and associated with a software upgrade group.	brief none
Platforms	The hardware platform information.	brief none
Group	The name of the assigned satellite software group or groups, if assigned.	brief none
Software Package Version	The satellite software package version.	detail
Platform	The platform type.	detail
Host Version	The host version of software for the platform.	detail

Table 22: show chassis satellite software Output Fields (Continued)

Field Name	Field Description	Level of Output
Current Groups	<p>The name or names of the satellite software upgrade groups that are using the software package.</p> <p>This output only appears if the software package is associated with a satellite software upgrade group.</p>	detail
Former Groups	<p>The name or names of satellite software upgrade groups that were previously using the software package.</p> <p>This output only appears if the software package was previously associated with a satellite software upgrade group.</p>	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

```


ppc	1.1.2	QFX5100-96S-8Q
		QFX5100-48SH-6Q
		QFX5100-48TH-6Q
		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		

Release Information

Command introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

Configuring or Expanding a Junos Fusion Enterprise
Configuring Junos Fusion Provider Edge 52

show chassis satellite statistics

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Syntax

```
show chassis satellite statistics  
<device-alias device-alias>  
<fpc-slot fpc-slot>  
<cluster cluster-name>
```

Description

Display statistics for satellite devices in a Junos Fusion.

Options

- device-alias*** Display output for the specified satellite device, which is identified by the device alias, only.
- fpc-slot*** Display output for the specified satellite device, which is identified by the FPC slot ID, only.
- cluster-name*** Display output for the satellite devices in the specified satellite device cluster only.

Required Privilege Level

view

Output Fields

Table 23 on page 584 lists the output fields for the show chassis satellite statistics command. Output fields are listed in the approximate order in which they appear.

Table 23: 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.
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.

Table 23: show chassis satellite statistics Output Fields (Continued)

Field Name	Field Description
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

```

Release Information

Command introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

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show chassis satellite unprovision

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Syntax

```
show chassis satellite unprovision
[brief | detail | extensive]
[cluster cluster-name]
<since time>
```

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 52](#) 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 <i>cluster-name</i>	(Optional) Display unprovisioned satellite device information for the specified satellite device cluster only.
since <i>time</i>	<p>(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 <i>YYYY-MM-DD.HH:MM:SS</i> format.</p> <p>To display unprovisioned satellite device information for all satellite devices unprovisioned since a specified date, enter the specific date as the time as the <i>time</i>. For instance, 2015-12-22.</p>

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

Output Fields

Table 24 on page 592 lists the output fields for the `show chassis satellite unprovision` command. Output fields are listed in the approximate order in which they appear.

Table 24: show chassis satellite unprovision Output Fields

Field Name	Field Description	Level of Output
System-Id	The MAC address of the satellite device.	brief extensive none
Serial-Number	The serial number of the satellite device.	brief extensive none
Device State	The device state of the unprovisioned satellite device.	brief extensive none
Cascade Ports	The cascade ports on the aggregation device that are connected to the satellite device.	brief extensive none
Port State	The port state of the cascade port.	brief extensive none
Operational State	The operational state of the satellite device.	detail

Table 24: show chassis satellite unprovision Output Fields (Continued)

Field Name	Field Description	Level of Output
Product Model	The product model of the satellite device.	detail
Product Family	The product family of the satellite device.	detail
Serial number	The serial number of the satellite device.	detail
System id	The MAC address of the satellite device.	detail
Software package version	The satellite software package version running on the satellite device.	detail
Host software version	The host software version.	detail

Fields for Cascade interfaces

Interface Name	The interface name of the cascade port on the aggregation device.	detail
State	The state of the cascade port.	detail
Uplink Interface	The uplink interface name. The uplink interface is the interface on the satellite device that connects to the aggregation device.	detail
Adjacency State	The adjacency state of the uplink interface to cascade port link.	detail
Last transition	The amount of time that has passed since the last link transition.	detail

Table 24: show chassis satellite unprovision Output Fields (Continued)

Field Name	Field Description	Level of Output
Adjacency down count	The number of times that the uplink interface to cascade port link has gone into the adjacency down count.	detail
Rx Packet	The number of received packets.	detail
Last received packet	The amount of time that has passed since the last received packet.	detail
Peer adjacency information	The amount of time that the adjacency has been active.	detail
Last down cause	The cause of the last time the adjacency went down.	detail
SDPD restart detected	The number of times that the SDPD has restarted.	detail

Fields for process information

Process Name	The name of the process.	detail
PID	The PID of the process.	detail
State	The current state of the process.	detail
Number of restart detected	The number of times that the process has restarted.	detail
Uptime	The amount of time that the process has been active.	detail
When	The date and time of the event.	extensive

Table 24: show chassis satellite unprovision Output Fields (Continued)

Field Name	Field Description	Level of Output
Event	The event.	extensive
Action	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      Cascade  Port
-----
AA:BB:CC:aa:bb:cc  TABCDE111111  Present     xe-0/0/1  present
                  TABCDE111111  Present     xe-0/1/2  present
AA:BB:CC:aa:bb:zz  PABCDE111111  Present     xe-0/0/2  present
                  PABCDE111111  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

```

Release Information

Command introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

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show chassis satellite upgrade-group

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Syntax

```
show chassis satellite upgrade-group
<upgrade-group-name>
[ brief | detail | extensive | terse]
```

Description

Display information about the satellite software upgrade groups for the Junos Fusion.

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.

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.

Options

none	(Same as brief and terse) Display satellite software upgrade group information for all satellite software upgrade groups.
brief detail extensive terse	(Optional) Display the specified level of output.
<i>upgrade-group-name</i>	Display satellite software upgrade group information for the specified satellite software upgrade group only. The satellite software upgrade group name is set using the set chassis satellite-management upgrade-groups <i>upgrade-group-name</i> statement for standalone satellite devices and is the cluster name for satellite device clusters.

Required Privilege Level

view

Output Fields

Table 25 on page 599 lists the output fields for the `show chassis satellite upgrade-group` command. Output fields are listed in the approximate order in which they appear.

Table 25: show chassis satellite upgrade-group Output Fields

Field Name	Field Description	Level of Output
Fields for Interface		
Group	<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 set chassis satellite-management upgrade-groups <i>upgrade-group-name</i> statement for standalone satellite devices.</p>	<p>brief</p> <p>terse</p> <p>extensive</p> <p>none</p>
Sw-Version	The version of satellite software associated with the satellite software upgrade group.	<p>brief</p> <p>terse</p> <p>extensive</p> <p>none</p>
Group State	The state of the satellite software upgrade group.	<p>brief</p> <p>terse</p> <p>extensive</p> <p>none</p>
Slot	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>

Table 25: show chassis satellite upgrade-group Output Fields (Continued)

Field Name	Field Description	Level of Output
Device State	<p>The state of the satellite software for the specified member of the satellite software upgrade group.</p> <p>The version-in-sync 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>
Software upgrade group	The name of the satellite software upgrade group.	detail
Software package version	The satellite software package associated with the satellite software upgrade group.	detail
Previous software package version	<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          Device
                State            Slot          State
__ungrouped__
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
                                                113          version-in-sync
qfx            3.0R1.0            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
```

Release Information

Command introduced in Junos OS Release 14.2R3.

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show chassis temperature-thresholds

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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 (QFX Series)

```
show chassis temperature-thresholds
<interconnect-device name>
<node-device name>
```

Description

Display chassis temperature threshold settings, in degrees Celsius.

Options

none	Display the temperature threshold details.
all-members	(MX Series routers only) (Optional) Display the chassis temperature threshold settings of all member routers in the Virtual Chassis configuration.
interconnect-device <i>name</i>	(QFabric systems only) (Optional) Display the chassis temperature threshold settings of the Interconnect device.
lcc <i>number</i>	(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.

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 chassis temperature threshold settings of the local Virtual Chassis member.
member <i>member-id</i>	(MX Series routers only) (Optional) Display the chassis temperature threshold settings of the specified member of the Virtual Chassis configuration. Replace <i>member-id</i> with a value of 0 or 1.
node-device <i>name</i>	(QFabric systems only) (Optional) Display the chassis temperature threshold settings of the Node device.
satellite [slot-id <i>slot-ID</i> device-alias <i>alias-name</i>]	(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 <i>number</i>	(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 <i>number</i> with 0.

Required Privilege Level

view

Output Fields

[Table 26 on page 605](#) lists the output fields for the `show chassis temperature-thresholds` command. Output fields are listed in the approximate order in which they appear.

Table 26: 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, CPUs, 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>NOTE: On the QFX3500 switch and QFX3600 switch, there are four fan speeds: low, medium-low, medium-high, and high. 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"> • 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. <p>NOTE: On a TX Matrix Plus router with 3D SIBs, the threshold temperature at the XF junction is set to 70°C for Normal fan speed, which is less than or equal to 4800 RPM.</p> <ul style="list-style-type: none"> • High—The fans operate at high speed if the component has exceeded this temperature or a fan has failed or is missing. <p>NOTE: On a TX Matrix Plus router with 3D SIBs, the threshold temperature at the XF junction is set to 75°C for High fan speed, which is greater than or equal to 5000 RPM.</p> <p>NOTE: 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"> • Normal—The temperature that must be exceeded on the component to trigger a yellow alarm when the fans are running at full speed. • 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.

Table 26: show chassis temperature-thresholds Output Fields (Continued)

Field name	Field Description
Red alarm	<p>Temperature threshold settings, in degrees Celsius, that trigger a red alarm.</p> <ul style="list-style-type: none"> • Normal—The temperature that must be exceeded on the component to trigger a red alarm when the fans are running at full speed. • 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.
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 (degrees C)		Yellow alarm (degrees C)		Red alarm (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
Fan speed      Yellow alarm      Red alarm      Fire Shutdown
                (degrees C)      (degrees C)      (degrees C)      (degrees C)
Item           Normal High   Normal Bad fan Normal Bad fan Normal
FPC 0 Sensor 1  43   65    68   68    70   70    72
FPC 0 Sensor 2  43   65    68   68    70   70    72
FPC 0 Coretemp  78   94   100  100   105  105   110

```

show chassis temperature-thresholds (MX104 Router)

```

user@host> show chassis temperature-thresholds
                Fan speed      Yellow alarm      Red alarm      Fire Shutdown
                (degrees C)      (degrees C)      (degrees C)      (degrees C)
Item           Normal High   Normal Bad fan Normal Bad fan Normal
Chassis default 48   54    65   55    75   65   100
Routing Engine 0 55   80    95   95   105  100  108

```

show chassis temperature-thresholds (MX240, MX480, MX960 Routers with Application Services Modular Line Card)

```

user@host> show chassis temperature-thresholds
Fan speed      Yellow alarm      Red alarm      Fire Shutdown
                (degrees C)      (degrees C)      (degrees C)      (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 (MX480 Router with MPC4E)

```
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	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
```

Item	Fan speed		Yellow alarm		Red alarm		Fire
	(degrees C)		(degrees C)		(degrees C)		Shutdown
	Normal	High	Normal	Bad fan	Normal	Bad fan	(degrees C)
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	81	89	103	103	107	107	111
FPC 3 EA2_HMC1 DRAM botm	76	84	98	98	102	102	106
FPC 3 EA2_HMC2 Logic die	81	89	103	103	107	107	111
FPC 3 EA2_HMC2 DRAM botm	76	84	98	98	102	102	106
FPC 3 EA3_HMC0 Logic die	81	89	103	103	107	107	111
FPC 3 EA3_HMC0 DRAM botm	76	84	98	98	102	102	106
FPC 3 EA3_HMC1 Logic die	81	89	103	103	107	107	111
FPC 3 EA3_HMC1 DRAM botm	76	84	98	98	102	102	106
FPC 3 EA3_HMC2 Logic die	81	89	103	103	107	107	111
FPC 3 EA3_HMC2 DRAM botm	76	84	98	98	102	102	106
FPC 4 Intake	46	55	65	60	81	76	90
FPC 4 Exhaust A	61	70	80	75	100	95	110
FPC 4 Exhaust B	61	70	80	75	95	90	105
FPC 4 EA0 Chip	86	95	105	100	117	112	123
FPC 4 EA0_XR0 Chip	86	95	105	100	110	105	116
FPC 4 EA0_XR1 Chip	86	95	105	100	115	110	121
FPC 4 EA1 Chip	86	95	105	100	117	112	123
FPC 4 EA1_XR0 Chip	86	95	105	100	110	105	116
FPC 4 EA1_XR1 Chip	86	95	105	100	115	110	121
FPC 4 PCIE_SW Chip	81	90	105	100	115	110	121
FPC 4 EA0_HMC0 DRAM botm	86	95	105	100	115	110	121
FPC 4 EA0_HMC1 DRAM botm	86	95	105	100	115	110	121
FPC 4 EA1_HMC0 DRAM botm	86	95	105	100	115	110	121
FPC 4 EA1_HMC1 DRAM botm	86	95	105	100	115	110	121
FPC 7 Intake	53	59	72	67	80	75	85
FPC 7 Exhaust A	77	85	98	93	103	98	108
FPC 7 Exhaust B	54	62	80	75	103	98	108
FPC 7 EA0 Chip	64	72	90	90	100	100	105
FPC 7 EA0_XR0 Chip	79	87	102	102	106	106	108
FPC 7 EA0_XR1 Chip	79	87	102	102	106	106	108
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 (MX2020 Router with MPC4E)

```
user@host> show chassis temperature-thresholds
```

Fan speed	Yellow alarm	Red alarm	Fire Shutdown
(degrees C)	(degrees C)	(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
```

Item	Fan speed (degrees C)		Yellow alarm (degrees C)		Red alarm (degrees C)		Fire Shutdown (degrees C)
	Normal	High	Normal	Bad fan	Normal	Bad fan	Normal
Routing Engine 0 CPU	58	63	78	75	93	90	98
Routing Engine 1 CPU	58	63	78	75	93	90	98
CB 0 Inlet1	55	60	65	62	75	72	85
CB 0 Inlet2	45	50	61	58	80	77	90
CB 0 Inlet3	57	62	68	65	80	77	90
CB 0 Inlet4	55	60	80	77	90	87	95
CB 0 Exhaust1	55	60	65	62	75	72	85
CB 0 Exhaust2	50	55	60	57	80	77	90
CB 0 Exhaust3	70	75	81	78	91	88	96
CB 0 Exhaust4	75	80	90	87	100	97	105
CB 1 Inlet1	55	60	65	62	75	72	85
CB 1 Inlet2	45	50	61	58	80	77	90
CB 1 Inlet3	57	62	68	65	80	77	90
CB 1 Inlet4	55	60	80	77	90	87	95

CB 1 Exhaust1	55	60	65	62	75	72	85
CB 1 Exhaust2	50	55	60	57	80	77	90
CB 1 Exhaust3	70	75	81	78	91	88	96
CB 1 Exhaust4	75	80	90	87	100	97	105
SFB 0 Inlet1	49	54	62	59	76	73	81
SFB 0 Inlet2	65	70	71	68	83	80	88
SFB 0 Exhaust1	45	50	61	58	75	72	80
SFB 0 Exhaust2	60	65	69	66	80	77	85
SFB 0 SFB2-PF-local	65	70	75	72	95	92	100
SFB 0 SFB2-PF-die	88	93	98	95	118	115	120
SFB 1 Inlet1	49	54	62	59	76	73	81
SFB 1 Inlet2	65	70	71	68	83	80	88
SFB 1 Exhaust1	45	50	61	58	75	72	80
SFB 1 Exhaust2	60	65	69	66	80	77	85
SFB 1 SFB2-PF-local	65	70	75	72	95	92	100
SFB 1 SFB2-PF-die	88	93	98	95	118	115	120
SFB 2 Inlet1	49	54	62	59	76	73	81
SFB 2 Inlet2	65	70	71	68	83	80	88
SFB 2 Exhaust1	45	50	61	58	75	72	80
SFB 2 Exhaust2	60	65	69	66	80	77	85
SFB 2 SFB2-PF-local	65	70	75	72	95	92	100
SFB 2 SFB2-PF-die	88	93	98	95	118	115	120
SFB 3 Inlet1	49	54	62	59	76	73	81
SFB 3 Inlet2	65	70	71	68	83	80	88
SFB 3 Exhaust1	45	50	61	58	75	72	80
SFB 3 Exhaust2	60	65	69	66	80	77	85
SFB 3 SFB2-PF-local	65	70	75	72	95	92	100
SFB 3 SFB2-PF-die	88	93	98	95	118	115	120
SFB 4 Inlet1	49	54	62	59	76	73	81
SFB 4 Inlet2	65	70	71	68	83	80	88
SFB 4 Exhaust1	45	50	61	58	75	72	80
SFB 4 Exhaust2	60	65	69	66	80	77	85
SFB 4 SFB2-PF-local	65	70	75	72	95	92	100
SFB 4 SFB2-PF-die	88	93	98	95	118	115	120
SFB 5 Inlet1	49	54	62	59	76	73	81
SFB 5 Inlet2	65	70	71	68	83	80	88
SFB 5 Exhaust1	45	50	61	58	75	72	80
SFB 5 Exhaust2	60	65	69	66	80	77	85
SFB 5 SFB2-PF-local	65	70	75	72	95	92	100
SFB 5 SFB2-PF-die	88	93	98	95	118	115	120
SFB 6 Inlet1	49	54	62	59	76	73	81
SFB 6 Inlet2	65	70	71	68	83	80	88
SFB 6 Exhaust1	45	50	61	58	75	72	80

SFB 6 Exhaust2	60	65	69	66	80	77	85
SFB 6 SFB2-PF-local	65	70	75	72	95	92	100
SFB 6 SFB2-PF-die	88	93	98	95	118	115	120
SFB 7 Inlet1	49	54	62	59	76	73	81
SFB 7 Inlet2	65	70	71	68	83	80	88
SFB 7 Exhaust1	45	50	61	58	75	72	80
SFB 7 Exhaust2	60	65	69	66	80	77	85
SFB 7 SFB2-PF-local	65	70	75	72	95	92	100
SFB 7 SFB2-PF-die	88	93	98	95	118	115	120
FPC 0	55	60	75	65	90	80	95
FPC 3	55	60	75	65	105	80	110
FPC 5	55	60	75	65	105	80	110
FPC 7	55	60	75	65	90	80	95
FPC 9 Intake	60	65	75	75	85	85	95
FPC 9 Exhaust A	60	65	75	75	85	85	95
FPC 9 Exhaust B	60	65	75	75	85	85	95
FPC 9 XL 0 Chip	70	75	85	85	102	102	110
FPC 9 XL 0 XR2 0 Chip	75	80	90	90	105	105	115
FPC 9 XL 0 XR2 1 Chip	75	80	90	90	105	105	115
FPC 9 XL 1 Chip	70	75	85	85	102	102	110
FPC 9 XL 1 XR2 0 Chip	75	80	90	90	105	105	115
FPC 9 XL 1 XR2 1 Chip	75	80	90	90	105	105	115
FPC 9 XM 0 Chip	70	75	85	85	100	100	110
FPC 9 XM 1 Chip	70	75	85	85	100	100	110
FPC 9 XM 2 Chip	70	75	85	85	100	100	110
FPC 9 XM 3 Chip	70	75	85	85	100	100	110
FPC 9 PCIe Switch Chip	80	85	95	95	105	105	120
ADC 0 Intake	50	55	65	65	75	75	80
ADC 0 Exhaust	50	55	65	65	75	75	80
ADC 0 ADC-XF1	70	75	90	85	95	90	100
ADC 0 ADC-XF0	70	75	90	85	95	90	100
ADC 3 Intake	50	55	65	65	75	75	80
ADC 3 Exhaust	50	55	65	65	75	75	80
ADC 3 ADC-XF1	70	75	90	85	95	90	100
ADC 3 ADC-XF0	70	75	90	85	95	90	100
ADC 5 Intake	50	55	65	65	75	75	80
ADC 5 Exhaust	50	55	65	65	75	75	80
ADC 5 ADC-XF1	70	75	90	85	95	90	100
ADC 5 ADC-XF0	70	75	90	85	95	90	100
ADC 7 Intake	50	55	65	65	75	75	80
ADC 7 Exhaust	50	55	65	65	75	75	80

ADC 7 ADC-XF1	70	75	90	85	95	90	100
ADC 7 ADC-XF0	70	75	90	85	95	90	100

show chassis temperature-thresholds (MX204 Router)

```
user@host> show chassis temperature-thresholds
```

	Fan speed		Yellow alarm		Red alarm		Fire
Shutdown							
(degrees C)	(degrees C)		(degrees C)		(degrees C)		
Item	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 (MX10008 Router)

```
user@host> show chassis temperature-thresholds
```

	Fan speed		Yellow alarm		Red alarm		Fire
Shutdown							
(degrees C)	(degrees C)		(degrees C)		(degrees C)		

Item	Normal	High	Normal	Bad fan	Normal	Bad fan	Normal
SFB 0 Intake-Top Temp	58	63	100	100	105	105	115
SFB 0 Intake-Middle-High Temp	63	68	100	100	105	105	115
SFB 0 Intake-Middle-Low Temp	66	71	100	100	105	105	115
SFB 0 Intake-Bottom Temp	65	70	100	100	105	105	115
SFB 0 Exhaust-Top Temp	82	87	100	100	105	105	115
SFB 0 Exhaust-Middle Temp	76	81	100	100	105	105	115
SFB 0 Exhaust-Bottom Temp	77	82	100	100	105	105	115
SFB 0 PCIe Switch Temp	70	75	110	110	115	115	125
SFB 0 ZF0 External Temp	85	90	95	95	116	116	121
SFB 0 ZF1 External Temp	84	89	95	95	116	116	121
SFB 0 ZF0 Internal Main	85	90	95	95	116	116	121
SFB 0 ZF0 Internal Remote 0	87	92	95	95	116	116	121
SFB 0 ZF0 Internal Remote 1	89	94	95	95	116	116	121
SFB 0 ZF0 Internal Remote 2	86	91	95	95	116	116	121
SFB 0 ZF0 Internal Remote 3	88	93	95	95	116	116	121
SFB 0 ZF0 Internal Remote 4	88	93	95	95	116	116	121
SFB 0 ZF0 Internal Remote 5	87	92	95	95	116	116	121
SFB 0 ZF0 Internal Remote 6	86	91	95	95	116	116	121
SFB 0 ZF1 Internal Main	84	89	95	95	116	116	121
SFB 0 ZF1 Internal Remote 0	85	90	95	95	116	116	121
SFB 0 ZF1 Internal Remote 1	88	93	95	95	116	116	121
SFB 0 ZF1 Internal Remote 2	86	91	95	95	116	116	121
SFB 0 ZF1 Internal Remote 3	88	93	95	95	116	116	121
SFB 0 ZF1 Internal Remote 4	87	92	95	95	116	116	121
SFB 0 ZF1 Internal Remote 5	85	90	95	95	116	116	121
SFB 0 ZF1 Internal Remote 6	87	92	95	95	116	116	121

show chassis temperature-thresholds (PTX10008 Routers)

```
user@host> show chassis temperature-thresholds
```

Item	Fan speed		Yellow alarm		Red alarm		Fire Shutdown
	(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 LCPU 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 (degrees C)		Yellow alarm (degrees C)		Red alarm (degrees C)		Fire Shutdown (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 (degrees C)		Yellow alarm (degrees C)		Red alarm (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:

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
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 (degrees C)		Yellow alarm (degrees C)		Red alarm (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 (degrees C)		Yellow alarm (degrees C)		Red alarm (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:
```

```
-----
```

Item	Fan speed (degrees C)		Yellow alarm (degrees C)		Red alarm (degrees C)	
	Normal	High	Normal	Bad fan	Normal	Bad fan

Item	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:
```

```
-----
```

Item	Fan speed (degrees C)		Yellow alarm (degrees C)		Red alarm (degrees C)		Fire Shutdown (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	70	75	82	74	105	100	107
SIB F2S 16 Board	60	65	78	75	85	80	95
SIB F2S 16 XF Junction	70	75	82	74	105	100	107
SIB F2S 17 Board	60	65	78	75	85	80	95
SIB F2S 17 XF Junction	70	75	82	74	105	100	107
SIB F2S 18 Board	60	65	78	75	85	80	95
SIB F2S 18 XF Junction	70	75	82	74	105	100	107
SIB F2S 19 Board	60	65	78	75	85	80	95
SIB F2S 19 XF Junction	70	75	82	74	105	100	107
SIB F2S 24 Board	60	65	78	75	85	80	95
SIB F2S 24 XF Junction	70	75	82	74	105	100	107
SIB F2S 25 Board	60	65	78	75	85	80	95
SIB F2S 25 XF Junction	70	75	82	74	105	100	107
SIB F2S 26 Board	60	65	78	75	85	80	95
SIB F2S 26 XF Junction	70	75	82	74	105	100	107
SIB F2S 27 Board	60	65	78	75	85	80	95
SIB F2S 27 XF Junction	70	75	82	74	105	100	107

lcc0-re0:

Item	Fan speed (degrees C)		Yellow alarm (degrees C)		Red alarm (degrees C)		Fire Shutdown (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
FPC 0	63	68	75	70	90	83	95
FPC 1	56	62	75	63	83	76	95
FPC 7	56	62	75	63	83	76	95
SIB 0	64	70	76	72	87	84	95
SIB 0 ASIC Junction	63	68	75	70	105	100	107
SIB 2	64	70	76	72	87	84	95
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		Yellow alarm		Red alarm	
	(degrees C)		(degrees C)		(degrees C)	
	Normal	High	Normal	Bad fan	Normal	Bad fan
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
temperature-thresholds interconnect-device interconnect1
```

Item	Fan speed		Yellow alarm		Red alarm	
	Normal	High	Normal	Bad fan	Normal	Bad fan
Chassis default	48	54	65	55	75	65

show chassis temperature-thresholds (QFX5700)

```
user@switch> show chassis temperature-thresholds
```

Item	Fan speed		Yellow alarm		Red alarm	
	Normal	High	Normal	Bad fan	Normal	Bad fan
Routing Engine 0 CPU Temperature	48	54	85	85	100	102
Routing Engine 1 CPU Temperature	48	54	85	85	100	102
CB 0 Intake 1 Temp Sensor	60	65	75	75	85	95
CB 0 Intake 2 Temp Sensor	60	65	75	75	85	95
CB 0 Middle Temp Sensor	83	90	98	98	105	110
CB 1 Intake 1 Temp Sensor	60	65	75	75	85	95

CB 1 Intake 2 Temp Sensor	60	65	75	75	85	85	95
CB 1 Exhaust 1 Temp Sensor	83	90	98	98	105	105	110
CB 1 Exhaust 2 Temp Sensor	83	90	98	98	105	105	110
CB 1 Middle Temp Sensor	83	90	98	98	105	105	110

show chassis temperature-thresholds (PTX5000 Packet Transport Router)

```
user@switch> show chassis temperature-thresholds
```

```
user@switch> show chassis temperature-thresholds
```

Item	Fan speed (degrees C)		Yellow alarm (degrees C)		Red alarm (degrees C)		Fire Shutdown (degrees C)
	Normal	High	Normal	Bad fan	Normal	Bad fan	Normal
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	80	90	95	85	105	95	115
FPC 3 TL5	80	90	95	85	105	95	115
FPC 3 TQ5	80	90	95	85	105	95	115
FPC 3 TL6	80	90	95	85	105	95	115
FPC 3 TQ6	80	90	95	85	105	95	115
FPC 3 TL1	80	90	95	85	105	95	115
FPC 3 TQ1	80	90	95	85	105	95	115
FPC 3 TL2	80	90	95	85	105	95	115
FPC 3 TQ2	80	90	95	85	105	95	115
FPC 3 TL4	80	90	95	85	105	95	115
FPC 3 TQ4	80	90	95	85	105	95	115
FPC 3 TL7	80	90	95	85	105	95	115
FPC 3 TQ7	80	90	95	85	105	95	115
FPC 3 TL0	80	90	95	85	105	95	115
FPC 3 TQ0	80	90	95	85	105	95	115
FPC 3 TL3	80	90	95	85	105	95	115
FPC 3 TQ3	80	90	95	85	105	95	115
SIB 0 Exhaust	60	65	78	75	85	80	95
SIB 0 Junction	75	80	90	85	105	95	115
SIB 1 Exhaust	60	65	78	75	85	80	95
SIB 1 Junction	75	80	90	85	105	95	115
SIB 2 Exhaust	60	65	78	75	85	80	95

SIB 2 Junction	75	80	90	85	105	95	115
SIB 3 Exhaust	60	65	78	75	85	80	95
SIB 3 Junction	75	80	90	85	105	95	115
SIB 4 Exhaust	60	65	78	75	85	80	95
SIB 4 Junction	75	80	90	85	105	95	115
SIB 5 Exhaust	60	65	78	75	85	80	95
SIB 5 Junction	75	80	90	85	105	95	115
SIB 6 Exhaust	60	65	78	75	85	80	95
SIB 6 Junction	75	80	90	85	105	95	115
SIB 7 Exhaust	60	65	78	75	85	80	95
SIB 7 Junction	75	80	90	85	105	95	115
SIB 8 Exhaust	60	65	78	75	85	80	95
SIB 8 Junction	75	80	90	85	105	95	115

show chassis temperature-thresholds (PTX1000 Packet Transport Router)

```
user@host> show chassis temperature-thresholds
```

Item	Fan speed (degrees C)		Yellow alarm (degrees C)		Red alarm (degrees C)		Fire Shutdown (degrees C)
	Normal	High	Normal	Bad fan	Normal	Bad fan	Normal
FPC 0 Intake Temp Sensor	30	65	65	65	70	70	75
FPC 0 Exhaust Temp Sensor	30	65	65	65	70	70	75
FPC 0 Mezz Temp Sensor 0	30	65	65	65	70	70	75
FPC 0 Mezz Temp Sensor 1	30	65	65	65	70	70	75
FPC 0 PE2 Temp Sensor	50	90	90	90	100	100	103
FPC 0 PE1 Temp Sensor	50	90	90	90	100	100	103
FPC 0 PF0 Temp Sensor	50	90	90	90	100	100	103
FPC 0 PE0 Temp Sensor	50	90	90	90	100	100	103
FPC 0 PE5 Temp Sensor	50	90	90	90	100	100	103
FPC 0 PE4 Temp Sensor	50	90	90	90	100	100	103
FPC 0 PF1 Temp Sensor	50	90	90	90	100	100	103
FPC 0 PE3 Temp Sensor	50	90	90	90	100	100	103
FPC 0 CPU Die Temp Sensor	50	90	90	90	100	100	103
FPC 0 OCX0 Temp Sensor	50	90	90	90	100	100	103

show chassis temperature-thresholds (MX Routers with Media Services Blade [MSB])

```
user@switch> 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	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
```

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		
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
```

Item	Fan speed (degrees C)		Yellow alarm (degrees C)		Red alarm (degrees C)		Fire Shutdown (degrees C)	
	Normal	High	Normal	Bad fan	Normal	Bad fan	Normal	
Routing Engine 0			48	54	85	85	100	102
CB 0 Exhaust Temp Sensor			60	65	75	75	85	95
CB 0 Inlet Temp Sensor			60	65	75	75	85	95
CB 0 CPU DIE Temp Sensor			83	90	98	98	105	110
CB 1 Exhaust Temp Sensor			60	65	75	75	85	95
CB 1 Inlet Temp Sensor			60	65	75	75	85	95
CB 1 CPU DIE Temp Sensor			83	90	98	98	105	110
FPC 0 Intake Temp Sensor			40	45	75	70	85	80
FPC 0 Exhaust-A Temp Sensor			55	60	85	80	90	90
FPC 0 Exhaust-B Temp Sensor			55	60	85	80	90	90
FPC 0 EA0 Chip			87	92	97	97	105	105
FPC 0 EA0-XR0 Chip			88	93	98	98	120	120
FPC 0 EA0-XR1 Chip			88	93	98	98	120	120
FPC 0 EA1 Chip			87	92	97	97	105	105
FPC 0 EA1-XR0 Chip			88	93	98	98	120	120
FPC 0 EA1-XR1 Chip			88	93	98	98	120	120
FPC 0 EA2 Chip			87	92	97	97	105	105
FPC 0 EA2-XR0 Chip			88	93	98	98	120	120
FPC 0 EA2-XR1 Chip			88	93	98	98	120	120
FPC 0 PF Chip			89	94	104	104	120	120
FPC 0 EA0_HMC0 Logic die			88	93	103	103	120	120
FPC 0 EA0_HMC0 DRAM botm			83	88	98	98	120	120
FPC 0 EA0_HMC1 Logic die			88	93	103	103	120	120
FPC 0 EA0_HMC1 DRAM botm			83	88	98	98	120	120
FPC 0 EA0_HMC2 Logic die			88	93	103	103	120	120
FPC 0 EA0_HMC2 DRAM botm			83	88	98	98	120	120
FPC 0 EA1_HMC0 Logic die			88	93	103	103	120	120
FPC 0 EA1_HMC0 DRAM botm			83	88	98	98	120	120
FPC 0 EA1_HMC1 Logic die			88	93	103	103	120	120
FPC 0 EA1_HMC1 DRAM botm			83	88	98	98	120	120

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

Release Information

Command introduced in Junos OS Release 8.0.

sfc command introduced in Junos OS Release 9.6 for the TX Matrix Plus router.

satellite option introduced in Junos OS Release 14.2R3.

Command introduced in Junos OS Release 18.2R1 for MX10008 Routers and EX9253 Switches.

show interfaces extensive satellite-device

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Syntax

```
show interfaces extensive satellite-device (device-alias | all)
```

Description

Display the satellite device extended ports in a Junos Fusion.

Options

device-alias <i>device-alias</i>	Display extended port information for the satellite device using the specified device alias only.
--------------------------------------------	---------------------------------------------------------------------------------------------------

all Display information for all extended ports and aggregated Ethernet interfaces with extended ports as members configured on all of the satellite devices.

Required Privilege Level

view

Output Fields

Table 27 on page 631 lists the output fields for the `show interfaces extensive satellite-device` command. Output fields are listed in the approximate order in which they appear.

Table 27: show interfaces extensive satellite-device Output Fields

Field Name	Field Description	Level of Output
Physical Interface		
Physical interface	Name of the physical interface.	All levels
Interface index	Index number of the physical interface, which reflects its initialization sequence.	detail extensive none
Device flags	Information about the physical device.	All levels
Flow control	Flow control status: Enabled or Disabled . NOTE: This field is only displayed if asymmetric flow control is not configured.	All levels
Pad to minimum frame size	Pad Tx VLAN-tagged frame to minimum of 68 bytes.	
Device flags	Information about the physical device.	All levels
Interface flags	Information about the interface.	All levels

Table 27: 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 Last flapped: <i>year-month-day hour:minute.second.timezone</i> (<i>hour:minute.second</i> ago) . For example, Last flapped: 2008-01-16 10:52:40 UTC (3d 22:58 ago) .	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"> • Input bytes—Number of bytes received on the interface. • Output bytes—Number of bytes transmitted on the interface. • Input packets—Number of packets received on the interface. • Output packets—Number of packets transmitted on the interface. <p>NOTE: 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"> • Input bytes—Number of bytes received on the interface. • Output bytes—Number of bytes transmitted on the interface. • Input packets—Number of packets received on the interface. • Output packets—Number of packets transmitted on the interface. <p>NOTE: The bandwidth bps counter is not enabled.</p>	detail extensive

Table 27: show interfaces extensive satellite-device Output Fields (*Continued*)

Field Name	Field Description	Level of Output
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"> • Errors—Sum of the incoming frame terminates and FCS errors. • Drops—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. • Framing errors—Number of packets received with an invalid frame checksum (FCS). • Runts—Number of frames received that are smaller than the runt threshold. • Giants—Number of frames received that are greater than the giant threshold. • Policed discards—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. • Resource errors—Sum of transmit drops. 	extensive

Table 27: show interfaces extensive satellite-device Output Fields (*Continued*)

Field Name	Field Description	Level of Output
Output errors	<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"> • Carrier transitions—Number of times the interface has gone from down to up. 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. • Errors—Sum of the outgoing frame terminates and FCS errors. • Drops—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. • MTU errors—Number of packets whose size exceeded the MTU of the interface. • Resource errors—Sum of transmit drops. 	extensive
Egress queues	Total number of egress queues supported on the specified interface.	detail extensive
Queue counters	<p>CoS queue number and its associated user-configured forwarding class name.</p> <ul style="list-style-type: none"> • Queued packets—Number of queued packets. • Transmitted packets—Number of transmitted packets. • Dropped packets—Number of packets dropped by the ASIC's RED mechanism. 	detail extensive
Queue Number	The CoS queue number and the forwarding classes mapped to the queue number. The Mapped forwarding class column lists the forwarding classes mapped to each CoS queue.	detail extensive

Table 27: show interfaces extensive satellite-device Output Fields *(Continued)*

Field Name	Field Description	Level of Output
Active alarms and Active defects	<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 None or Link.</p> <ul style="list-style-type: none"> • None—There are no active defects or alarms. • Link—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. 	detail extensive none

Table 27: show interfaces extensive satellite-device Output Fields (*Continued*)

Field Name	Field Description	Level of Output
MAC statistics	<p>Receive and Transmit statistics reported by the PIC's MAC subsystem.</p> <ul style="list-style-type: none"> • Total octets and total packets—Total number of octets and packets. For Gigabit Ethernet IQ PICs, the received octets count varies by interface type. • Unicast packets, Broadcast packets, and Multicast packets—Number of unicast, broadcast, and multicast packets. • CRC/Align errors—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). • FIFO error—Number of FIFO errors that are reported by the ASIC on the PIC. If this value is ever nonzero, the PIC is probably malfunctioning. • MAC control frames—Number of MAC control frames. • MAC pause frames—Number of MAC control frames with pause operational code. • Oversized frames—Number of packets that exceeds the configured MTU. • Jabber frames—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. • Fragment frames—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. 	extensive

Table 27: show interfaces extensive satellite-device Output Fields *(Continued)*

Field Name	Field Description	Level of Output
	<ul style="list-style-type: none"> • VLAN tagged frames—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. • Code violations—Number of times an event caused the PHY to indicate “Data reception error” or “invalid data symbol error.” 	
Filter statistics	Receive and Transmit statistics reported by the PIC's MAC address filter subsystem.	extensive
Packet Forwarding Engine configuration	Information about the configuration of the Packet Forwarding Engine: <ul style="list-style-type: none"> • Destination slot—FPC slot number. • CoS transmit queue—Queue number and its associated user-configured forwarding class name. • Bandwidth %—Percentage of bandwidth allocated to the queue. • Bandwidth bps—Bandwidth allocated to the queue (in bps). • Buffer %—Percentage of buffer space allocated to the queue. • Buffer usec—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. • Priority—Queue priority: low or high. • Limit—Displayed if rate limiting is configured for the queue. Possible values are none and exact. If exact is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If none is configured, the queue transmits beyond the configured bandwidth if bandwidth is available. 	extensive
Logical Interface		
Logical interface	Name of the logical interface.	All levels

Table 27: show interfaces extensive satellite-device Output Fields *(Continued)*

Field Name	Field Description	Level of Output
Index	Index number of the logical interface, which reflects its initialization sequence.	detail extensive none
SNMP ifIndex	SNMP interface index number for the logical interface.	detail extensive none
Generation	Unique number for use by Juniper Networks technical support only.	detail extensive
Flags	Information about the logical interface.	All levels
Statistics	<ul style="list-style-type: none"> • Packets • pps • Bytes • bps 	All levels
Bundle	<p>Provide information for each active bundle link.</p> <ul style="list-style-type: none"> • Input <ul style="list-style-type: none"> • Packets— • pps • Bytes • bps • Output <ul style="list-style-type: none"> • Packets— • pps • Bytes • bps 	All levels

Table 27: show interfaces extensive satellite-device Output Fields (*Continued*)

Field Name	Field Description	Level of Output
Adaptive Statistics	<ul style="list-style-type: none"> • Adaptive Adjusts • Adaptive Scans • Adaptive Updates 	All levels
Link	Link state: up or down.	All levels
LACP info	<p>LACP state information for each aggregated interface:</p> <ul style="list-style-type: none"> • Role priority—Role played by the interface. It can be one of the following: <ul style="list-style-type: none"> • Actor—Local device participating in LACP negotiation. • Partner—Remote device participating in LACP negotiation. • System identifier—48-bit (6-byte) globally unique field. • System priority—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. • Port number • Port key • Port 	All levels
LACP Statistics	<p>LACP statistics are returned when the extensive option is used and provides the following information:</p> <ul style="list-style-type: none"> • LACP Rx—LACP received counter that increments for each normal hello. • LACP Tx—Number of LACP transmit packet errors logged. • Unknown Rx—Number of unrecognized packet errors logged. • Illegal Rx—Number of invalid packets received. 	All levels

Table 27: show interfaces extensive satellite-device Output Fields (Continued)

Field Name	Field Description	Level of Output
Marker statistics	<p>Marker statistics are returned when the extensive option is used and provides the following information:</p> <ul style="list-style-type: none"> • Marker Rx—Marker received counter that increments for each normal hello. • Resp Tx—Number of RESP transmit packet errors logged. • Unknown Rx—Number of unrecognized packet errors logged. • Illegal Rx—Number of invalid packets received. 	All levels
Protocol	Protocol family configured on the logical interface.	All levels
MTU	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
Generation	Unique number for use by Juniper Networks technical support only.	All levels
Route table	Routing table in which this address exists. For example, Route table:0 refers to inet.0.	All levels
Mesh table	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 priority	System identifier	Port priority	Port number	Port 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 priority	System identifier	Port priority	Port number	Port 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 priority	System identifier	Port priority	Port number	Port 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	%		usec		
0 FC0	95	950000000	95	0	low	none	
3 FC3	5	50000000	5	0	low	none	

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
  0 FC0                    95      950000000  95      0      low      none
  3 FC3                     5       50000000   5       0      low      none
Interface transmit statistics: Disabled

```

Release Information

Command introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

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show interfaces satellite-device

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Syntax

```
show interfaces satellite-device (device-alias | all)
```

Description

Display the satellite device extended ports in a Junos Fusion.

Options

- | | |
|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| device-alias
<i>device-alias</i> | Display extended port information for the satellite device using the specified device alias only. |
| all | Display information for all extended ports and aggregated Ethernet interfaces with extended ports as members configured on all of the satellite devices. |

Required Privilege Level

view

Output Fields

Table 28 on page 657 lists the output fields for the `show interfaces satellite-device` command. Output fields are listed in the approximate order in which they appear.

Table 28: show interfaces satellite-device Output Fields

Field Name	Field Description	Level of Output
Physical Interface		
Physical interface	Name of the physical interface.	All levels
Interface index	Index number of the physical interface, which reflects its initialization sequence.	detail extensive none
Link-level type	Encapsulation being used on the physical interface.	All levels
Device flags	Information about the physical device.	All levels
Flow control	Flow control status: Enabled or Disabled . NOTE: This field is only displayed if asymmetric flow control is not configured.	All levels
Pad to minimum frame size	Pad Tx VLAN-tagged frame to minimum of 68 bytes.	All levels
Minimum links needed	Minimum number of aggregated links.	All levels
Minimum bandwidth needed	Minimum bandwidth configured for aggregated bundle.	All levels
Device flags	Information about the physical device.	All levels

Table 28: show interfaces satellite-device Output Fields (*Continued*)

Field Name	Field Description	Level of Output
Interface flags	Information about the interface.	All levels
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 Last flapped: <i>year-month-day hour:minute.second.timezone</i> (<i>hour:minute.second</i> ago) . For example, Last flapped: 2008-01-16 10:52:40 UTC (3d 22:58 ago) .	detail extensive none
Input rate	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
Output rate	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
Extended port information	Satellite device port ID	All levels
Active alarms and Active defects	<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 None or Link.</p> <ul style="list-style-type: none"> • None—There are no active defects or alarms. • Link—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. 	detail extensive none

Table 28: show interfaces satellite-device Output Fields *(Continued)*

Field Name	Field Description	Level of Output
Interface transmit statistics	All levels	All levels
Logical Interface		
Logical interface	Name of the logical interface.	All levels
Index	Index number of the logical interface, which reflects its initialization sequence.	detail extensive none
SNMP ifIndex	SNMP interface index number for the logical interface.	detail extensive none
Generation	Unique number for use by Juniper Networks technical support only.	detail extensive
Flags	Information about the logical interface.	All levels
Statistics	<ul style="list-style-type: none"> • Packets • pps • Bytes • bps 	All levels

Table 28: show interfaces satellite-device Output Fields *(Continued)*

Field Name	Field Description	Level of Output
Bundle	<p>Provides information for each active bundle link.</p> <ul style="list-style-type: none"> • Input <ul style="list-style-type: none"> • Packets • pps • Bytes • bps • Output <ul style="list-style-type: none"> • Packets— • pps • Bytes • bps 	All levels
Adaptive Statistics	<ul style="list-style-type: none"> • Adaptive Adjusts • Adaptive Scans • Adaptive Updates 	All levels
Protocol	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

```

Release Information

Command introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

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

show interfaces statistics

IN THIS SECTION

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- [Description | 664](#)
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- [Sample Output | 665](#)
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Syntax

```
show interfaces statistics interface-name
<satellite-device [device-alias-name |all ]>
<detail>
```

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

<i>interface-name</i>	Name of an interface.
satellite-device [<i>device-alias-name</i> 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

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 (packet-per-second)	Bytes (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           0 bps
Output bytes :          37461038          0 bps

```

```

Input  packets:           0                0 pps
Output packets:          882131            0 pps
IPv6 transit statistics:
  Input  bytes  :           0
  Output bytes  :        16681118
  Input  packets:           0
  Output packets:        362633
Multicast statistics:
  IPV4 multicast statistics:
    Input  bytes  :        112048            0 bps
    Output bytes  :       20779920            0 bps
    Input  packets:        1801              0 pps
    Output packets:       519498              0 pps
  IPV6 multicast statistics:
    Input  bytes  :        156500            0 bps
    Output bytes  :       16681118            0 bps
    Input  packets:        1818              0 pps
    Output packets:       362633              0 pps
Protocol inet, MTU: 1500, Generation: 151, Route table: 0
  Addresses, Flags: Is-Preferred Is-Primary
    Destination: 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> 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      Packets      pps      Bytes      bps

```

Bundle:

```

Input :      11826292    148809    544009602    54761856
Output:       42         0        3396         0

```

Link:

ge-5/2/0.0

```

Input :      11826292    148809    544009602    54761856
Output:       42         0        3396         0

```

```

Marker Statistics:  Marker Rx    Resp Tx    Unknown Rx    Illegal Rx

```

```

ge-5/2/0.0          0         0         0         0

```

Protocol inet, MTU: 1500, Generation: 236, Route table: 0

Addresses, Flags: Is-Preferred Is-Primary

Destination: 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: OC192, Loopback: None,
  FCS: 16, Payload scrambler: Enabled
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
  Link flags     : Keepalives
  Hold-times     : Up 0 ms, Down 0 ms
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive statistics:
    Input : 13 (last seen 00:00:04 ago)
    Output: 14 (last sent 00:00:02 ago)
  LCP state: Opened
  NCP state: inet: Opened, inet6: Opened, iso: Not-configured, mpls: Not-configured
  CHAP state: Closed
  PAP state: Closed
  CoS queues   : 8 supported, 8 maximum usable queues
  Last flapped : 2009-11-09 02:52:34 PST (01:12:39 ago)
  Statistics last cleared: 2009-11-09 03:58:54 PST (00:06:19 ago)

```

```

Traffic statistics:
  Input bytes :          2559160294          54761720 bps
  Output bytes :           10640           48 bps
  Input packets:         55633975         148809 pps
  Output packets:          216           0 pps
IPv6 transit statistics:
  Input bytes :         647922328
  Output bytes :           0
  Input packets:       14085269
  Output packets:           0
Input errors:
  Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0, Bucket drops: 0, Policed
discards: 0, L3 incompletes: 0,
  L2 channel errors: 0, L2 mismatch timeouts: 0, HS link CRC errors: 0, HS link FIFO
overflows: 0
  Output errors:
    Carrier transitions: 0, Errors: 0, Drops: 0, Aged packets: 0, HS link FIFO underflows: 0,
MTU errors: 0
Egress queues: 8 supported, 4 in use
Queue counters:      Queued packets  Transmitted packets      Dropped packets
  0 best-effort           4              4              0
  1 expedited-fo          0              0              0
  2 assured-forw          0              0              0
  3 network-cont        213             213             0
SONET alarms   : None
SONET defects  : None

Logical interface so-3/0/0.0 (Index 72) (SNMP ifIndex 578) (Generation 182)
  Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPP
  Protocol inet, MTU: 4470, Generation: 244, Route table: 0
    Addresses, Flags: Is-Preferred Is-Primary
      Destination: 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          Seconds
  Bit errors            109
  Errored blocks        109
Interface transmit statistics: Disabled

```

show interfaces statistics (MX Series Routers; With RPF Check Detail of Ethernet Interface)

```

user@host> show interfaces ge-0/0/0 extensive
Physical interface: ge-0/0/0, Enabled, Physical link is Up
  Interface index: 149, SNMP ifIndex: 527, Generation: 152
  Link-level type: Ethernet, MTU: 1514, MRU: 1522, LAN-PHY mode, Speed: 1000mbps, BPDU Error:
None, Loop Detect PDU Error: None,
  Ethernet-Switching Error: None, MAC-REWRITE Error: None, Loopback: Disabled, Source filtering:
Disabled, Flow control: Enabled, Auto-negotiation: Enabled,
  Remote fault: Online
  Pad to minimum frame size: Disabled
  Device flags   : Present Running
  Interface Specific flags: RPF_statistics
  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
  Damping        : half-life: 0 sec, max-suppress: 0 sec, reuse: 0, suppress: 0, state:
unsuppressed
  Current address: 56:68:ad:c0:1f:72, Hardware address: 56:68:ad:c0:1f:72
  Last flapped   : 2021-02-12 17:21:37 IST (3d 15:55 ago)
  Statistics last cleared: Never
  Traffic statistics:
    Input bytes   :                0                0 bps
    Output bytes  :                0                0 bps
    Input packets :                0                0 pps
    Output packets:                0                0 pps
  IPv6 transit statistics:

```

```

Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
Dropped traffic statistics due to STP State:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Runt: 0, Policed discards: 0, L3 incompletes: 0, L2
channel errors: 0, L2 mismatch timeouts: 0, FIFO errors: 0,
Resource errors: 0
Output errors:
Carrier transitions: 1, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0, FIFO errors: 0,
HS link CRC errors: 0, MTU errors: 0, Resource errors: 0
RPF counters statistics:
Rpf IPv4 bytes : 0
Rpf IPv4 packets : 0
Rpf IPv6 bytes : 0
Rpf IPv6 packets : 0
Active alarms : None
Active defects : None
PCS statistics          Seconds
Bit errors              0
Errored blocks          0

```

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          0 bps
    Output bytes :          0          0 bps
    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

```

Release Information

Command introduced before Junos OS Release 7.4.

Command introduced in Junos OS Release 12.2 for ACX Series Routers.

satellite-device option introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

| [clear interfaces statistics](#)

show interfaces terse satellite-device

IN THIS SECTION

- [Syntax | 682](#)
- [Description | 682](#)
- [Options | 682](#)
- [Required Privilege Level | 683](#)
- [Output Fields | 683](#)
- [Sample Output | 683](#)
- [Sample Output | 684](#)
- [Release Information | 686](#)

Syntax

```
show interfaces terse satellite-device (device-alias | all)
```

Description

Display the satellite device extended ports in a Junos Fusion.

Options

device-alias <i>device-alias</i>	Display extended port information for the satellite device using the specified device alias only.
--------------------------------------------	---------------------------------------------------------------------------------------------------

all Display information for all extended ports and aggregated Ethernet interfaces with extended ports as members configured on all of the satellite devices.

Required Privilege Level

view

Output Fields

[Table 29 on page 683](#) lists the output fields for the `show interfaces terse satellite-device` command. Output fields are listed in the approximate order in which they appear.

Table 29: 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: up or down .
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

```

Release Information

Command introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

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

show system core-dumps

IN THIS SECTION

- [Syntax | 687](#)
- [Syntax \(SRX Series\) | 687](#)
- [Syntax \(Junos OS Evolved\) | 687](#)
- [Syntax \(EX Series Switches\) | 687](#)
- [Syntax \(TX Matrix Router\) | 688](#)
- [Syntax \(TX Matrix Plus Router\) | 688](#)

- [Syntax \(QFX Series and OCX Series\) | 688](#)
- [Description | 688](#)
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Syntax

```
show system core-dumps
<re0>
<re1>
<routing-engine>
<satellite [fpc-slot-id | device-alias alias-name]>
```

Syntax (SRX Series)

```
show system core-dumps
```

Syntax (Junos OS Evolved)

```
show system core-dumps
```

Syntax (EX Series Switches)

```
show system core-dumps
<all-members>
<local>
<member member-id>
```

Syntax (TX Matrix Router)

```
show system core-dumps
<all-chassis | all-lcc | lcc number | scc>
```

Syntax (TX Matrix Plus Router)

```
show system core-dumps
<all-chassis | all-lcc | lcc number | sfc number>
```

Syntax (QFX Series and OCX Series)

```
show system core-dumps
<component (UUID / serial number | all)>
<display-period (hours / minutes / seconds)>
<display-order>
<kernel-crashinfo component (UUID / serial number)>
<repository (core | log)>
```

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.

For Junos OS, all cores files are stored at `/var/core/re`. For Junos OS Evolved, a core file created during early bootup is stored in `/var/core/re`. But a core file created later in the bootup, for example, after the Routing Engine slot number can be determined, is stored in `/var/core/re0` or `/var/core/re1`. The command `show system core-dumps` continues to show all cores generated.

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.

On vSRX, the srpxfe process might stop if you perform a reboot or an upgrade. You might observe core files whn you execute the show system core-dump command.

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 (<i>UUID</i> <i>serial number</i> <i>all</i>)	(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 (<i>timestamp-sort</i> <i>alphanumeric-sort</i>)	(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 (<i>hours</i> <i>minutes</i> <i>seconds</i>)	(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 (<i>UUID</i> <i>serial number</i>)	(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 <i>member-id</i>	(EX4200 switches only) (Optional) Display system core files on the specified member of the Virtual Chassis configuration. Replace <i>member-id</i> with a value from 0 through 9.
node <i>node-name</i>	(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 (<i>core</i> <i>log</i>)	(QFabric systems only) (Optional) Specify either the core or log repository in which to view core-dump files.
routing-engine (<i>backup</i> <i>both</i> <i>local</i> <i>master</i> <i>other</i>)	(Dual routing engines only) Display a list of core-dump files for either the backup, local, primary, or other routing engine or both routing engines.
satellite [<i>fpc-slot-id</i> <i>device-alias</i> <i>alias-name</i>]	(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

Output Fields

Table 30 on page 691 describes the output fields for the `show system core-dumps` command. Output fields are listed in the approximate order in which they appear.

Table 30: 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.
<i>Path/filename</i>	File path where the file resides and the filename. (MX Series routers only) When you display the core files for an MX Series Virtual Chassis, the <code>show system core-dumps</code> command does not display information about files pertaining to the relayd process.

Table 30: show system core-dumps Output Fields (Continued)

Field Name	Field Description
Repository scope:	Repository where core-dump files and log files are stored. The core-dump files are located in the core repository, and the log files are located in the log repository. The default Repository scope is shared since both the core and log repositories are shared by all of the QFabric system devices.
Repository head:	Path to the top-level repository location.
Repository name:	Name of the repository: core or log.
List of nodes for core repository:	List of core-dump files associated with a particular QFabric system device located in the core repository.
Node Group	Name of the QFabric system device.
Node Identifier	UUID or serial number of the QFabric system device.
Num	Number of core-dump and log files.
Model	Model number of the QFabric system device.
Usage	Usage of the repository in megabytes.
Total usage of core repository:	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.
Total usage of log repository:	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.
List of nodes for core repository:	List of core-dump files associated with a particular QFabric system device located in the core repository.

Table 30: show system core-dumps Output Fields (Continued)

Field Name	Field Description
List of nodes for log repository:	List of log files associated with a particular QFabric system device located in the log repository.
Filename	Name of the core-dump file.
Date	Last core-dump file modification date and time.
Size	Size of the core-dump file.
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

re1:
-----
/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/rdumps/
```

Node Group	Node Identifier	Num	Model	Usage
DG-0	BCF7208D-E44F-E011-802F-4171BAAC781D	0	qfx3100	0M
FM-0	73747cd8-0710-11e1-b6a4-00e081c5297e	0	fx-jvre	0M
DRE-0	77116f18-0710-11e1-a2a0-00e081c5297e	0	fx-jvre	0M
NW-NG-0	BBAK0394	0	qfx3500	0M
NW-NG-0	cd78871a-0710-11e1-878e-00e081c5297e	0	fx-jvre	0M
NW-NG-0	d0afda1e-0710-11e1-a1d0-00e081c5297e	0	fx-jvre	0M
FC-0	d31ab7a6-0710-11e1-ad1b-00e081c5297e	0	fx-jvre	0M
FC-1	d4d0f254-0710-11e1-90c3-00e081c5297e	0	fx-jvre	0M
IC-WS001	WS001	0	-	-
IC-WS001	WS001/YW3803	0	qfxc08-3008	0M
IC-WS001	WS001/YN5999	0	qfxc08-3008	0M
node-device1	BBAK0372	0	qfx3500	0M
node-device1	EE3093	0	qfx3500	0M

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	0M
FM-0	73747cd8-0710-11e1-b6a4-00e081c5297e	1	fx-jvre	0M
DRE-0	77116f18-0710-11e1-a2a0-00e081c5297e	1	fx-jvre	0M
NW-NG-0	BBAK0394	1	qfx3500	0M
NW-NG-0	cd78871a-0710-11e1-878e-00e081c5297e	1	fx-jvre	0M
NW-NG-0	d0afda1e-0710-11e1-a1d0-00e081c5297e	3	fx-jvre	0M
FC-0	d31ab7a6-0710-11e1-ad1b-00e081c5297e	1	fx-jvre	0M
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 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	0M
FM-0	73747cd8-0710-11e1-b6a4-00e081c5297e	0	fx-jvre	0M
DRE-0	77116f18-0710-11e1-a2a0-00e081c5297e	0	fx-jvre	0M
NW-NG-0	BBAK0394	0	qfx3500	0M
NW-NG-0	cd78871a-0710-11e1-878e-00e081c5297e	0	fx-jvre	0M
NW-NG-0	d0afda1e-0710-11e1-a1d0-00e081c5297e	0	fx-jvre	0M
FC-0	d31ab7a6-0710-11e1-ad1b-00e081c5297e	0	fx-jvre	0M
FC-1	d4d0f254-0710-11e1-90c3-00e081c5297e	0	fx-jvre	0M
IC-WS001	WS001	0	-	-
IC-WS001	WS001/YW3803	0	qfx08-3008	0M
IC-WS001	WS001/YN5999	0	qfx08-3008	0M
node-device1	BBAK0372	0	qfx3500	0M

```
node-device1    EE3093                                0    qfx3500    0M
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	0M
FM-0	73747cd8-0710-11e1-b6a4-00e081c5297e	1	fx-jvre	0M
DRE-0	77116f18-0710-11e1-a2a0-00e081c5297e	1	fx-jvre	0M
NW-NG-0	BBAK0394	1	qfx3500	0M
NW-NG-0	cd78871a-0710-11e1-878e-00e081c5297e	1	fx-jvre	0M
NW-NG-0	d0afda1e-0710-11e1-a1d0-00e081c5297e	3	fx-jvre	0M
FC-0	d31ab7a6-0710-11e1-ad1b-00e081c5297e	1	fx-jvre	0M
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%)
```

Release Information

Command introduced before Junos OS Release 8.5.

sfc option introduced in Junos OS Release 9.6 for the TX Matrix Plus router.

re0, re1, and routing-engine options introduced for dual Routing Engines in Junos OS Release 13.1.

satellite option introduced in Junos OS Release 14.2R3.

core-file-info option is deprecated in Junos OS Release 16.1R3.

show system storage satellite

IN THIS SECTION

- [Syntax | 706](#)
- [Description | 706](#)
- [Options | 706](#)
- [Required Privilege Level | 707](#)
- [Output Fields | 707](#)
- [Sample Output | 707](#)
- [Release Information | 708](#)

Syntax

```
show system storage satellite
<fpc-slot>
device-alias <device-alias>
```

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.
<i>fpc-slot</i>	(Optional) Display satellite device connection information for the satellite device using the specified FPC slot number only.
device-alias <i>device-alias</i>	(Optional) Display satellite device connection information for the satellite device using the specified device alias only.

Required Privilege Level

view

Output Fields

Table 31 on page 707 describes the output fields for the `show system storage` command. Output fields are listed in the approximate order in which they appear.

Table 31: show system storage Output Fields

Field Name	Field Description
Filesystem	Name of the filesystem.
Size	Size of the filesystem.
Used	Amount of space used in the filesystem.
Avail	Amount of space available in the filesystem.
Use %	Percentage of the filesystem space that is being used.
Mounted on	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

```

Release Information

Command introduced in Junos OS Release 17.1R1.

CHAPTER 6

Power over Ethernet, LLDP, and LLDP-MED on a Junos Fusion Provider Edge

IN THIS CHAPTER

- [Understanding Power over Ethernet in a Junos Fusion | 709](#)
- [Understanding LLDP and LLDP-MED on a Junos Fusion | 712](#)
- [Configuring Power over Ethernet in a Junos Fusion | 714](#)
- [Verifying PoE Configuration and Status for a Junos Fusion \(CLI Procedure\) | 719](#)

Understanding Power over Ethernet in a Junos Fusion

IN THIS SECTION

- [Power over Ethernet in a Junos Fusion Overview | 710](#)
- [Understanding the Role of the Aggregation Devices for PoE Support in a Junos Fusion | 710](#)
- [Understanding the Role of the Satellite Devices for PoE Support in a Junos Fusion | 710](#)
- [Understanding PoE Configuration in a Junos Fusion | 711](#)
- [Understanding PoE Support Standards for Extended Ports in a Junos Fusion | 711](#)
- [Understanding Maximum PoE Power Budgets in a Junos Fusion | 711](#)
- [Understanding PoE Controller Software in a Junos Fusion | 712](#)
- [Understanding PoE Power Allocation Configuration Options in a Junos Fusion | 712](#)

This topic describes Power over Ethernet (PoE) in a Junos Fusion.

This topic covers:

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 24](#)

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

Verifying PoE Configuration and Status for a Junos Fusion (CLI Procedure)

Understanding LLDP and LLDP-MED on a Junos Fusion

IN THIS SECTION

- [LLDP and LLDP-MED in a Junos Fusion Overview | 713](#)
- [Understanding LLDP and LLDP-MED Configuration and Traffic Handling in a Junos Fusion | 713](#)

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

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

IN THIS SECTION

- [PoE Configurable Options | 714](#)
- [Enabling PoE | 716](#)
- [Disabling PoE | 716](#)
- [Setting the Power Management Mode | 717](#)
- [Setting the Maximum Power That Can Be Delivered from a PoE Interface | 718](#)
- [Setting the Guard Band | 718](#)
- [Setting the PoE Interface Priority | 719](#)

PoE Configurable Options

[Table 32 on page 715](#) 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 32: Configurable PoE Options and Default Settings

Option	Default	Description
disable (Power over Ethernet)	Not included in default configuration. NOTE: 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.
guard-band	0 W	Reserves a specified amount of power from the PoE power budget for possible spikes in PoE power consumption. In a Junos Fusion, the guard band can be 0 to 19 W.
management	class	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"> • class—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. • static—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.
maximum-power (Interface)	30.0 W (PoE+, IEEE 802.3at)	Sets the maximum power that can be delivered by a PoE interface when the power management mode is static . In a Junos Fusion, all extended ports support PoE+ so the maximum power is up to 30 W. This setting is ignored if the power management mode is class .

Table 32: Configurable PoE Options and Default Settings (*Continued*)

Option	Default	Description
priority (Power over Ethernet)	low	Sets an interface's power priority to either low or high . 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)

Understanding Power over Ethernet in a Junos Fusion

Verifying PoE Configuration and Status for a Junos Fusion (CLI Procedure)

IN THIS SECTION

- [PoE Power Budgets, Consumption, and Mode on Satellite Devices | 720](#)
- [PoE Interface Configuration and Status | 721](#)

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

IN THIS SECTION

- Purpose | 720
- Action | 720
- Meaning | 720

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

IN THIS SECTION

Purpose | 721

Action | 721

Meaning | 723

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	not-applicable
ge-100/0/23	Enabled	OFF	16.0W	Low	0.0W	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
ge-100/0/26	Enabled	OFF	16.0W	Low	0.0W	not-applicable
ge-100/0/27	Enabled	OFF	16.0W	Low	0.0W	not-applicable
ge-100/0/28	Enabled	OFF	16.0W	Low	0.0W	not-applicable
ge-100/0/29	Enabled	OFF	16.0W	Low	0.0W	not-applicable
ge-100/0/30	Enabled	OFF	16.0W	Low	0.0W	not-applicable
ge-100/0/31	Enabled	OFF	16.0W	Low	0.0W	not-applicable
ge-100/0/32	Enabled	OFF	16.0W	Low	0.0W	not-applicable
ge-100/0/33	Enabled	OFF	16.0W	Low	0.0W	not-applicable
ge-100/0/34	Enabled	OFF	16.0W	Low	0.0W	not-applicable
ge-100/0/35	Enabled	OFF	16.0W	Low	0.0W	not-applicable
ge-100/0/36	Enabled	OFF	16.0W	Low	0.0W	not-applicable
ge-100/0/37	Enabled	ON	16.0W	Low	2.0W	0
ge-100/0/38	Enabled	OFF	16.0W	Low	0.0W	not-applicable
ge-100/0/39	Enabled	OFF	16.0W	Low	0.0W	not-applicable
ge-100/0/40	Enabled	OFF	16.0W	Low	0.0W	not-applicable
ge-100/0/41	Enabled	OFF	16.0W	Low	0.0W	not-applicable
ge-100/0/42	Enabled	OFF	16.0W	Low	0.0W	not-applicable
ge-100/0/43	Enabled	OFF	16.0W	Low	0.0W	not-applicable
ge-100/0/44	Enabled	OFF	16.0W	Low	0.0W	not-applicable
ge-100/0/45	Enabled	OFF	16.0W	Low	0.0W	not-applicable
ge-100/0/46	Enabled	OFF	16.0W	Low	0.0W	not-applicable
ge-100/0/47	Enabled	OFF	16.0W	Low	0.0W	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
ge-120/0/2	Enabled	OFF	16.0W	Low	2.0W	not-applicable
ge-120/0/3	Enabled	OFF	16.0W	Low	0.0W	not-applicable
ge-120/0/4	Enabled	OFF	16.0W	Low	0.0W	not-applicable
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

Understanding Power over Ethernet in a Junos Fusion

Configuration Statements for Power over Ethernet and Power Supply Management on a Junos Fusion Provider Edge

IN THIS CHAPTER

- [disable \(Power over Ethernet\) | 724](#)
- [guard-band | 726](#)
- [interface \(Power over Ethernet\) | 728](#)
- [management | 729](#)
- [maximum-power \(Interface\) | 732](#)
- [n-plus-n \(satellite-management\) | 734](#)
- [poe | 736](#)
- [priority \(Power over Ethernet\) | 738](#)
- [psu \(satellite-management\) | 740](#)
- [redundancy \(satellite-management\) | 741](#)

disable (Power over Ethernet)

IN THIS SECTION

- [Syntax | 725](#)
- [Hierarchy Level | 725](#)
- [Description | 725](#)
- [Required Privilege Level | 725](#)
- [Release Information | 725](#)

Syntax

```
disable;
```

Hierarchy Level

```
[edit poe                interface (all | all-extended | interface-name)],
[edit poe                interface (all | all-extended | interface-name) telemetries],
[edit poe                notification-control fpc slot-number]
```

Description

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 `disable` statement depends on which statement it is used with:

- When used with **interface**—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 reenabling the PoE capability of this interface, delete the `disable` statement from the **interface** entry in the configuration.
- When used with **telemetries**—Disable the collection of PoE power consumption records for this interface. Any previously collected records are deleted. However, the **telemetries** configuration is retained, including the values for **interval** and **duration**. To reenabling record collection, delete the `disable` statement from the **telemetries** entry in the configuration.
- When used with **notification-control**—Disable the generation of PoE SNMP traps. To reenabling PoE traps, delete the `disable` statement from the **notification-control** entry in the configuration.

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.0.

all-extended option introduced in Junos OS Release 16.1R1.

Statement introduced in Junos OS Release 17.2R1 for a Junos Fusion Provider Edge.

RELATED DOCUMENTATION

[Example: Configuring PoE Interfaces with Different Priorities on an EX Series Switch](#)

[Configuring PoE Interfaces on EX Series Switches](#)

Configuring Power over Ethernet in a Junos Fusion

guard-band

IN THIS SECTION

- [Syntax | 726](#)
- [Hierarchy Level | 726](#)
- [Description | 727](#)
- [Options | 727](#)
- [Required Privilege Level | 727](#)
- [Release Information | 727](#)

Syntax

```
guard-band watts;
```

Hierarchy Level

```
[edit poe],  
[edit poe (all | fpc slot-number)]
```

Description

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.

Options

watts—Amount of power to be reserved in case of a spike in PoE consumption.

- **Range:** 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.

- **Default:** 0

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.0.

Statement introduced in Junos OS Release 12.2 for ACX2000 Universal Metro Routers.

Statement introduced in Junos OS Release 17.2R1 for a Junos Fusion Provider Edge.

RELATED DOCUMENTATION

[Configuring PoE Interfaces on EX Series Switches](#)

Configuring Power over Ethernet in a Junos Fusion

interface (Power over Ethernet)

IN THIS SECTION

- [Syntax | 728](#)
- [Hierarchy Level | 728](#)
- [Description | 728](#)
- [Options | 729](#)
- [Required Privilege Level | 729](#)
- [Release Information | 729](#)

Syntax

```
interface (all | all-extended | interface-name) {  
    af-mode;  
    disable;  
    maximum-power watts;  
    priority (high | low);  
    telemetries {  
        disable;  
        duration hours;  
        interval minutes;  
    }  
}
```

Hierarchy Level

[edit poe]

Description

Specify a PoE interface to be configured.

Options

all—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 **all**.

all-extended—(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 **all-extended**.

interface-name—Name of the specific interface being configured.

If you use the `interface` statement without any substatements, default values are used for the remaining statements.

The remaining statements are explained separately. See [CLI Explorer](#).

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.0.

Statement introduced in Junos OS Release 17.2R1 for a Junos Fusion Provider Edge.

RELATED DOCUMENTATION

[Configuring PoE Interfaces on EX Series Switches](#)

Configuring Power over Ethernet in a Junos Fusion

management

IN THIS SECTION

● [Syntax | 730](#)

● [Hierarchy Level | 730](#)

- Description | 730
- Default | 730
- Options | 730
- Required Privilege Level | 731
- Release Information | 731

Syntax

```
management (class | static | high-power);
```

Hierarchy Level

```
[edit poe],
[edit poe (all | fpc slot-number)]
```

Description

Designate how the PoE controller allocates power to the PoE interfaces.

Default

class

Options

- **class**—The amount of power allocated to the interface is based on the class of the connected powered device. If LLDP power negotiation is enabled, the powered device can request more or less power. LLDP power negotiation is enabled by default in class management mode.

If LLDP power negotiation is disabled, the power allocation is determined solely by the class of the connected powered device. If there is no powered device connected, standard 15.4W power is allocated on the interface. For more information about disabling LLDP power negotiation, see [Device Discovery Using LLDP and LLDP-MED on Switches](#).

- **static**—The amount of power allocated to the interface is determined by the value of the `maximum-power` 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.

NOTE: Static mode is not supported in PoE-bt.

- **high-power**—(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 high-power 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, high-power mode is not enabled and has to be explicitly enabled. When the PoE controller is configured for high-power mode, the PoE controller does not deliver power to normal powered devices that request power over two pairs.

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.0.

Statement introduced in Junos OS Release 17.2R1 for a Junos Fusion Provider Edge.

RELATED DOCUMENTATION

[Understanding PoE on EX Series Switches](#)

[Configuring PoE Interfaces on EX Series Switches](#)

Configuring Power over Ethernet in a Junos Fusion

maximum-power (Interface)

IN THIS SECTION

- [Syntax | 732](#)
- [Hierarchy Level | 732](#)
- [Description | 732](#)
- [Options | 733](#)
- [Required Privilege Level | 734](#)
- [Release Information | 734](#)

Syntax

```
maximum-power watts;
```

Hierarchy Level

```
[edit poe interface (all | all-extended | interface-name)]
```

Description

Configure the maximum amount of power that the switch can supply to the PoE port. The maximum power configuration is valid when the PoE power management is in static mode. If PoE power management is in class mode, which is the default, the maximum power configuration will have no effect on the power allocation. For more information on power management configuration options, see [management](#).

NOTE: Maximum power configuration is not supported in PoE-bt (IEEE 802.3bt).

NOTE: 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.

Options

watts—The maximum power in watts that can be supplied to the ports.

For EX2200, EX3300, EX4200, EX4300, EX4600, EX6200, and EX8200 switches:

- **Range:** 0.0 through 30.0
- **Default:** 15.4 W for ports that support IEEE 802.3af and 30 W for ports that support IEEE 802.3at

For EX3200 switches:

- **Range:** 0.0 through 18.6
- **Default:** 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.

Release Information

Statement introduced in Junos OS Release 9.0.

RELATED DOCUMENTATION

[Configuring PoE Interfaces on EX Series Switches](#)

Configuring Power over Ethernet in a Junos Fusion

n-plus-n (satellite-management)

IN THIS SECTION

● [Syntax](#) | 735

- [Hierarchy Level | 735](#)
- [Description | 735](#)
- [Required Privilege Level | 735](#)
- [Release Information | 735](#)

Syntax

```
n-plus-n
```

Hierarchy Level

```
[edit chassis satellite-management psu redundancy]
```

Description

Configure $N+N$ power supply redundancy for the satellite devices in a Junos Fusion.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 16.1R1.

RELATED DOCUMENTATION

| *Understanding Power over Ethernet in a Junos Fusion*

poe

IN THIS SECTION

- [Syntax | 736](#)
- [Hierarchy Level | 738](#)
- [Description | 738](#)
- [Required Privilege Level | 738](#)
- [Release Information | 738](#)

Syntax

For switches other than EX6200 and EX8200 switches:

```
poe {
    guard-band watts;
    interface (all | interface-name) {
        disable;
        maximum-power watts;
        priority (high | low);
        telemetries {
            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);
        telemetries {
            disable;
            duration hours;
            interval minutes;
        }
    }
}
notification-control {
    fpc slot-number {
        disable;
    }
}
}
```

Hierarchy Level

[edit]

Description

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.

The remaining statements are explained separately. See [CLI Explorer](#).

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.0.

Statement introduced in Junos OS Release 17.2R1 for a Junos Fusion Provider Edge.

RELATED DOCUMENTATION

[Configuring PoE Interfaces on EX Series Switches](#)

Configuring Power over Ethernet in a Junos Fusion

priority (Power over Ethernet)

IN THIS SECTION

- [Syntax | 739](#)
- [Hierarchy Level | 739](#)
- [Description | 739](#)
- [Default | 739](#)

- [Options | 739](#)
- [Required Privilege Level | 740](#)
- [Release Information | 740](#)

Syntax

```
priority (low | high);
```

Hierarchy Level

```
[edit poe interface (interface-name | all | all-extended)]
```

Description

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.

Default

low

Options

high—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.

low—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.

Required Privilege Level

system—To view this statement in the configuration.

system-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 9.0.

Statement introduced in Junos OS Release 17.2R1 for a Junos Fusion Provider Edge.

RELATED DOCUMENTATION

[Example: Configuring PoE Interfaces with Different Priorities on an EX Series Switch](#)

[Configuring PoE Interfaces on EX Series Switches](#)

Configuring Power over Ethernet in a Junos Fusion

psu (satellite-management)

IN THIS SECTION

- [Syntax | 740](#)
- [Hierarchy Level | 741](#)
- [Description | 741](#)
- [Required Privilege Level | 741](#)
- [Release Information | 741](#)

Syntax

```
psu {
  redundancy {
    n-plus-n;
```

```
}
}
```

Hierarchy Level

```
[edit chassis satellite-management]
```

Description

Configure *N+N* power supply redundancy for the satellite devices in a Junos Fusion.

The remaining statements are explained separately. See [CLI Explorer](#).

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 16.1R1.

RELATED DOCUMENTATION

| *Understanding Power over Ethernet in a Junos Fusion*

redundancy (satellite-management)

IN THIS SECTION

- [Syntax | 742](#)
- [Hierarchy Level | 742](#)
- [Description | 742](#)
- [Default | 742](#)

- Required Privilege Level | 742
- Release Information | 742

Syntax

```
redundancy {  
    n-plus-n;  
}
```

Hierarchy Level

```
[edit chassis satellite-management psu]
```

Description

Configure $N+1$ power supply redundancy for the satellite devices in a Junos Fusion.

The remaining statement is explained separately. See [CLI Explorer](#).

Default

$N+1$ power supply redundancy is configured on each satellite device by default.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 16.1R1.

RELATED DOCUMENTATION

| *Understanding Power over Ethernet in a Junos Fusion*

CHAPTER 8

Operational Commands for Power over Ethernet and Power Supply Management on Junos Fusion Provider Edge

IN THIS CHAPTER

- [show chassis satellite power-budget-statistics | 744](#)
- [show poe controller | 748](#)
- [show poe interface | 752](#)

show chassis satellite power-budget-statistics

IN THIS SECTION

- [Syntax | 745](#)
- [Description | 745](#)
- [Options | 745](#)
- [Required Privilege Level | 745](#)
- [Output Fields | 745](#)
- [Sample Output | 746](#)
- [Release Information | 747](#)

Syntax

```
show chassis satellite power-budget-statistics
<slot-id slot-id-number>
```

Description

Display the power budget statistics of a satellite device or devices in a Junos Fusion.

Options

- none** Display power budget statistics for all satellite devices in the Junos Fusion.
- slot-id slot-id-number** Display power budget statistics for the specified satellite device only. The *slot-id-number* and the FPC ID are the same number in a Junos Fusion.

Required Privilege Level

view

Output Fields

[Table 33 on page 745](#) lists the output fields for the `show chassis satellite-management power-budget-statistics` command. Output fields are listed in the approximate order in which they appear.

Table 33: 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> (<i>supply type</i>)	Capacity rating of the power supply and whether the power supply is currently operating (Online) or not (Offline). If a power supply is offline, the capacity is shown as 0 W.

Table 33: show chassis satellite-management power-budget-statistics Output Fields (Continued)

Field Name	Field Description
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 $N+1$ or $N+N$.
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.
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

```

Release Information

Command introduced in Junos OS Release 16.1R1.

RELATED DOCUMENTATION

Understanding Power over Ethernet in a Junos Fusion

show poe controller

IN THIS SECTION

- [Syntax | 748](#)
- [Description | 748](#)
- [Required Privilege Level | 748](#)
- [Output Fields | 748](#)
- [Sample Output | 750](#)
- [Release Information | 751](#)

Syntax

```
show poe controller
```

Description

Display configuration and status of the PoE controllers.

Required Privilege Level

view

Output Fields

[Table 34 on page 749](#) lists the output fields for the `show poe controller` command. Output fields are listed in the approximate order in which they appear.

Table 34: show poe controller Output Fields

Field Name	Field Description
Controller index	<p>PoE controller number:</p> <ul style="list-style-type: none"> • 0 for EX2200, EX3200, standalone EX3300, standalone EX4200 switches, standalone EX4300 switches, and ACX2000 routers. • Member ID for switches in an EX3300 Virtual Chassis, EX4200 Virtual Chassis, EX4300 Virtual Chassis, a mixed EX4200 and EX4500 Virtual Chassis. • Slot number for line cards with a PoE controller in an EX6200 or EX8200 switch.
Maximum power	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.
Power consumption	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 Maximum power.
Guard Band	Amount of power that has been placed in reserve for power demand spikes and that cannot be allocated to a PoE interface.
Management	<p>Power management mode: class or static or high-power.</p> <p>NOTE: The mode high-power is available on only ACX2000 routers.</p>

Table 34: show poe controller Output Fields (*Continued*)

Field Name	Field Description
Status	<p>Status of the PoE controller:</p> <ul style="list-style-type: none"> • AF_ENHANCE—Controller supports enhanced PoE. The maximum power per PoE port is 18.6 W in static mode (15.4 W in class mode). • DEVICE FAIL—Software download to the controller has failed or the PoE controller is not initialized because of a hardware failure. • DOWNLOAD_INIT—Software download to the controller is in the initial phase. • AF_MODE—Controller supports standard IEEE 802.3af. The maximum power per PoE port is 15.4 W. • AT/AF COMBO—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. • AT_MODE—Controller supports IEEE 802.3at (PoE+). The maximum power per PoE port is 30 W. • SW_DOWNLOAD (r%)—Software download to the controller is in progress.
Lldp Priority	<p>Link Layer Discovery Protocol (LLDP) priority operating state. The state can be Enabled or Disabled.</p> <p>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.</p>

Sample Output

show poe controller (EX3200 Switch)

```

user@switch> show poe controller
Controller  Maximum   Power      Guard    Management  Status    Lldp
index      power     consumption band
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	

Release Information

Command introduced in Junos OS Release 9.0.

Command introduced in Junos OS Release 12.2 for ACX2000 routers.

Statement introduced in Junos OS Release 17.2R1 for a Junos Fusion Provider Edge.

RELATED DOCUMENTATION

show poe interface

[request system firmware upgrade poe](#)

[Verifying PoE Configuration and Status \(CLI Procedure\)](#)

Verifying PoE Configuration and Status for a Junos Fusion (CLI Procedure)

[Monitoring PoE Power Consumption \(CLI Procedure\)](#)

[Upgrading the PoE Controller Software](#)

show poe interface

IN THIS SECTION

- [Syntax | 752](#)
- [Description | 752](#)
- [Options | 753](#)
- [Required Privilege Level | 753](#)
- [Output Fields | 753](#)
- [Sample Output | 757](#)
- [Release Information | 760](#)

Syntax

```
show poe interface  
<fpc-slot number>  
<interface-name>
```

Description

Display the status of PoE interfaces.

Options

`none`—Display status of all PoE interfaces on the switch or router.

`fpc-slot number`—(Optional) (EX6200 or EX8200 switches only) Display the status of the PoE interfaces on the specified line card.

`interface-name`—(Optional) Display the status of a specific PoE interface on the switch.

Required Privilege Level

view

Output Fields

Table 35 on page 753 lists the output fields for the `show poe interface` command. Output fields are listed in the approximate order in which they appear.

Table 35: show poe interface Output Fields

Field Name (All Interfaces Output)	Field Name (Single Interface Output)	Field Description
Interface	PoE Interface	Interface name.
Admin status	Administrative status	Administrative state of the PoE interface: Enabled or Disabled . If the PoE interface is disabled, it can provide network connectivity, but it cannot provide power to connected devices.
Oper status	Operational status	Operational state of the PoE interface: <ul style="list-style-type: none"> ON—The interface is currently supplying power to a powered device. OFF—PoE is enabled on the interface, but the interface is not currently supplying power to a powered device. FAULT—PoE interface is in the OFF state due to a fault condition. Disabled—PoE is disabled on the interface.

Table 35: show poe interface Output Fields (Continued)

Field Name (All Interfaces Output)	Field Name (Single Interface Output)	Field Description
	Operational status detail	<p>Additional information for troubleshooting the operational state of the PoE interface:</p> <ul style="list-style-type: none"> • Admin up but disabled on hardware—The interface is disabled due to power budget unavailability. • Overload—Interface is in the fault condition. • IEEE PD Detected—The interface is providing power to the powered device. • Detection In Progress—Detection of the powered device is ongoing. • 4P Port that deliver only 2 Pair non IEEE—Signature failure on Alt-B, allowing power only on Alt-A (Non IEEE or Legacy PD). • 4P Port delivering 2P non IEEE—Non-IEEE PD was detected using 4P matrix in BT mode and power as 2Pair . • 4P Port delivering 4P non IEEE—Non-IEEE PD was detected using 4P matrix in BT mode and power as 4Pair. • 4P Port delivering 2P IEEE SSPD—802.3BT- SSPD was detected using 4P matrix and operate as 2P if requested class =< 4. • 4P Port delivering 4P IEEE SSPD—802.3BT- SSPD was detected using 4P matrix and operate as 4P if requested class > 4. • 4P Port delivering 2P IEEE DSPD in 1st phase—802.3BT- DSPD was detected using 4P matrix and operate as 2P due to 4pair candidate validation in two cycles. • 4P Port delivering 2P IEEE DSPD—802.3BT- DSPD was detected using 4P matrix and operate as 2P. • 4P Port delivering 4P IEEE DSPD—802.3BT- DSPD was detected using 4P matrix and operate as 4P. • Force Power BT 4P—Port matrix 4P and delivers power on both pair sets due to force power command.

Table 35: show poe interface Output Fields (*Continued*)

Field Name (All Interfaces Output)	Field Name (Single Interface Output)	Field Description
		<ul style="list-style-type: none"> Force Power BT Error—Force power command was set, one of the port pair sets stop delivering power, from at least one reason out of various reasons (System related, Device related, port related or Pair set related). Connection Check error—This error will be reported only in 4 pair port when invalid connection check signature was detected. In such case detection fail counter will be incremented. Open—Port is not connected (Equivalent to Detection in Progress).
	FourPair status	<p>Status of four-pair PoE (PoE-4P), a Juniper Networks extension to the IEEE 802.3at standard, which can be enabled for high or ultra-high power delivery:</p> <ul style="list-style-type: none"> Enabled—High or ultra-high power mode is enabled. Disabled—High or ultra-high power mode is disabled. <p>See Enabling PoE on EX Series Switches (CLI Procedure) for information on how to enable four-pair PoE.</p>
Pair/Mode status		<p>Shows the mode of power delivery configured on the interface.</p> <ul style="list-style-type: none"> 4P/AT—Interface is configured for high power mode. 4P/POH—Interface is configured for ultra-high power mode. DS/BT—Interface is configured for dual-signature powered devices. SS/BT—Interface is configured for single-signature powered devices.

Table 35: show poe interface Output Fields *(Continued)*

Field Name (All Interfaces Output)	Field Name (Single Interface Output)	Field Description
Max power	Power limit on the interface	<p>Maximum power that can be provided by the interface. This is determined by the class of the powered device.</p> <p>For dual-signature devices, each pair set has its own class. The maximum power will be the total of the maximum power for the two classes: $\text{max power} = \text{class x} + \text{class y}$ for dual signature x/y. For example, a dual-signature device with a class value displayed as 5/5 has a maximum power of 90W, because class 5 has a maximum power of 45W.</p> <p>An (L) next to the value indicates that the value on the port was negotiated by LLDP.</p>
Priority	Priority	<p>Interface power priority: either High or Low.</p> <p>An (L) next to the value indicates that the value on the port was negotiated by LLDP.</p>
Power consumption	Power consumed	Amount of power being used by the interface at the time the command is executed.
Class	Class of power device	<p>IEEE PoE class of the powered device. Class 0 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 not applicable.</p> <p>PoE-bt supports power devices with dual signatures. For dual-signature devices, the output value contains both the class values, e.g. 5/5. For single-signature devices, the output value is formatted as 5/-.</p>
	PoE Mode	IEEE PoE standard supported by the interface—either 802.3af, or 802.3at, ultra-poe, or 802.3bt.

Sample Output

show poe interface

```
user@switch> show poe interface
```

Interface	Admin status	Oper status	Max power	Priority	Power 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 (with LLDP negotiation)

```
user@switch> show poe interface
```

Interface	Admin status	Oper status	Max power	Priority	Power 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

```

show poe interface (PoE-bt mode)

```

user@switch> show poe interface

```

Interface	Admin status	Oper status	Pair/Mode status	Max power	Priority	Power consumption	Class
ge-0/0/0	Enabled	ON	SS/BT	15.4W	Low	12.0W (L)	3/-
ge-0/0/1	Enabled	ON	4P/BT	60.0W	Low	55.0W	4/-
ge-0/0/2	Enabled	ON	4P/POH	90.0W	Low	81.0W	4/-
ge-0/0/3	Enabled	ON	SS/BT	90.0W	High	80.0W	8/-
ge-0/0/4	Enabled	ON	SS/BT	75.0W	Low	65.0W(L)	7/-
ge-0/0/5	Enabled	ON	SS/BT	30.0W	Low	27.0W	4/-
ge-0/0/6	Enabled	ON	SS/BT	15.4W	Low	13.0W	3/-
ge-0/0/7	Enabled	ON	SS/BT	60.0W	Low	49.0W	6/-
ge-0/0/8	Enabled	ON	DS/BT	90.0W	Low	78.0W	5/5
ge-0/0/9	Enabled	ON	DS/BT	75.0W	Low	68.0W(L)	5/4
ge-0/0/10	Enabled	ON	DS/BT	60.0W	Low	55.0W	4/4

show poe interface (PoE-bt mode: 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
Four-pair status        : NA
Power limit on the interface : 90.0W
Priority                 : Low
Power consumed           : 78.0W
Class of power device    : 5/5
PoE Mode                 : 802.3bt
```

Release Information

Command introduced in Junos OS Release 9.0.

Command introduced in Junos OS Release 12.2 for ACX2000 routers.

RELATED DOCUMENTATION

show poe controller

[Enabling PoE on EX Series Switches \(CLI Procedure\)](#)

Monitoring Junos Fusion Provider Edge

IN THIS CHAPTER

- [Connectivity Fault Management in Junos Fusion | 761](#)

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.

SNMP MIB Support on Junos Fusion Provider Edge

IN THIS CHAPTER

- Chassis MIB Support (Junos Fusion) | 763

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 36 on page 763 shows the CIDXs used for satellite devices.

Table 36: CIDX's for Satellite Devices

CIDX	Component Type
102	Power Supply
104	Fan
107	FPC

Table 36: CIDX's for Satellite Devices (Continued)

CIDX	Component Type
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 37 on page 765](#) shows the SNMP traps that can be generated for satellite devices.

Table 37: 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

Table 37: SNMP Traps Generated for Satellite Devices (Continued)

Trap	Condition
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)
```

Link Aggregation and Link Aggregation Control Protocol on Junos Fusion Provider Edge

IN THIS CHAPTER

- [Understanding Link Aggregation and Link Aggregation Control Protocol in a Junos Fusion | 768](#)
- [Configuring an Aggregated Ethernet Interface | 770](#)
- [Configuring Junos OS for Supporting Aggregated Devices | 772](#)

Understanding Link Aggregation and Link Aggregation Control Protocol in a Junos Fusion

IN THIS SECTION

- [Link Aggregation in Junos Fusion | 768](#)
- [Link Aggregation Control Protocol in Junos Fusion | 769](#)
- [Configuring Link Aggregation and LACP in Junos Fusion | 769](#)
- [Software and Hardware Guidelines when Configuring Link Aggregation and LACP in Junos Fusion | 770](#)

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.

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.
- 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 and Junos Fusion Enterprise, and the LAGs are numbered from ae0 through ae4091.
- Up to 16 members are supported in a LAG in Junos Fusion Provider Edge and Junos Fusion Enterprise.
- 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 | 3](#)

[Understanding Junos Fusion Ports](#)

[Configuring Junos OS for Supporting Aggregated Devices](#)

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*.

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.

Configuring Junos OS for Supporting Aggregated Devices

IN THIS SECTION

- [Configuring Virtual Links for Aggregated Devices | 772](#)
- [Configuring LACP Link Protection at the Chassis Level | 774](#)
- [Enabling LACP Link Protection | 775](#)
- [Configuring System Priority | 775](#)
- [Configuring the Maximum Links Limit | 776](#)
- [Configuring PPM on Junos Fusion | 776](#)

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

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.

[Table 38 on page 774](#) lists the MX Series routers and the maximum number of interfaces per LAG and the maximum number of LAG groups they support. MX Series routers can support up to 64 LAGs.

Table 38: Maximum Interface Per LAG and Maximum LAGs per MX Router

MX Series Routers	Maximum Interfaces per LAG	Maximum LAG Groups
MX5, MX10, MX40, MX80, and MX104	16	Limited by the interface capacity. 80 on MX104.
MX240, MX480, MX960, MX10003, MX2010, and MX2020	64	1000

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).

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 as0 through as63.

RELATED DOCUMENTATION

[Configuring Aggregated SONET/SDH Interfaces](#)

Uplink Failure Detection on Junos Fusion Provider Edge

IN THIS CHAPTER

- Overview of Uplink Failure Detection on a Junos Fusion | 778
- Configuring Uplink Failure Detection on a Junos Fusion | 780

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 779](#) 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 1/0 through 1/1 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

[Overview of Uplink Failure Detection on a Junos Fusion](#) | 778

Configuring Uplink Failure Detection on a Junos Fusion

IN THIS SECTION

- [Enabling Uplink Failure Detection on a Junos Fusion | 780](#)
- [Configuring a Candidate Uplink Port Policy | 782](#)
- [Configuring an Uplink Port Group | 785](#)

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

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 781](#).

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 782](#).

Table 40: Junos Fusion Uplink Failure Detection Default Configuration

Configuration Parameter	Description	Default
holddown	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
minimum-links	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
uplink-port-group	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 UFD Default Uplink Interfaces for Satellite Devices on page 779 for the default uplink ports by device.

Configuring a Candidate Uplink Port Policy

IN THIS SECTION

- [Configuring Candidate Uplink Port Policy Default Configuration | 782](#)
- [Configuring Candidate Uplink Port Policy Terms | 783](#)

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

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 781](#).
- 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 778](#).

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 785](#).

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 785](#).

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 778](#). 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](#) | 778

Configuration Statements for Uplink Failure Detection on Junos Fusion Provider Edge

IN THIS CHAPTER

- [candidate-uplink-port-policy \(satellite-policies\) | 786](#)
- [holddown \(candidate-uplink-port-profile\) | 788](#)
- [minimum-links \(candidate-uplink-port-profile\) | 790](#)
- [pic \(satellite-policies port-group-alias\) | 791](#)
- [port \(satellite-policies port-group-alias\) | 793](#)
- [port-group-alias \(satellite-policies\) | 794](#)
- [product-model \(Junos Fusion\) | 796](#)
- [satellite-policies | 798](#)
- [term \(candidate-uplink-policy\) | 800](#)
- [uplink-failure-detection \(Junos Fusion\) | 802](#)
- [uplink-port-group \(Junos Fusion\) | 804](#)

candidate-uplink-port-policy (satellite-policies)

IN THIS SECTION

- [Syntax | 787](#)
- [Hierarchy Level | 787](#)
- [Description | 787](#)
- [Default | 787](#)
- [Options | 787](#)
- [Required Privilege Level | 788](#)

Syntax

```
candidate-uplink-port-policy policy-name{
  <holddown>holddown-timenumber-of-linksuplink-port-group-nameterm-name {
    from {
      product-model model-name;
      <holddown> holddown-timenumber-of-linksuplink-port-group-name

```

Hierarchy Level

```
[edit policy-options satellite-policies]
```

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

policy-name User-defined name for the policy.

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.

Release Information

Statement introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 52](#)

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

holddown (candidate-uplink-port-profile)

IN THIS SECTION

- [Syntax | 788](#)
- [Hierarchy Level | 789](#)
- [Description | 789](#)
- [Default | 789](#)
- [Options | 789](#)
- [Required Privilege Level | 789](#)
- [Release Information | 789](#)

Syntax

```
holddown interval;
```

Hierarchy Level

```
[edit policy-options satellite-policies candidate-uplink-port-profile profile-name]
[edit policy-options satellite-policies candidate-uplink-port-profile profile-name term term-name from]
```

Description

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.

Default

The default holddown interval is 6 seconds.

Options

interval—The holddown interval, in seconds. Valid values are 1-600 seconds.

Required Privilege Level

admin—To view this statement in the configuration.

admin-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

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

minimum-links (candidate-uplink-port-profile)

IN THIS SECTION

- [Syntax | 790](#)
- [Hierarchy Level | 790](#)
- [Description | 790](#)
- [Default | 790](#)
- [Options | 791](#)
- [Required Privilege Level | 791](#)
- [Release Information | 791](#)

Syntax

```
minimum-links link-count;
```

Hierarchy Level

```
[edit policy-options satellite-policies candidate-uplink-port-profile profile-name]  
[edit policy-options satellite-policies candidate-uplink-port-profile profile-name term term-name from]
```

Description

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.

Default

The default number of minimum links is 1.

Options

link-count—Specifies the minimum number of active uplink ports a satellite device must have. Valid values are 1-32 links.

Required Privilege Level

admin—To view this statement in the configuration.

admin-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 52](#)

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

pic (satellite-policies port-group-alias)

IN THIS SECTION

- [Syntax | 792](#)
- [Hierarchy Level | 792](#)
- [Description | 792](#)
- [Options | 792](#)
- [Required Privilege Level | 792](#)
- [Release Information | 792](#)

Syntax

```
pic pic-number {
    port [port-number | port-number-range | all];
}
```

Hierarchy Level

```
[edit policy-options satellite-policies port-group-alias port-group-alias-name]
```

Description

Specify the PIC number to apply a port group alias for satellite policies in a Junos Fusion.

You must also specify the ports on the PIC when you use this statement.

Options

pic-number The PIC number on the satellite device.

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.

Release Information

Statement introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 52](#)

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

port (satellite-policies port-group-alias)

IN THIS SECTION

- [Syntax | 793](#)
- [Hierarchy Level | 793](#)
- [Description | 793](#)
- [Options | 793](#)
- [Required Privilege Level | 794](#)
- [Release Information | 794](#)

Syntax

```
port [port-number | port-number-range | all];
```

Hierarchy Level

```
[edit policy-options satellite-policies port-group-alias port-group-alias-name pic pic-number]
```

Description

Specify the port or ports to apply a port group alias for satellite policies in a Junos Fusion.

You must also specify the PIC when you use this statement.

Options

<i>port-number</i>	The port number on the PIC on the satellite device.
<i>port-number-range</i>	A range of port numbers on the PIC.
all	All ports on the PIC.

Required Privilege Level

admin—To view this statement in the configuration.

admin-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 52](#)

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

port-group-alias (satellite-policies)

IN THIS SECTION

- [Syntax | 794](#)
- [Hierarchy Level | 795](#)
- [Description | 795](#)
- [Default | 795](#)
- [Options | 795](#)
- [Required Privilege Level | 795](#)
- [Release Information | 796](#)

Syntax

```
port-group-alias port-group-alias-name {
  pic pic-number {
    port [port-number | port-number-range | all];
```

```
}
}
```

Hierarchy Level

```
[edit policy-options satellite-policies]
```

Description

Configure a port group alias for satellite policies in a Junos Fusion.

A port group alias is used to define the candidate uplink ports on satellite devices that use the satellite policy.



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.

A port group alias is associated with a satellite policy using the `set uplink-port-group uplink-port-group-name` statement in the `[edit policy-options satellite-policies candidate-uplink-policy policy-name]` hierarchy.

Default

Each satellite device model has a set of default uplink ports (see ["Overview of Uplink Failure Detection on a Junos Fusion" on page 778](#)). 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

port-group-alias-name The user-defined name of the port group alias.

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.

Release Information

Statement introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 52](#)

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

product-model (Junos Fusion)

IN THIS SECTION

- [Syntax | 796](#)
- [Hierarchy Level | 796](#)
- [Description | 797](#)
- [Options | 797](#)
- [Required Privilege Level | 797](#)
- [Release Information | 797](#)

Syntax

```
product-model model-name;
```

Hierarchy Level

```
[edit policy-options satellite-policies candidate-uplink-port-policy policy-name term term-name
from]
```

```
[edit policy-options satellite-policies candidate-uplink-port-policy policy-name term term-name
from]
```

```
[edit policy-options satellite-policies forwarding-policy policy-name term term-name from]
```

Description

Define the satellite device product models that will use the candidate uplink port policy defined in the `from` statement.

The other statements in the same `from` statement are applied to satellite devices that match the `product-model model-name` definition. Those configuration statements are not applied to satellite devices that do not match the definition.

Options

model-name 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.

Some examples of using the wildcard character in the match term:

- To apply the satellite policy to all EX4300 switches in the satellite device role, enter EX4300* as the *model-name*.
- To apply the satellite policy to all QFX5100 switches in the satellite device role, enter QFX5100* as the *model-name*.
- To apply the satellite policy to QFX5100 switches with model names that start with QFX5100-96, enter QFX5100-96* as the *model-name*.

Required Privilege Level

admin—To view this statement in the configuration.

admin-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 52](#)

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

satellite-policies

IN THIS SECTION

- Syntax | 798
- Hierarchy Level | 799
- Description | 799
- Options | 799
- Required Privilege Level | 800
- Release Information | 800

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
        holddown time;
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
                holddown time;
        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]

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.

Release Information

Statement introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 52](#)

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

term (candidate-uplink-policy)

IN THIS SECTION

- [Syntax | 800](#)
- [Hierarchy Level | 801](#)
- [Description | 801](#)
- [Options | 801](#)
- [Required Privilege Level | 801](#)
- [Release Information | 801](#)

Syntax

```
term term-name{
  from {
    product-model model-name;
    <holddown holddown-time>;
    <minimum-links number-of-links>;
    <uplink-port-group uplink-port-group-name>;
```

```
}
}
```

Hierarchy Level

```
[edit policy-options satellite-policies candidate-uplink-port-profile policy-name]
```

Description

Create and configure a term in a candidate uplink satellite policy within a Junos Fusion.

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.

Options

- | | |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>term-name</i> | <p>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> |
| from | <p>The statements under the <i>from</i> statement define the satellite device model match criteria and uplink failure detection configuration for the term. Each term can contain only one <i>from</i> statement.</p> |

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.

Release Information

Statement introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 52](#)

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

uplink-failure-detection (Junos Fusion)

IN THIS SECTION

- [Syntax | 802](#)
- [Hierarchy Level | 802](#)
- [Description | 802](#)
- [Default | 803](#)
- [Options | 803](#)
- [Required Privilege Level | 803](#)
- [Release Information | 803](#)

Syntax

```
uplink-failure-detection {  
    <candidate-uplink-policy policy-name>;  
}
```

Hierarchy Level

```
[edit chassis satellite-management]  
[edit chassis satellite-management fpc slot-id]
```

Description

Enables uplink failure detection in 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 in a Junos Fusion for a single satellite device using the **fpc slot-id** option. If uplink failure detection is enabled without specifying the **fpc slot-id** option, uplink failure detection is enabled for all cascade ports on the aggregation device.

If you enable uplink failure detection without the `candidate-uplink-policy` substatement, the default uplink failure detection settings are applied. To configure non-default uplink failure detection settings, include the `candidate-uplink-policy` substatement. Candidate uplink policies are configured under `[edit policy-options satellite-policies candidate-uplink-port-policy]`.

Default

Uplink failure detection is disabled.

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.

Release Information

Statement introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 52](#)

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

uplink-port-group (Junos Fusion)

IN THIS SECTION

- [Syntax | 804](#)
- [Hierarchy Level | 804](#)
- [Description | 804](#)
- [Default | 805](#)
- [Options | 805](#)
- [Required Privilege Level | 805](#)
- [Release Information | 805](#)

Syntax

```
uplink-port-group group-name;
```

Hierarchy Level

```
[edit policy-options satellite-policies candidate-uplink-port-profile profile-name]  
[edit policy-options satellite-policies candidate-uplink-port-profile profile-name term term-name from]
```

Description

In Junos Fusion configuration, assign an uplink port group to a candidate uplink port policy.

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.



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.

Uplink port groups are defined under [edit policy-options satellite-policies port-group-alias].

Default

Each satellite device model has a set of default uplink ports (see ["Overview of Uplink Failure Detection on a Junos Fusion" on page 778](#)). 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

group-name The name of the port group to assign.

Required Privilege Level

admin—To view this statement in the configuration.

admin-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 52](#)

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

Operational Commands for Uplink Failure Detection on Junos Fusion Provider Edge

IN THIS CHAPTER

- [show chassis satellite | 806](#)

show chassis satellite

IN THIS SECTION

- [Syntax | 806](#)
- [Description | 807](#)
- [Options | 807](#)
- [Required Privilege Level | 807](#)
- [Output Fields | 807](#)
- [Sample Output | 816](#)
- [Sample Output | 817](#)
- [Sample Output | 818](#)
- [Sample Output | 818](#)
- [Release Information | 822](#)

Syntax

```
show chassis satellite  
[device-alias device-alias | fpc-slot fpc-slot | cluster cluster-name]
```

```
[brief | detail | extensive | terse]
<since time>
```

Description

Display the status of the satellite device connections in a Junos Fusion.

Options

- none** (Same as **brief**) Display satellite device connection information

- device-alias** (Optional) Display satellite device connection information for the satellite device
device-alias using the specified device alias only.

- fpc-slot** **fpc-slot** (Optional) Display satellite device connection information for the satellite device
using the specified FPC slot number only.

- cluster** **cluster-** (Optional) Display satellite device connection information for the satellite devices in
name the specified satellite device cluster only.

- brief | detail |** (Optional) Display the specified level of output.
extensive | terse

- since** **time** (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.

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 **2015-12-22** as the *time*.

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 **2015-12-22.11:01:00** as the *time*.

Required Privilege Level

view

Output Fields

[Table 41 on page 808](#) 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
Fields for Interface		
Alias	<p>The satellite device's alias.</p> <p>The satellite device's alias is configured using the set chassis satellite-management fpc slot-id alias <i>alias</i> statement.</p>	<p>brief</p> <p>extensive</p> <p>none</p>
Slot	<p>The slot number of the satellite device.</p> <p>The slot number can be configured using the set chassis satellite-management fpc slot-id statement..</p>	<p>brief</p> <p>terse</p> <p>extensive</p> <p>none</p>

Table 41: show chassis satellite Output Fields *(Continued)*

Field Name	Field Description	Level of Output
Device State	<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"> • Online—the satellite device is online and active. This is the satellite device state during normal operating procedure. • Offline—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. • Present—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. • Rebooting—the satellite device is rebooting. • Disable—the satellite device has been disabled. • Misconfig—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. • Miswire—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 show chassis satellite detail to gather more information on the issue when the device state is Miswire. <p>Other less common device states include:</p> <ul style="list-style-type: none"> • ModeChanging—the device is converting from a standalone device to a satellite device, or from a satellite device to a standalone device. 	<p>brief</p> <p>terse</p> <p>extensive</p> <p>none</p>

Table 41: show chassis satellite Output Fields *(Continued)*

Field Name	Field Description	Level of Output
	<ul style="list-style-type: none"> • ModeChangeFail—the mode change operation failed. • MinorUpgradeOn—A minor satellite software upgrade is in progress. • MajorUpgradeOn—A major satellite software upgrade is in progress. • Upgrade-pending—the satellite device is waiting for a satellite software upgrade. • ProvSessionDn—the provisioning session is down. • ReconcileState—the satellite provisioning daemon has restarted and is reconciling the satellite device state. 	
Cascade Ports	<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</p> <p>extensive</p> <p>none</p>

Table 41: show chassis satellite Output Fields (*Continued*)

Field Name	Field Description	Level of Output
Port State	<p>The state of the cascade port on the aggregation device.</p> <p>Port states include:</p> <ul style="list-style-type: none"> • online—the cascade port is online and active. This is the port state during normal operating procedure. • txUpRxDn—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. • miswire—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 show chassis satellite detail to gather more information on the issue when the device state is Miswire. • present—The cascade port recognized the satellite device and is up. • misconfig—the cascade port is assigned, but this interface is not working correctly due to a misconfiguration. • down—the cascade port is down. • offline—the satellite device was previously recognized from this interface, but is no longer present. • absent—the cascade port is configured but no satellite device is detected on the interface. 	<p>brief</p> <p>extensive</p> <p>none</p>

Table 41: show chassis satellite Output Fields (Continued)

Field Name	Field Description	Level of Output
Extended Ports Total	<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>
Extended Ports Up	The number of active extended ports.	<p>brief</p> <p>none</p> <p>terse</p>
Model	The hardware model of the satellite device.	terse
Version	The version of satellite device software running on the satellite device.	terse
Satellite Alias	<p>The satellite device's alias.</p> <p>The satellite device's alias is configured using the set chassis satellite-management fpc slot-id alias alias statement.</p>	detail
FPC slot	<p>The FPC slot number of the satellite device.</p> <p>The slot number can be configured using the set chassis satellite-management fpc slot-id statement.</p>	detail
Operational State	<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
Product Model	The hardware model of the satellite device.	detail

Table 41: show chassis satellite Output Fields (Continued)

Field Name	Field Description	Level of Output
Product Family	The product family of the satellite device.	detail
Serial number	The serial number of the satellite device.	detail
System ID	The system ID of the satellite device. The system ID is also the satellite device's MAC address.	detail
Software package version	The satellite software version running on the satellite device.	detail
Host software version	The host operating system software version running on the satellite device.	detail
Management Address	<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
UFD config state	Uplink failure detection configuration state.	detail
Minimum link	Uplink failure detection minimum active uplink port setting.	detail

Table 41: show chassis satellite Output Fields (Continued)

Field Name	Field Description	Level of Output
Holdddown timer (seconds)	Uplink failure detection holdddown timer setting, in seconds.	detail
UFD operational state	Uplink failure detection operational state.	detail
Candidate uplink interfaces (pic/port)	Uplink failure detection candidate uplink interfaces.	detail
Extended Ports	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
When	The date and time of the event.	extensive
Event	The event.	extensive
Action	The actions that resulted from the event.	extensive

Fields for Cascade interfaces

Interface Name	The name of the cascade interface on the aggregation device.	detail
State	The state of the cascade interface.	detail

Table 41: show chassis satellite Output Fields (Continued)

Field Name	Field Description	Level of Output
Uplink Interface	The name of the uplink interface on the satellite device.	detail
Adjacency state	The adjacency state of the cascade to uplink interface link.	detail
Last transition	The amount of time that has passed since the last transition of the cascade to uplink interface link.	detail
Adjacency down count (Interface Name)	The number of times the cascade to uplink interface link has gone into the down state.	detail
RX Packet	The number of packets received on the cascade interface.	detail
Last received packet	The amount of time that has passed since the last packet was received on the cascade interface.	detail
Peer adjacency information	The amount of time that has passed since the last peer adjacency transition.	detail
Adjacency down count (Peer adjacency information)	The number of times the cascade to uplink interface link has gone into the down state.	detail
Last down cause	The cause of the last adjacency failure.	detail

Table 41: show chassis satellite Output Fields (Continued)

Field Name	Field Description	Level of Output
SDPD restart detected	The number of times that the satellite device protocol process has restarted.	detail

Fields for Process information

Process Name	The name of the process.	detail
PID	The process identification number of the process.	detail
State	The current state of the process.	detail
Number of restart detected	The number of times the process has restarted.	detail
Uptime	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 xe-0/3/0	online online	9/2
qfx5100-24q-02	101	Online	xe-0/0/2 xe-0/3/1	online online	20/12
qfx5100-24q-03	102	Online	xe-0/0/3 xe-0/3/2	online online	16/6
qfx5100-24q-04	103	Online	xe-0/0/4 xe-0/3/3	online online	16/4
qfx5100-24q-05	104	Online	xe-0/0/5	online	13/3

qfx5100-24q-06	105	Online	xe-0/3/4	online	
			xe-0/0/6	online	24/15
			xe-0/3/5	online	
qfx5100-24q-07	106	Online	xe-0/0/7	online	24/15
			xe-0/3/6	online	
qfx5100-24q-08	107	Online	xe-0/0/8	online	21/12
			xe-0/3/7	online	
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
```

		Device	Cascade	Port	Extended Ports
Alias	Slot	State	Ports	State	Total/Up
ex4300-22	101	Online	xe-0/0/2	online	20/12
			xe-0/3/1	online	

Sample Output

show chassis satellite terse

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

		Device	Extended Ports	
Slot	State	Model	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,
Holddown 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>

```


Release Information

Command introduced in Junos OS Release 14.2R3.

RELATED DOCUMENTATION

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

[Configuring Junos Fusion Provider Edge](#) | 52

Multicast Replication on Junos Fusion Provider Edge

IN THIS CHAPTER

- [Understanding Multicast Replication in a Junos Fusion | 823](#)
- [Ingress Replication at the Aggregation Device to Satellite Devices | 827](#)
- [Egress \(Local\) Replication on the Satellite Devices | 829](#)
- [Configuring Egress \(Local\) Replication on a Junos Fusion | 834](#)

Understanding Multicast Replication in a Junos Fusion

IN THIS SECTION

- [Junos Fusion Multicast Replication Overview | 823](#)
- [ECIDs for Multicast Traffic | 825](#)
- [Multicast Replication Limitations in a Junos Fusion | 826](#)

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

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. The satellite device load-balances forwarded source traffic over the available uplink ports to the aggregation device.

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.

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 825](#).) 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 827](#) 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. 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 825](#).) 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 829](#) 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*), 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.

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
16.1	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.

RELATED DOCUMENTATION

| [Ingress Replication at the Aggregation Device to Satellite Devices](#) | 827

[Egress \(Local\) Replication on the Satellite Devices | 829](#)

[Configuring Egress \(Local\) Replication on a Junos Fusion | 834](#)

Understanding the Flow of Data Packets in a Junos Fusion Topology

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.

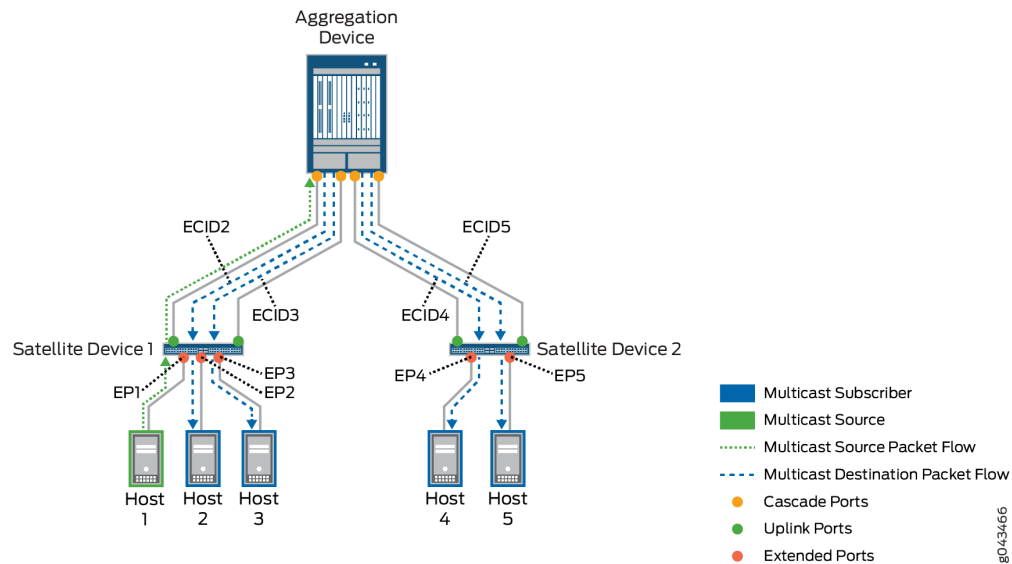
In ingress replication mode, the ingress aggregation device replicates the multicast packets and forwards them to every destination extended port. The data packet flow is similar to unicast data packet flow from the multicast source to each destination.

[Figure 12 on page 828](#) 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.

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 829 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](#) | 823

[Egress \(Local\) Replication on the Satellite Devices](#) | 829

Understanding the Flow of Data Packets in a Junos Fusion Topology

Egress (Local) Replication on the Satellite Devices

IN THIS SECTION

- [Local Replication for Layer 2 Multicast Traffic with IGMP Snooping](#) | 830
- [Local Replication for VLAN Flooding](#) | 831
- [Local Replication for Layer 3 Multicast Traffic Over IRB Interfaces](#) | 832

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.

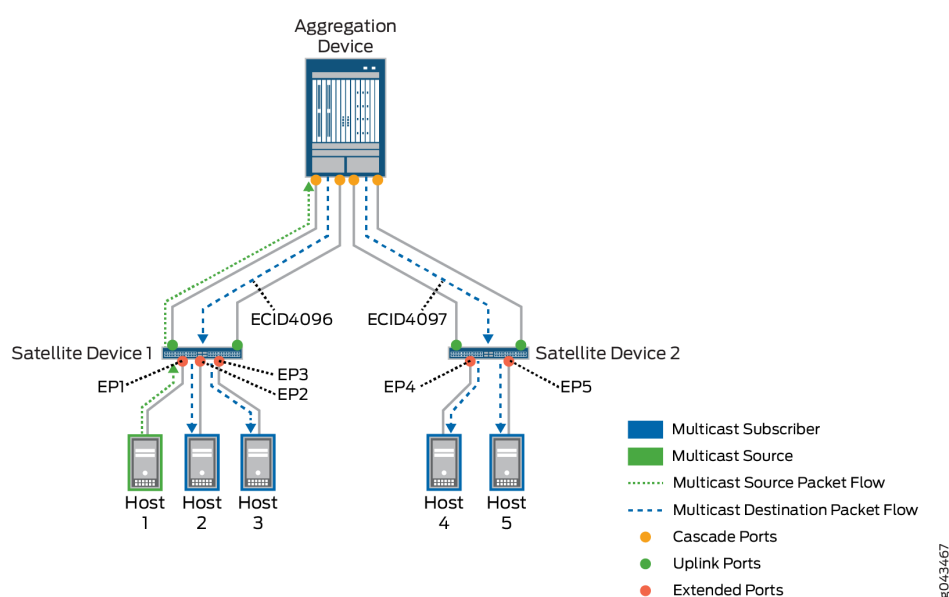
Local replication is performed at Layer 2. Each receiving satellite device maintains tables that map the assigned ECIDs to corresponding destination extended ports, and simply forward outgoing multicast or broadcast packets to local extended ports. For Layer 3 multicast traffic, such as when forwarding 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

Figure 13 on page 830 illustrates Layer 2 multicast traffic flow with IGMP snooping when local replication is enabled.

Figure 13: 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.

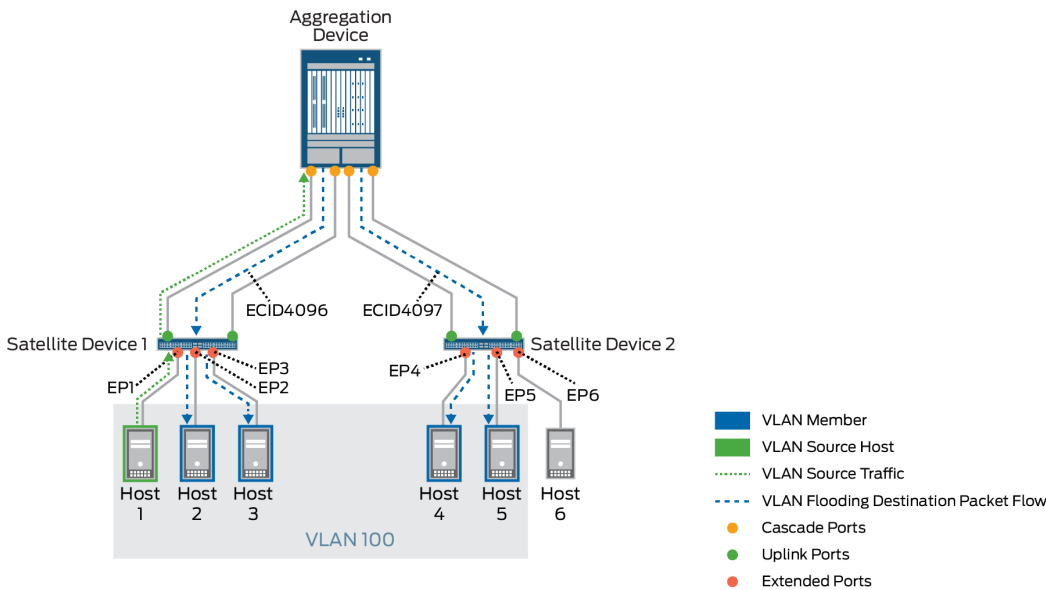
Other multicast destinations might be reached through ports on the aggregation devices, rather than through extended ports. For these destinations, the aggregation device creates and sends copies to those local ports directly.

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 14 on page 831 illustrates the packet flow for VLAN flooding when local replication is enabled.

Figure 14: 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.

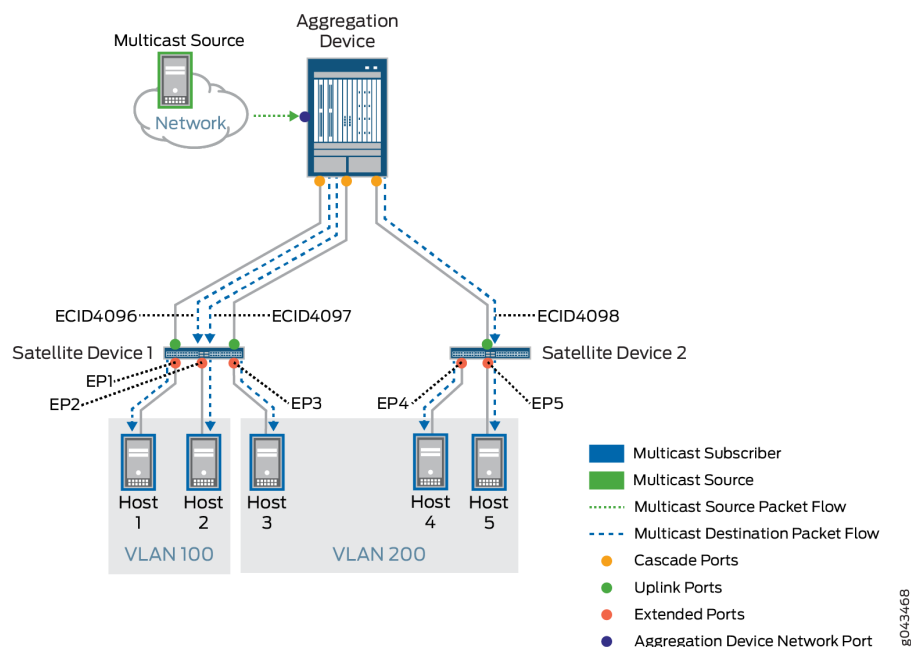
Local Replication for Layer 3 Multicast Traffic Over IRB Interfaces

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 15 on page 833 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 15: 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.

RELATED DOCUMENTATION

[Understanding Multicast Replication in a Junos Fusion | 823](#)

[Ingress Replication at the Aggregation Device to Satellite Devices | 827](#)

[Configuring Egress \(Local\) Replication on a Junos Fusion | 834](#)

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 823 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.

RELATED DOCUMENTATION

[Ingress Replication at the Aggregation Device to Satellite Devices | 827](#)

[Egress \(Local\) Replication on the Satellite Devices | 829](#)

Configuration Statements and Operational Commands for Multicast Support

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local-replication

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Syntax

```
local-replication
```

Hierarchy Level

```
[edit forwarding-options satellite]
```

Description

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.

Required Privilege Level

routing—To view this statement in the configuration.

routing-control—To add this statement to the configuration.

Release Information

Statement introduced in Junos OS Release 16.1.

RELATED DOCUMENTATION

| [Configuring Egress \(Local\) Replication on a Junos Fusion](#) | 834

show bridge flood nexthops satellite

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- [Release Information | 841](#)

Syntax

```
show bridge flood nexthops satellite
<brief | detail | extensive>
<nexthop-id nexthop-id>
```

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

Output Fields

Table 42 on page 839 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
Composite function	Purpose of a composite next-hop entry. Values include: <ul style="list-style-type: none"> • FLOOD_ALL—Flood next hop. • FLOOD_ALL_SPLIT_HZ—Flood next hop including split-horizon information. 	All
Table	Name of next-hop routing or forwarding table for the listed entry.	All
Flags	Flags giving additional information about a next-hop entry. Values include: <ul style="list-style-type: none"> • 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, <i>sd-fpc-id/0/0</i>, and the associated ECID shown in the label field. • ST—The entry is stale and waiting to be refreshed. • RU—The entry is stale, but is marked to be reused. 	All

Table 42: show bridge flood next-hops satellite Command Output Fields (Continued)

Field Name	Field Description	Level of Output
aggregation-device	Next-hop IDs and corresponding interfaces to reach local flood destination ports on the aggregation device.	detail extensive
satellite-device-id <i>id</i>	<p>Satellite device ID with the next-hop IDs and interface names to reach extended ports that are flood destinations on the listed satellite device.</p> <p>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 (<i>sd-fpc-id/0/0</i>), and the allocated ECID (<i>label</i> field).</p>	detail extensive
label	ECID associated with a group of flood destination extended ports on the satellite device specified in the <i>satellite-device-id</i> field.	detail extensive
When	Elapsed time since an event related to a flood next-hop entry change.	extensive
Event	Brief description of the event related to a flood next-hop entry change.	extensive
Action	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   Composite      Table          Flags
ID         function
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
```

command-name

Release Information

Command introduced in Junos OS Release 16.1.

RELATED DOCUMENTATION

[Understanding Multicast Replication in a Junos Fusion](#) | 823

[Egress \(Local\) Replication on the Satellite Devices](#) | 829

show bridge flood satellite

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Syntax

```
show bridge flood satellite
<brief | detail | extensive>
<bridge-domain-name bridge-domain-name>
<vswitch-name vswitch-name>
```

Description

Display bridge flood routing information for the satellite devices in Junos Fusion Provider Edge.

This command lists flood routes by route prefix for each bridge domain. Each flood route prefix entry lists the ingress replication next-hop ID (NhIndex). When egress (local) replication is enabled and the bridge domain has multiple destination extended ports on a satellite device, the aggregation device:

- Creates a satellite device next-hop chain to reach those destinations through their corresponding satellite devices.
- Updates the flood route entry with a satellite next-hop chain ID (Satellite-Nh).

When a flood route does not have a satellite next-hop chain, the value 0 is displayed in the Satellite-Nh column. When the Satellite-Nh value is non-zero, the aggregation device uses the satellite next-hop chain instead of the original ingress replication next-hop (NhIndex). You can see satellite device flood next-hop chain details, including the ECIDs assigned to satellite device flood destination extended ports, using the detail option and the bridge-domain-name option for a specific bridge domain.

Options

brief detail extensive	(Optional) Display the specified level of output.
bridge-domain-name <i>bridge-domain-name</i>	Display bridge flooding information for the specified bridge domain.
vswitch-name <i>vswitch-name</i>	Display bridge flood information for the specified virtual satellite device.

Required Privilege Level

view

Output Fields

Table 43 on page 843 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
Bridging domain	Bridge domain name.	All
Flood Routes	Flood route information listed by route prefix.	All
Prefix	Flood route prefix.	All
Token	Internal ID for flood route prefix.	All
NhIndex	The ingress replication next-hop for the flood route.	All
Satellite-Nh	Satellite device next-hop ID when local replication is enabled and there are multiple flood destination extended ports.	All
Next-hop information	Details for each next hop, listed by next-hop or satellite next-hop iID.	detail extensive
aggregation-device	Next-hop interfaces for ports that are flood destinations on the aggregation device, listed by next-hop ID.	detail extensive

Table 43: show bridge flood satellite Command Output Fields (Continued)

Field Name	Field Description	Level of Output
satellite-device-id <i>id</i>	Next-hop interfaces for extended ports that are flood destinations on satellite devices, listed by satellite next-hop ID.	detail extensive
label	ECID assigned to a satellite device interface.	detail extensive
When	Elapsed time since an event related to a flood route entry change.	extensive
Event	Brief description of the event related to a flood route entry change.	extensive
Action	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

```

Release Information

Command introduced in Junos OS Release 16.1.

RELATED DOCUMENTATION

[Understanding Multicast Replication in a Junos Fusion | 823](#)

[Egress \(Local\) Replication on the Satellite Devices | 829](#)

show bridge satellite device

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Syntax

```
show bridge satellite device  
<brief | detail>  
< device-id device-id>
```

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

Output Fields

Table 44 on page 847 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
Device ID Device (detail view)	Satellite device ID.	All
Interface Index Device Interface Index (detail view)	Internal ID for the satellite device virtual interface.	All
Interface Name Device Interface Name (detail view)	Satellite device virtual interface name (<i>sd-fpc-id/0/0</i> , where <i>fpc-id</i> is the satellite device ID).	All
State Device Interface State (detail view)	State of the satellite device virtual interface. If the interface is created and active, possible values include Up or Down.	All

Table 44: show bridge satellite device Command Output Fields (Continued)

Field Name	Field Description	Level of Output
Connection State Device connection Status (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 Up or Down.	All
Requests	Number of request messages sent to the listed satellite device aggregation device to allocate or update ECID mappings.	All
Responses	Number of response messages returned from the listed satellite device to the aggregation device for granting ECID requests.	All
Device connection uptime	Duration of the connection between the aggregation device and the specified satellite device.	detail
Device heartbeat status	Status of keep-alive message exchange between satellite device and aggregation device control processes.	detail
Echo packets sent	Number of keep-alive packets sent to the satellite device from the aggregation device.	detail
Echo packets received	Number of keep-alive response packets sent to the aggregation device from the satellite device.	detail
Multicast IPC stats	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

Table 44: show bridge satellite device Command Output Fields (Continued)

Field Name	Field Description	Level of Output
Bridge IPC stats	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	Interface	Interface	Connection			
ID	index	Name	State	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

Release Information

Command introduced in Junos OS Release 16.1.

RELATED DOCUMENTATION

| [Understanding Multicast Replication in a Junos Fusion](#) | 823

show multicast ecid-mapping satellite

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Syntax

```
show multicast ecid-mapping satellite  
  <brief | detail | extensive>  
  <device-id device-id>  
  <ecid ecid>  
  <reference-id reference-id>
```

Description

Displays entries in the satellite multicast ECID mapping database.

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.

Options

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

device-id *device-ID* Display information from the ECID database for a specified satellite device ID.

- `ecid` *ecid*

Display information from the ECID database for a specified ECID.
- `reference-id` *reference ID*

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).

Required Privilege Level

view

Output Fields

[Table 45 on page 851](#) lists the output fields for the `show multicast ecid-mapping satellite` command. Output fields are listed in the approximate order in which they appear.

Table 45: show multicast ecid-mapping satellite Command Output Fields

Field Name	Field Description	Level of Output
Satellite Device ID	Satellite device ID.	All
ECID	ECID assigned to a grouping of extended ports on the satellite device. Satellite devices have multiple ECIDs assigned that represent different groups of extended ports.	All

Table 45: show multicast ecid-mapping satellite Command Output Fields (Continued)

Field Name	Field Description	Level of Output
State	<p>Status of requesting and allocating the ECID. Values include:</p> <ul style="list-style-type: none"> • Init—An ECID mapping entry for a group of ports has been created. • Request Scheduled—An ECID mapping entry has been queued for an ECID value request. • Request Sent—The ECID request has been sent to the corresponding satellite device. • Response Received—An ECID value has been received from the satellite device. • Sync—An ECID mapping with an ECID value is to be synchronized with a satellite device. • Ready—An ECID next hop has been created and is ready to be referenced for forwarding. 	All
Flags	Internal flag values for troubleshooting.	All
nhid	Satellite device next-hop ID associated with the ECID.	All
Reference ID	Internal reference ID assigned to an ECID request message, used for troubleshooting ECID communication with satellite devices.	All (with specified device-id or ecid)

Sample Output

show multicast ecid-mapping satellite

```

user@host> show multicast ecid-mapping satellite
Satellite  ECID      State                Flags
Device ID
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	ECID	State	Reference ID
Device ID			
100	4101	Ready [nhid=1845]	14

Release Information

Command introduced in Junos OS Release 16.1.

RELATED DOCUMENTATION

- [Understanding Multicast Replication in a Junos Fusion | 823](#)
- [Egress \(Local\) Replication on the Satellite Devices | 829](#)

show multicast next-hops satellite

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Syntax

```
show multicast next-hops satellite
```

Description

Display satellite multicast next-hop table information.

The output lists next-hops for all interfaces in the VPLS address family used in multicast replication.

Options

brief | detail (Optional) Output level is the same when either option or no option is specified.

Required Privilege Level

view

Output Fields

[Table 46 on page 855](#) lists the output fields for the `show multicast next-hops 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 46: show multicast next-hops satellite Command Output Fields

Field Name	Field Description	Level of Output
Next-hop ID	Next-hop ID in the database.	All
Interface Index	Internal ID for a satellite device virtual interface.	All

Table 46: show multicast next-hops satellite Command Output Fields (Continued)

Field Name	Field Description	Level of Output
Interface Name	<p>Interface name for configured interfaces in the Junos Fusion.</p> <p>A satellite device virtual interface named <i>sd-fpc-id/0/0</i> is used to send traffic to extended ports on satellite device <i>fpc-id</i>.</p>	All
Label	<p>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.</p> <p>Satellite device interfaces might have multiple ECIDs listed that represent different groups of multicast destination extended ports on that satellite device.</p>	All
Flags	<p>Flags giving additional information about a next-hop entry. Values include:</p> <ul style="list-style-type: none"> • 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, <i>sd-fpc-id/0/0</i>, and the associated ECID shown in the Label field. 	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	lc-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	

Release Information

Command introduced in Junos OS Release 16.1.

RELATED DOCUMENTATION

[Understanding Multicast Replication in a Junos Fusion](#) | 823

[show multicast snooping next-hops satellite](#) | 858

show multicast snooping next-hops satellite

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Syntax

```
show multicast snooping next-hops satellite  
<brief | detail | extensive>  
<nexthop-id nexthop-id>
```

Description

Display detailed multicast next-hop information for satellite device destinations.

You can use this command to:

- View the current list of all multicast traffic next hops.
- See details about a specified multicast next hop.
- Follow aggregation device composite next-hop processing as the aggregation device resolves and updates multicast 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 multicast 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 multicast satellite next-hop information only for the specified next-hop ID.

Required Privilege Level

view

Output Fields

[Table 47 on page 859](#) 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
Next-hop ID	Multicast next-hop ID (original multicast next hop used with ingress multicast replication).	All
Forwarding Next-Hop Type	Type of next-hop entry. Values include: <ul style="list-style-type: none"> COMPOSITE—Composite next hop. 	All
Table	Name of routing or forwarding table for the listed entry.	All

Table 47: show multicast snooping next-hops satellite Command Output Fields (Continued)

Field Name	Field Description	Level of Output
Flags	<p>Flags giving additional information about a next-hop entry. Values include:</p> <ul style="list-style-type: none"> • 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, <code>sd-fpc/0/0</code>, and the associated ECID shown in the <code>label</code> field. • ST—The entry is stale and waiting to be refreshed. • RU—The entry is stale, but is marked to be reused. 	All
Mrouter	Next-hop list for multicast routers connected to the bridge domain or VLAN.	detail extensive
aggregation-device	Next-hop IDs and corresponding interfaces for the composite next hop to reach local multicast destination ports on the aggregation device.	detail extensive
satellite-device-id <i>id</i>	<p>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.</p> <p>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 (<code>sd-fpc-id/0/0</code>), and the allocated ECID (<code>label</code> field).</p>	detail extensive
AE	Link aggregation group interface next-hop IDs and interface names for multicast destination composite next hops.	detail extensive

Table 47: show multicast snooping next-hops satellite Command Output Fields (Continued)

Field Name	Field Description	Level of Output
label	ECID associated with one or more multicast destination extended ports on the satellite device in the satellite-device-id field.	detail extensive
Linked Next-hop	Multicast satellite next-hop ID (next hop used with egress multicast replication).	detail extensive
When	Elapsed time since an event related to a multicast next-hop entry change.	extensive
Event	Brief description of the event related to a multicast next-hop entry change.	extensive
Action	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      Forwarding      Table            Flags
ID            Next-Hop
              Type
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 (extensive view for a specified next-hop ID)

```

user@host> show multicast snooping next-hops satellite nexthop-id 1048576 extensive
Next-hop      Forwarding      Table            Flags
ID            Next-Hop
              Type
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
sd-100/0/0.32770 ECID:4105 [nhid=627]
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]:

```

Release Information

Command introduced in Junos OS Release 16.1.

RELATED DOCUMENTATION

[Understanding Multicast Replication in a Junos Fusion | 823](#)

[Egress \(Local\) Replication on the Satellite Devices | 829](#)

[show multicast snooping route satellite | 864](#)

show multicast snooping route satellite

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- [Required Privilege Level | 865](#)
- [Output Fields | 865](#)
- [Sample Output | 867](#)
- [Release Information | 870](#)

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>
```

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). 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 <i>bridge-domain-name</i>	(Junos Fusion Provider Edge only) Filter output to display bridge domain flooding information only for the specified bridge domain name.
group <i>group-address</i>	Filter output to display flooding information only for the specified multicast group.
source <i>source-address</i>	Filter output to display flooding information only for the specified multicast source.
vswitch-name <i>virtual-switch-name</i>	Filter output to display flooding information only for the specified Layer 2 virtual switch.

Required Privilege Level

view

Output Fields

[Table 48 on page 865](#) 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
Route	Multicast route information listed by route prefix under this heading.	All

Table 48: show multicast snooping route satellite Command Output Fields (Continued)

Field Name	Field Description	Level of Output
(S, G/m)	Multicast entry state.	All
Bridge Domain	Bridge domain or VLAN name.	All
NH Index	Multicast next-hop ID (original multicast next hop used with ingress multicast replication).	brief
Linked NH Index	Multicast satellite next-hop ID (next hop used with egress multicast replication).	brief
Next-hop information	Detailed list of next-hop chain information for the original and satellite next-hop chains, listed by original next-hop index (NH Index) and satellite next-hop chain index (Linked NH Index) output field values.	detail extensive
Mrouter	Next-hop chain list for multicast routers connected to the bridge domain or VLAN.	detail extensive
aggregation-device	Next-hop IDs and corresponding interfaces for the composite next hop to reach local multicast destination ports on the aggregation device.	detail extensive
satellite-device-id <i>id</i>	<p>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.</p> <p>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 (<i>sd-fpc-id/0/0</i>), and the allocated ECID (label field).</p>	detail extensive

Table 48: show multicast snooping route satellite Command Output Fields (Continued)

Field Name	Field Description	Level of Output
AE	Link aggregation group interface next-hop IDs and interface names multicast destination composite next hops.	detail extensive
label	ECID associated with one or more multicast destination extended ports on the satellite device in the satellite-device-id field.	
When	Elapsed time since an event related to a multicast next-hop entry addition or update.	extensive
Event	Brief description of the event related to a multicast next-hop entry addition or update.	extensive
Action	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: 00.04.00.01.00.00.233.252.0.1.0.0.0.00.00/80
(S, G/m): (*, 233.252.0.1/32)
  Bridge Domain:   bd100
  NH Index:        1048585
  Linked NH Index: 1048621

```

show multicast snooping route satellite 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

```

Release Information

Command introduced in Junos OS Release 16.1.

RELATED DOCUMENTATION

[Understanding Multicast Replication in a Junos Fusion | 823](#)

[Egress \(Local\) Replication on the Satellite Devices | 829](#)

[show multicast snooping next-hops satellite | 858](#)

show multicast statistics satellite

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Syntax

```
show multicast statistics satellite  
<brief | detail >
```

Description

Display statistics about multicast satellite routing tables and ECID management.

Options

brief | detail (Optional) Display the specified level of output. The default output level is brief.

Required Privilege Level

view

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

```

Release Information

Command introduced in Junos OS Release 16.1.

RELATED DOCUMENTATION

[Understanding Multicast Replication in a Junos Fusion](#) | 823

show multicast summary satellite

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Syntax

```
show multicast summary satellite
```

Description

Display summary status of multicast replication features in a Junos Fusion.

This command displays whether or not egress multicast replication (also called local replication) is enabled. When local replication is configured, this command displays `Egress replication: Enabled`, and `Egress replication: Disabled` otherwise.

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 `Restart phase` output field value indicates the phase where the restart process stalled or failed, or displays a `Complete` message if the restart process completed successfully.

Options

This command has no options.

Required Privilege Level

view

Sample Output

show multicast summary satellite

```
user@host>show multicast summary satellite
Multicast:
  Restart phase:      Complete (11/11)
  Egress replication: Enabled
```

Release Information

Command introduced in Junos OS Release 16.1.

RELATED DOCUMENTATION

[Understanding Multicast Replication in a Junos Fusion](#) | 823

[Configuring Egress \(Local\) Replication on a Junos Fusion](#) | 834

[show multicast statistics satellite](#) | 870

Class of Service on Junos Fusion Provider Edge

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- [Understanding CoS on an MX Series Aggregation Device in Junos Fusion Provider Edge | 874](#)
- [Configuring CoS on an MX Series Aggregation Device in Junos Fusion | 882](#)

Understanding CoS on an MX Series Aggregation Device in Junos Fusion Provider Edge

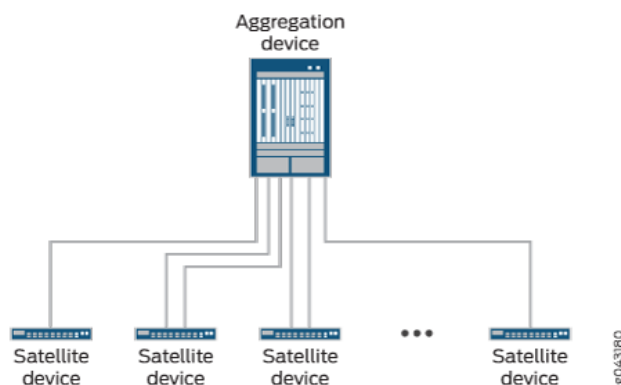
IN THIS SECTION

- [Overview of CoS on Different Types of Ports in Junos Fusion | 876](#)
- [CoS on Extended Ports and Uplink Ports in Junos Fusion | 877](#)
- [Per-unit and Hierarchical Scheduling on Extended Ports | 878](#)
- [Broadband Subscriber Services Support | 879](#)
- [CoS Hierarchical Port Scheduling with Enhanced Transmission Selection in Junos Fusion | 880](#)
- [CoS on Cascade Ports in Junos Fusion | 881](#)

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 16 on page 875](#) for an illustration of the Junos Fusion topology.

Figure 16: 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.

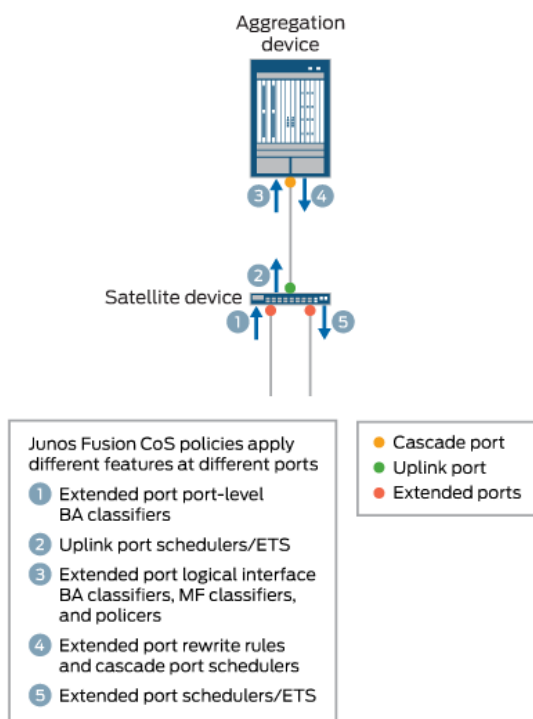
This topic describes class of service (CoS) on the different types of ports in Junos Fusion.

This topic covers:

Overview of CoS on Different Types of Ports in Junos Fusion

Figure 17 on page 876 provides an overview of packet flow through Junos Fusion and how CoS features are applied at the different ports.

Figure 17: 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 17 on page 876:

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/           Shaping    Guaranteed    Guaranteed/    Queue
Excess
Resource name        rate      rate          Excess
weight      weight
                    kbits      kbits
priority        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.

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.

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 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.
17.2R1	Beginning with Junos OS 17.2R1, Junos Fusion Provider Edge supports per-unit and hierarchical schedulers on extended ports.

RELATED DOCUMENTATION

- [Broadband Subscription Services on Junos Fusion | 49](#)
- [CoS for Subscriber Access Overview](#)
- [Understanding CoS Hierarchical Port Scheduling \(ETS\)](#)
- [CoS on Virtual Chassis Fabric \(VCF\) EX4300 Leaf Devices \(Mixed Mode\)](#)
- [Junos Fusion Provider Edge Overview | 3](#)
- [Understanding Junos Fusion Provider Edge Components | 5](#)
- [Configuring CoS on an MX Series Aggregation Device in Junos Fusion | 882](#)

Configuring CoS on an MX Series Aggregation Device in Junos Fusion

IN THIS SECTION

- [Configuring Behavior Aggregate Classifiers on Satellite Device Extended Ports | 882](#)
- [Configuring Rewrite Rules on Satellite Device Extended Ports | 884](#)
- [Configuring CoS Hierarchical Port Scheduling with Enhanced Transmission Selection on Satellite Device Ports | 885](#)
- [Changing the Default Scheduling Policy on an Aggregated Device Cascade Port | 889](#)

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

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 | 16](#)

[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 | 16](#)

[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;
            }
        }
    }
}
}

```

5. 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/ Resource name	Shaping rate kbits	Guaranteed rate kbits	Guaranteed/ Excess priority	Queue weight	Excess weight high/low
xe-0/0/1.32770	10000000	0			1 1
BE	10000000	0	Low Low	118	
NC	10000000	0	Low Low	6	
xe-0/0/1.32769	10000000	50000			62 62
BE	10000000	47500	Low Low	118	
NC	10000000	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/
Resource name      Shaping Guaranteed  Guaranteed/  Queue  Excess
                   rate    rate    Excess    weight weight
                   kbits   kbits   priority
xe-0/0/1.32770     10000000  0      Low  Low    12    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   Low  Low    118   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](#) | 874