

# Junos Fusion Provider Edge User Guide

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*Junos Fusion Provider Edge User Guide*

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# Table of Contents

## About the Documentation | xiii

Documentation and Release Notes | xiii

Using the Examples in This Manual | xiii

Merging a Full Example | xiv

Merging a Snippet | xv

Documentation Conventions | xv

Documentation Feedback | xviii

Requesting Technical Support | xviii

Self-Help Online Tools and Resources | xix

Creating a Service Request with JTAC | xix

## 1

## Junos Fusion Provider Edge

### Junos Fusion Provider Edge Overview | 3

Junos Fusion Provider Edge Overview | 3

Understanding Junos Fusion Provider Edge Components | 5

Junos Fusion Topology | 5

Aggregation Devices | 6

Satellite Devices | 6

Cascade Ports | 7

Uplink Ports | 8

Extended Ports | 8

Understanding FPC Identifiers and Assignment in a Junos Fusion Fabric | 8

Understanding Software in a Junos Fusion | 9

Understanding Interface Naming in a Junos Fusion | 9

Understanding Satellite Device Clustering in a Junos Fusion | 10

Satellite Device Clustering Overview | 11

Satellite Device Cluster Topology | 11

Satellite Device Cluster Names and Identifiers | 11

Satellite Device Cluster Uplink Interfaces | 12

Cluster Interfaces | 12

Satellite Device Cluster Software Management | 12

FPC Identifiers and Extended Port Interfaces in a Satellite Device Cluster	13
Understanding 40-Gbps Interfaces with QSFP+ Transceiver Roles for Satellite Devices in a Satellite Device Cluster	13
Understanding Junos Fusion Ports	14
Understanding Cascade Ports	16
Understanding Uplink Ports	16
Understanding Extended Ports	17
Understanding Port-Based Authentication in a Junos Fusion Provider Edge	18
Understanding Software in a Junos Fusion Provider Edge	19
Understanding Junos OS for the Aggregation Device in a Junos Fusion	19
Understanding Satellite Software for the Satellite Devices in a Junos Fusion	19
Understanding the Preboot eXecution Environment (PXE) Junos OS Software Package for QFX5100 Switches in a Junos Fusion	20
Understanding Minimum Software Requirements for a Junos Fusion	21
Understanding Satellite Software Upgrade Groups	21
Understanding Junos Fusion Provider Edge Software and Hardware Requirements	22
Aggregation Devices	22
Aggregation Device Hardware Models	22
Support for Junos Node Slicing	23
Maximum Number of Aggregation Devices	24
Cascade Ports	24
Satellite Devices	26
Satellite Device Hardware Models	26
Power over Ethernet Requirements for a Satellite Device	27
Maximum Number of Satellite Devices	27
Understanding the Flow of Data Packets in a Junos Fusion Topology	28
Understanding Satellite Policies in a Junos Fusion	32
Satellite Policies Overview	32
Understanding Environment Monitoring Satellite Policies	32
Junos Fusion Provider Edge Supported Protocols	33
Layer 3 Protocols Supported on Junos Fusion Provider Edge	33
BFD Support on Junos Fusion Provider Edge	34
BGP Support on Junos Fusion Provider Edge	34
IS-IS Support on Junos Fusion Provider Edge	35
OSPF Support on Junos Fusion Provider Edge	35

LACP Support on Junos Fusion Provider Edge | 35

Multicast Protocols Supported on Junos Fusion Provider Edge | 35

PIM on Junos Fusion Provider Edge | 35

IGMP on Junos Fusion Provider Edge | 35

MLD on Junos Fusion Provider Edge | 36

VPN Protocols Supported on Junos Fusion Provider Edge | 36

Layer 2 Circuits on Junos Fusion Provider Edge | 36

Layer 2 VPNs on Junos Fusion Provider Edge | 36

Layer 3 VPNs on Junos Fusion Provider Edge | 36

VPLS on Junos Fusion Provider Edge | 37

EVPN with VXLAN | 37

Local Switching on Junos Fusion Provider Edge | 37

Selective VLAN Local Switching | 38

Policer | 38

Example: Configuring Selective VLAN Local Switching | 39

Broadband Subscription Services on Junos Fusion | 41

Benefits of Broadband Subscription on Junos Fusion | 42

## **Junos Fusion Provider Edge Configuration | 44**

Configuring Junos Fusion Provider Edge | 44

Preparing the Aggregation Device | 45

Configuring the Cascade Ports on the Aggregation Device | 46

Configuring the FPC Slot Identifiers | 47

Configuring Software Upgrade Groups on the Aggregation Device | 49

Preparing the Satellite Device | 50

Adding Satellite Devices to the Junos Fusion Provider Edge | 51

Autoconverting a Switch into a Satellite Device | 52

Manually Converting a Switch into a Satellite Device | 55

Configuring a Switch into a Satellite Device Before Interconnecting It into a Junos Fusion Provider Edge | 57

Configuring Satellite Device Alarm Handling Using an Environment Monitoring Satellite Policy in a Junos Fusion | 59

## **Junos Fusion Provider Edge Configuration Statements | 62**

- aging-timer (Junos Fusion) | 63
- alarm (Satellite Policies) | 64
- alias (Junos Fusion) | 65
- auto-satellite-conversion (Junos Fusion) | 66
- cascade-port | 67
- cascade-ports | 68
- description (Junos Fusion) | 70
- environment-monitoring-policy (satellite-management) | 71
- environment-monitoring-policy (satellite-policies) | 73
- fpc (Junos Fusion) | 75
- linkdown (satellite-policies alarm) | 77
- network-services | 78
- satellite (Junos Fusion Automatic Satellite Conversion) | 80
- satellite (Junos Fusion Satellite Software Upgrade Groups) | 82
- satellite-management (Junos Fusion) | 83
- serial-number (Junos Fusion) | 86
- selective-vlan-switching | 87
- single-home (Junos Fusion) | 88
- system-id (Junos Fusion) | 89
- term (satellite-policies) | 91
- upgrade-groups (Junos Fusion) | 93

## **Junos Fusion Provider Edge Administration | 95**

### **Managing Satellite Software Upgrade Groups in a Junos Fusion | 95**

- Creating a Satellite Software Upgrade Group | 96
- Adding Satellite Devices to a Satellite Software Upgrade Group | 96
- Removing a Satellite Device from a Satellite Software Upgrade Group | 97
- Modifying the Satellite Software Used by a Satellite Software Upgrade Group | 98
- Deleting Associated Satellite Software from a Satellite Software Upgrade Group | 99

Deleting Satellite Software on the Aggregation Device | 99

Verifying Connectivity, Device States, Satellite Software Versions, and Operations in a Junos Fusion | 100

Verifying a Junos Fusion Configuration | 101

Verifying Basic Junos Fusion Connectivity | 101

Verifying the Satellite Device Hardware Model | 103

Verifying Cascade Port and Uplink Port State | 104

Verifying That a Cascade Port Recognizes a Satellite Device | 107

Verifying Extended Port Operation | 110

Verifying the Satellite Software Version | 112

Verifying the Devices and Software Used in a Satellite Software Upgrade Group | 113

Converting a Satellite Device in a Junos Fusion to a Standalone Device | 114

Download Junos OS Software | 115

Disable the Automatic Conversion Configuration | 116

Install Junos OS Software on the Satellite Device | 118

Installing Junos OS Software on a Standalone Device Running Satellite Software | 119

**Junos Fusion Provider Edge Operational Commands | 122**

request chassis device-mode satellite | 124

request chassis satellite disable | 125

request chassis satellite enable | 127

request chassis satellite file-copy | 129

request chassis satellite install | 131

request chassis satellite interface | 134

request chassis satellite login | 136

request chassis satellite reboot | 137

request chassis satellite restart | 139

request chassis satellite shell-command | 140

request system software add | 141

request system software delete | 164

request system software rollback | 169

request system storage cleanup | 175

show chassis alarms | 195

show chassis environment | 219

show chassis environment fpc | 332

show chassis environment pem | 412

show chassis environment routing-engine | 432

show chassis firmware | 442

show chassis fan | 462

show chassis hardware | 479

show chassis led satellite | 496

show chassis routing-engine | 501

show chassis satellite | 530

show chassis satellite extended-port | 544

show chassis satellite interface | 549

show chassis satellite neighbor | 556

show chassis satellite software | 562

show chassis satellite statistics | 565

show chassis satellite unprovision | 572

show chassis satellite upgrade-group | 578

show chassis temperature-thresholds | 582

show interfaces extensive satellite-device | 617

show interfaces satellite-device | 641

show interfaces statistics | 647

show interfaces terse satellite-device | 664

show system core-dumps | 668

show system storage satellite | 686

## **Power over Ethernet, LLDP, and LLDP-MED on a Junos Fusion Provider Edge | 689**

Understanding Power over Ethernet in a Junos Fusion | 689

Power over Ethernet in a Junos Fusion Overview | 690

Understanding the Role of the Aggregation Devices for PoE Support in a Junos Fusion | 690

Understanding the Role of the Satellite Devices for PoE Support in a Junos Fusion | 690

Understanding PoE Configuration in a Junos Fusion | 691

Understanding PoE Support Standards for Extended Ports in a Junos Fusion | 691

Understanding Maximum PoE Power Budgets in a Junos Fusion | 691

Understanding PoE Controller Software in a Junos Fusion | 692



Understanding PoE Power Allocation Configuration Options in a Junos Fusion | 692

Understanding LLDP and LLDP-MED on a Junos Fusion | 692

LLDP and LLDP-MED in a Junos Fusion Overview | 693

Understanding LLDP and LLDP-MED Configuration and Traffic Handling in a Junos Fusion | 693

Configuring Power over Ethernet in a Junos Fusion | 694

PoE Configurable Options | 695

Enabling PoE | 696

Disabling PoE | 696

Setting the Power Management Mode | 697

Setting the Maximum Power That Can Be Delivered from a PoE Interface | 697

Setting the Guard Band | 698

Setting the PoE Interface Priority | 698

Verifying PoE Configuration and Status for a Junos Fusion (CLI Procedure) | 699

PoE Power Budgets, Consumption, and Mode on Satellite Devices | 699

PoE Interface Configuration and Status | 700

## **Configuration Statements for Power over Ethernet and Power Supply Management on a Junos Fusion Provider Edge | 705**

disable (Power over Ethernet) | 706

guard-band | 707

interface (Power over Ethernet) | 708

management | 710

maximum-power (Interface) | 712

n-plus-n (satellite-management) | 714

poe | 715

priority (Power over Ethernet) | 718

psu (satellite-management) | 719

redundancy (satellite-management) | 720

## **Operational Commands for Power over Ethernet and Power Supply Management on Junos Fusion Provider Edge | 721**

show chassis satellite power-budget-statistics | 722

show poe controller | 725

show poe interface | 729

## **Monitoring Junos Fusion Provider Edge | 736**

Connectivity Fault Management in Junos Fusion | 736

## **SNMP MIB Support on Junos Fusion Provider Edge | 738**

Chassis MIB Support (Junos Fusion) | 738

## **Link Aggregation and Link Aggregation Control Protocol on Junos Fusion Provider Edge | 742**

Understanding Link Aggregation and Link Aggregation Control Protocol in a Junos Fusion | 742

Link Aggregation in Junos Fusion | 742

Link Aggregation Control Protocol in Junos Fusion | 743

Configuring Link Aggregation and LACP in Junos Fusion | 743

Software and Hardware Guidelines when Configuring Link Aggregation and LACP in Junos Fusion | 744

Configuring an Aggregated Ethernet Interface | 744

Configuring Junos OS for Supporting Aggregated Devices | 746

Configuring Virtual Links for Aggregated Devices | 746

Configuring LACP Link Protection at the Chassis Level | 747

Enabling LACP Link Protection | 748

Configuring System Priority | 749

Configuring the Maximum Links Limit | 749

Configuring PPM on Junos Fusion | 750

## **Uplink Failure Detection on Junos Fusion Provider Edge | 752**

Overview of Uplink Failure Detection on a Junos Fusion | 752

Configuring Uplink Failure Detection on a Junos Fusion | 754

Enabling Uplink Failure Detection on a Junos Fusion | 754

Configuring a Candidate Uplink Port Policy | 755

Configuring Candidate Uplink Port Policy Default Configuration | 756

Configuring Candidate Uplink Port Policy Terms | 757

Configuring an Uplink Port Group | 758

## **Configuration Statements for Uplink Failure Detection on Junos Fusion Provider Edge | 760**

candidate-uplink-port-policy (satellite-policies) | 761

holddown (candidate-uplink-port-profile) | 762

minimum-links (candidate-uplink-port-profile) | 763

pic (satellite-policies port-group-alias) | 764

port (satellite-policies port-group-alias) | 765

port-group-alias (satellite-policies) | 766

product-model (Junos Fusion) | 768

satellite-policies | 770

term (candidate-uplink-policy) | 772

uplink-failure-detection (Junos Fusion) | 774

uplink-port-group (Junos Fusion) | 776

## **Operational Commands for Uplink Failure Detection on Junos Fusion Provider Edge | 778**

show chassis satellite | 779

## **Multicast Replication on Junos Fusion Provider Edge | 793**

Understanding Multicast Replication in a Junos Fusion | 793

Junos Fusion Multicast Replication Overview | 793

ECIDs for Multicast Traffic | 795

Multicast Replication Limitations in a Junos Fusion | 796

Ingress Replication at the Aggregation Device to Satellite Devices | 797

Egress (Local) Replication on the Satellite Devices | 798

Local Replication for Layer 2 Multicast Traffic with IGMP Snooping | 799

Local Replication for VLAN Flooding | 800

Local Replication for Layer 3 Multicast Traffic Over IRB Interfaces | 802

Configuring Egress (Local) Replication on a Junos Fusion | 804

## **Configuration Statements and Operational Commands for Multicast Support | 805**

local-replication | 806

show bridge flood nexthops satellite | 807

show bridge flood satellite | 810

show bridge satellite device | 814

show multicast ecid-mapping satellite | 817

show multicast next-hops satellite | **821**  
show multicast snooping next-hops satellite | **824**  
show multicast snooping route satellite | **829**  
show multicast statistics satellite | **835**  
show multicast summary satellite | **837**

## **Class of Service on Junos Fusion Provider Edge | 839**

Understanding CoS on an MX Series Aggregation Device in Junos Fusion Provider Edge | **839**

- Overview of CoS on Different Types of Ports in Junos Fusion | **840**
- CoS on Extended Ports and Uplink Ports in Junos Fusion | **842**
- Per-unit and Hierarchical Scheduling on Extended Ports | **843**
- Broadband Subscriber Services Support | **844**
- CoS Hierarchical Port Scheduling with Enhanced Transmission Selection in Junos Fusion | **845**
- CoS on Cascade Ports in Junos Fusion | **846**

Configuring CoS on an MX Series Aggregation Device in Junos Fusion | **847**

- Configuring Behavior Aggregate Classifiers on Satellite Device Extended Ports | **848**
- Configuring Rewrite Rules on Satellite Device Extended Ports | **849**
- Configuring CoS Hierarchical Port Scheduling with Enhanced Transmission Selection on Satellite Device Ports | **851**
- Changing the Default Scheduling Policy on an Aggregated Device Cascade Port | **854**

# About the Documentation

## IN THIS SECTION

- Documentation and Release Notes | **xiii**
- Using the Examples in This Manual | **xiii**
- Documentation Conventions | **xv**
- Documentation Feedback | **xviii**
- Requesting Technical Support | **xviii**

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.

## Documentation and Release Notes

To obtain the most current version of all Juniper Networks® technical documentation, see the product documentation page on the Juniper Networks website at <https://www.juniper.net/documentation/>.

If the information in the latest release notes differs from the information in the documentation, follow the product Release Notes.

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## Using the Examples in This Manual

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

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

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

## Merging a Full Example

To merge a full example, follow these steps:

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

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

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

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

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

## Merging a Snippet

To merge a snippet, follow these steps:

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

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

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

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

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

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

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

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

## Documentation Conventions

[Table 1 on page xvi](#) defines notice icons used in this guide.

Table 1: Notice Icons







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

Table 2 on page xvi defines the text and syntax conventions used in this guide.

Table 2: Text and Syntax Conventions

Convention	Description	Examples
<b>Bold text like this</b>	Represents text that you type.	To enter configuration mode, type the <b>configure</b> command:  user@host> <b>configure</b>
Fixed-width text like this	Represents output that appears on the terminal screen.	user@host> <b>show chassis alarms</b>  No alarms currently active
<i>Italic text like this</i>	<ul style="list-style-type: none"> <li>Introduces or emphasizes important new terms.</li> <li>Identifies guide names.</li> <li>Identifies RFC and Internet draft titles.</li> </ul>	<ul style="list-style-type: none"> <li>A policy <i>term</i> is a named structure that defines match conditions and actions.</li> <li><i>Junos OS CLI User Guide</i></li> <li>RFC 1997, <i>BGP Communities Attribute</i></li> </ul>



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

Convention	Description	Examples
<i>Italic text like this</i>	Represents variables (options for which you substitute a value) in commands or configuration statements.	Configure the machine's domain name:  [edit] root@# <b>set system domain-name</b> <i>domain-name</i>
<b>Text like this</b>	Represents names of configuration statements, commands, files, and directories; configuration hierarchy levels; or labels on routing platform components.	<ul style="list-style-type: none"><li>• To configure a stub area, include the <b>stub</b> statement at the [edit <b>protocols ospf area area-id</b>] hierarchy level.</li><li>• The console port is labeled <b>CONSOLE</b>.</li></ul>
< > (angle brackets)	Encloses optional keywords or variables.	<b>stub</b> <default-metric <i>metric</i> >;
(pipe symbol)	Indicates a choice between the mutually exclusive keywords or variables on either side of the symbol. The set of choices is often enclosed in parentheses for clarity.	<b>broadcast   multicast</b>  ( <i>string1</i>   <i>string2</i>   <i>string3</i> )
# (pound sign)	Indicates a comment specified on the same line as the configuration statement to which it applies.	<b>rsvp { # Required for dynamic MPLS only</b>
[ ] (square brackets)	Encloses a variable for which you can substitute one or more values.	<b>community name members [ <i>community-ids</i> ]</b>
Indentation and braces ( { } )	Identifies a level in the configuration hierarchy.	[edit] routing-options { static { route default { nexthop <i>address</i> ; retain; } } }
; (semicolon)	Identifies a leaf statement at a configuration hierarchy level.	
GUI Conventions		

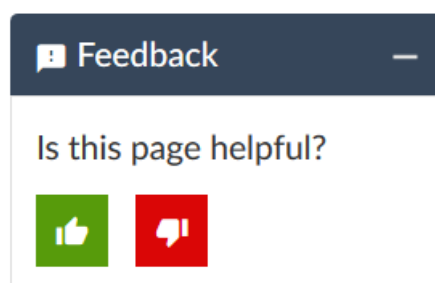
Table 2: Text and Syntax Conventions (*continued*)

Convention	Description	Examples
<b>Bold text like this</b>	Represents graphical user interface (GUI) items you click or select.	<ul style="list-style-type: none"> <li>In the Logical Interfaces box, select <b>All Interfaces</b>.</li> <li>To cancel the configuration, click <b>Cancel</b>.</li> </ul>
> (bold right angle bracket)	Separates levels in a hierarchy of menu selections.	In the configuration editor hierarchy, select <b>Protocols&gt;Ospf</b> .

## Documentation Feedback

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

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



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

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Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active Juniper Care or Partner Support Services support contract, or are

covered under warranty, and need post-sales technical support, you can access our tools and resources online or open a case with JTAC.

- JTAC policies—For a complete understanding of our JTAC procedures and policies, review the *JTAC User Guide* located at <https://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf>.
- Product warranties—For product warranty information, visit <https://www.juniper.net/support/warranty/>.
- JTAC hours of operation—The JTAC centers have resources available 24 hours a day, 7 days a week, 365 days a year.

## Self-Help Online Tools and Resources

For quick and easy problem resolution, Juniper Networks has designed an online self-service portal called the Customer Support Center (CSC) that provides you with the following features:

- Find CSC offerings: <https://www.juniper.net/customers/support/>
- Search for known bugs: <https://prsearch.juniper.net/>
- Find product documentation: <https://www.juniper.net/documentation/>
- Find solutions and answer questions using our Knowledge Base: <https://kb.juniper.net/>
- Download the latest versions of software and review release notes: <https://www.juniper.net/customers/csc/software/>
- Search technical bulletins for relevant hardware and software notifications: <https://kb.juniper.net/InfoCenter/>
- Join and participate in the Juniper Networks Community Forum: <https://www.juniper.net/company/communities/>
- Create a service request online: <https://myjuniper.juniper.net>

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

## Creating a Service Request with JTAC

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

- Visit <https://myjuniper.juniper.net>.
- Call 1-888-314-JTAC (1-888-314-5822 toll-free in the USA, Canada, and Mexico).

For international or direct-dial options in countries without toll-free numbers, see <https://support.juniper.net/support/requesting-support/>.

# 1

PART

## Junos Fusion Provider Edge

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

[Junos Fusion Provider Edge Configuration | 44](#)

[Junos Fusion Provider Edge Configuration Statements | 62](#)

[Junos Fusion Provider Edge Administration | 95](#)

[Junos Fusion Provider Edge Operational Commands | 122](#)

[Power over Ethernet, LLDP, and LLDP-MED on a Junos Fusion Provider Edge | 689](#)

[Configuration Statements for Power over Ethernet and Power Supply Management on a Junos Fusion Provider Edge | 705](#)

[Operational Commands for Power over Ethernet and Power Supply Management on Junos Fusion Provider Edge | 721](#)

[Monitoring Junos Fusion Provider Edge | 736](#)

[SNMP MIB Support on Junos Fusion Provider Edge | 738](#)

[Link Aggregation and Link Aggregation Control Protocol on Junos Fusion Provider Edge | 742](#)

[Uplink Failure Detection on Junos Fusion Provider Edge | 752](#)

Configuration Statements for Uplink Failure Detection on Junos Fusion Provider Edge | **760**

Operational Commands for Uplink Failure Detection on Junos Fusion Provider Edge | **778**

Multicast Replication on Junos Fusion Provider Edge | **793**

Configuration Statements and Operational Commands for Multicast Support | **805**

Class of Service on Junos Fusion Provider Edge | **839**

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# Junos Fusion Provider Edge Overview

## IN THIS CHAPTER

- Junos Fusion Provider Edge Overview | 3
- Understanding Junos Fusion Provider Edge Components | 5
- Understanding Satellite Device Clustering in a Junos Fusion | 10
- Understanding Junos Fusion Ports | 14
- Understanding Port-Based Authentication in a Junos Fusion Provider Edge | 18
- Understanding Software in a Junos Fusion Provider Edge | 19
- Understanding Junos Fusion Provider Edge Software and Hardware Requirements | 22
- Understanding the Flow of Data Packets in a Junos Fusion Topology | 28
- Understanding Satellite Policies in a Junos Fusion | 32
- Junos Fusion Provider Edge Supported Protocols | 33
- Local Switching on Junos Fusion Provider Edge | 37
- Broadband Subscription Services on Junos Fusion | 41

## Junos Fusion Provider Edge Overview

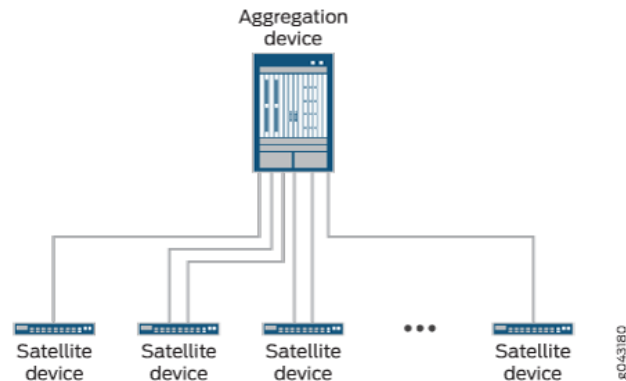
Junos Fusion provides a method of significantly expanding the number of available network interfaces on a device—an *aggregation device*—by allowing the aggregation device to add interfaces through interconnections with *satellite devices*. The entire system—the interconnected aggregation device and 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.

## RELATED DOCUMENTATION

- [Understanding Junos Fusion Provider Edge Components | 5](#)
- [Understanding Junos Fusion Ports | 14](#)
- [Understanding the Flow of Data Packets in a Junos Fusion Topology | 28](#)
- [Configuring Junos Fusion Provider Edge | 44](#)

## Understanding Junos Fusion Provider Edge Components

### IN THIS SECTION

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

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

This topic covers:

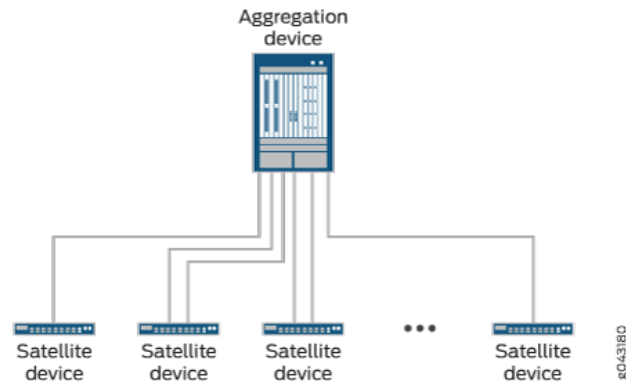
### Junos Fusion Topology

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.

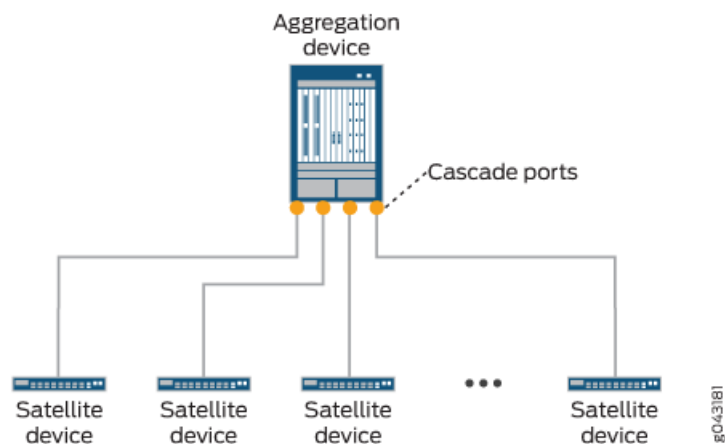
The link that connects an aggregation device to a satellite device has an interface on each end of the link. The interface on the aggregation device end of the link is a cascade port. The interface on the satellite device end of the link is an uplink port.

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 7](#).

Figure 3: Cascade Ports



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

## Uplink Ports

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

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

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

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

An uplink port is typically 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 **ABCDEFGHijkl** was assigned to FPC ID 110 using unique-ID based FPC identification, the satellite device with the serial number **ABCDEFGHijkl** will always be associated with FPC ID 110 in the Junos Fusion. If the satellite device with the serial number **ABCDEFGHijkl** connects to the aggregation device using a different cascade port, the FPC ID for the satellite device remains 110.

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

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

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

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

## Understanding Software in a Junos Fusion

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

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

The role of Junos OS and satellite software is discussed in greater detail in [“Understanding Software in a Junos Fusion Provider Edge” on page 19](#).

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

## Understanding Interface Naming in a Junos Fusion

Network interfaces in Junos OS are specified as follows:

- *type-fpc / pic / port*

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

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

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

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

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

**ge-101/0/2**

## RELATED DOCUMENTATION

| [Configuring Junos Fusion Provider Edge](#) | 44

## Understanding Satellite Device Clustering in a Junos Fusion

### IN THIS SECTION

- [Satellite Device Clustering Overview](#) | 11
- [Satellite Device Cluster Topology](#) | 11
- [Satellite Device Cluster Names and Identifiers](#) | 11
- [Satellite Device Cluster Uplink Interfaces](#) | 12
- [Cluster Interfaces](#) | 12
- [Satellite Device Cluster Software Management](#) | 12
- [FPC Identifiers and Extended Port Interfaces in a Satellite Device Cluster](#) | 13
- [Understanding 40-Gbps Interfaces with QSFP+ Transceiver Roles for Satellite Devices in a Satellite Device Cluster](#) | 13

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.

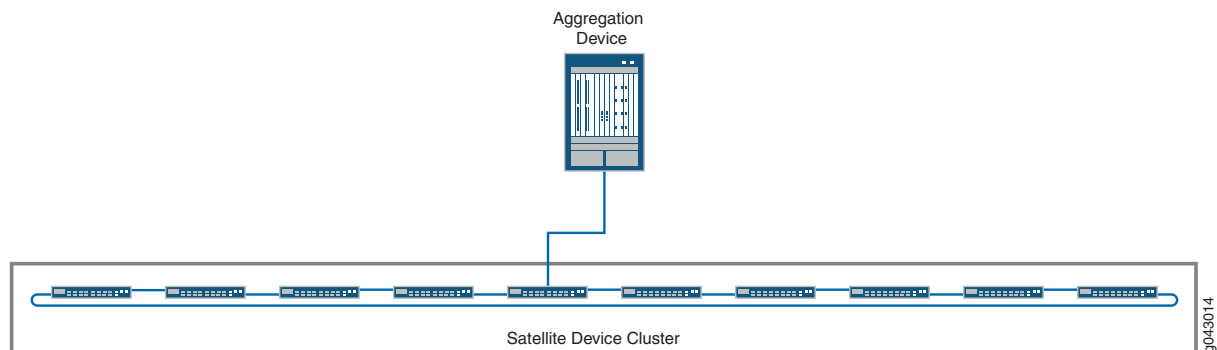
Satellite device clustering is particularly useful in scenarios where optical cabling options between buildings are limited and in scenarios where you want to preserve optical interfaces for other purposes. If you have, for instance, two buildings that have limited optical interfaces between each other 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 11 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 3 on page 13](#) for the default uplink ports for satellite devices. When these devices are part of a satellite device cluster, the default uplink ports cannot be configured as extended ports to pass network traffic unless they have a direct connection to the aggregation device or if there is an uplink port policy configured that excludes them from acting as uplink ports.

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

Device Type	Default Uplink Interfaces
EX2300 (4 ports on PIC1)	1/0 through 1/3



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

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

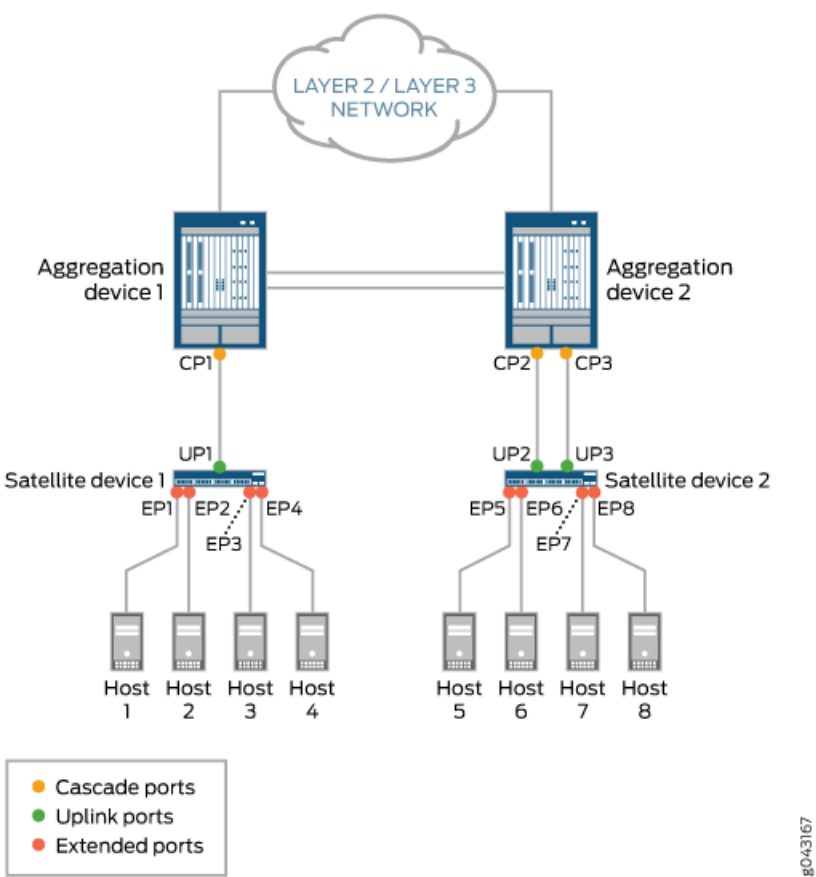
- [Understanding Cascade Ports | 16](#)
- [Understanding Uplink Ports | 16](#)
- [Understanding Extended Ports | 17](#)

In a Junos Fusion topology, cascade, uplink, and extended ports are components that play key roles. [Figure 5 on page 15](#) 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 15](#), two aggregation devices and two satellite devices are deployed. The aggregation devices are connected to each other through a multichassis link aggregation group (MC-LAG). Each satellite device is connected to its respective aggregation device through one or two links.

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**



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 15](#), 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 15](#), 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 15](#), 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 15](#), 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 15](#), the FPC slot number could be 100, the PIC slot number could be 0, the first extended port could be 1, the second extended port could be 2, the third extended port could be 3, and the fourth extended port could be 4. The complete 10-Gigabit Ethernet extended port names could be as follows:

xe-100/0/1

xe-100/0/2

xe-100/0/3

xe-100/0/4

You can configure the following features on extended ports:

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

## RELATED DOCUMENTATION

[Understanding the Flow of Data Packets in a Junos Fusion Topology | 28](#)

*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 | 19](#)
- [Understanding Satellite Software for the Satellite Devices in a Junos Fusion | 19](#)
- [Understanding the Preboot eXecution Environment \(PXE\) Junos OS Software Package for QFX5100 Switches in a Junos Fusion | 20](#)
- [Understanding Minimum Software Requirements for a Junos Fusion | 21](#)
- [Understanding Satellite Software Upgrade Groups | 21](#)

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” on page 114](#).

## 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



## Understanding Junos Fusion Provider Edge Software and Hardware Requirements

### IN THIS SECTION

- [Aggregation Devices | 22](#)
- [Satellite Devices | 26](#)

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

It covers:

### Aggregation Devices

### IN THIS SECTION

- [Aggregation Device Hardware Models | 22](#)
- [Support for Junos Node Slicing | 23](#)
- [Maximum Number of Aggregation Devices | 24](#)
- [Cascade Ports | 24](#)

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 4 on page 23](#) lists the hardware platforms that are supported as aggregation devices, and the Junos OS release that introduced aggregation device support to Junos Fusion Provider Edge for the hardware.

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

Hardware	Initial Junos OS Release
MX5 Universal Routing Platform	14.2R6
MX10 Universal Routing Platform	14.2R6
MX40 Universal Routing Platform	14.2R6
MX80 Universal Routing Platform	14.2R6
MX104 Universal Routing Platform	14.2R6
MX204 Universal Routing Platform	17.4R1
MX240 Universal Routing Platform	14.2R3
MX480 Universal Routing Platform	14.2R3
MX960 Universal Routing Platform	14.2R3
MX2010 Universal Routing Platform	14.2R3
MX2020 Universal Routing Platform	14.2R3
MX10003 Universal Routing Platform	17.3R1
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 5 on page 24](#) provides a list of line cards on an MX Series 5G Universal Routing Platform that have interfaces that can be converted into cascade ports, and the initial Junos OS release when cascade port support was introduced for interfaces on the line card.

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

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

Hardware	Initial Junos OS Release
16x10GE MPC	14.2R3
MPC1 Q	14.2R3

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

Hardware	Initial Junos OS Release
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
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

### IN THIS SECTION

- [Satellite Device Hardware Models | 26](#)
- [Power over Ethernet Requirements for a Satellite Device | 27](#)
- [Maximum Number of Satellite Devices | 27](#)

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 6 on page 26](#) 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 6: 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

Table 6: 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
QFX5110-48S	18.1R1	18.1R1	3.4R1
QFX5200-32C	18.1R1	18.1R1	3.4R1
EX4300-24P	14.1X53-D16	14.2R3	1.0R1
EX4300-24T	14.1X53-D16	14.2R3	1.0R1
EX4300-32F	14.1X53-D30	14.2R5	1.0R2.2
EX4300-32F-DC	14.1X53-D30	14.2R5	1.0R2.2
EX4300-48P	14.1X53-D16	14.2R3	1.0R1
EX4300-48T	14.1X53-D16	14.2R3	1.0R1
EX4300-48T-DC	14.1X53-D26	14.2R3	1.0R1

**Power over Ethernet Requirements for a Satellite Device**

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

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

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

**Maximum Number of Satellite Devices**

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

**Release History Table**

Release	Description
<a href="#">18.1R1</a>	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

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[Configuring Junos Fusion Provider Edge | 44](#)

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[Managing Satellite Software Upgrade Groups in a Junos Fusion | 95](#)

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[Converting a Satellite Device in a Junos Fusion to a Standalone Device | 114](#)

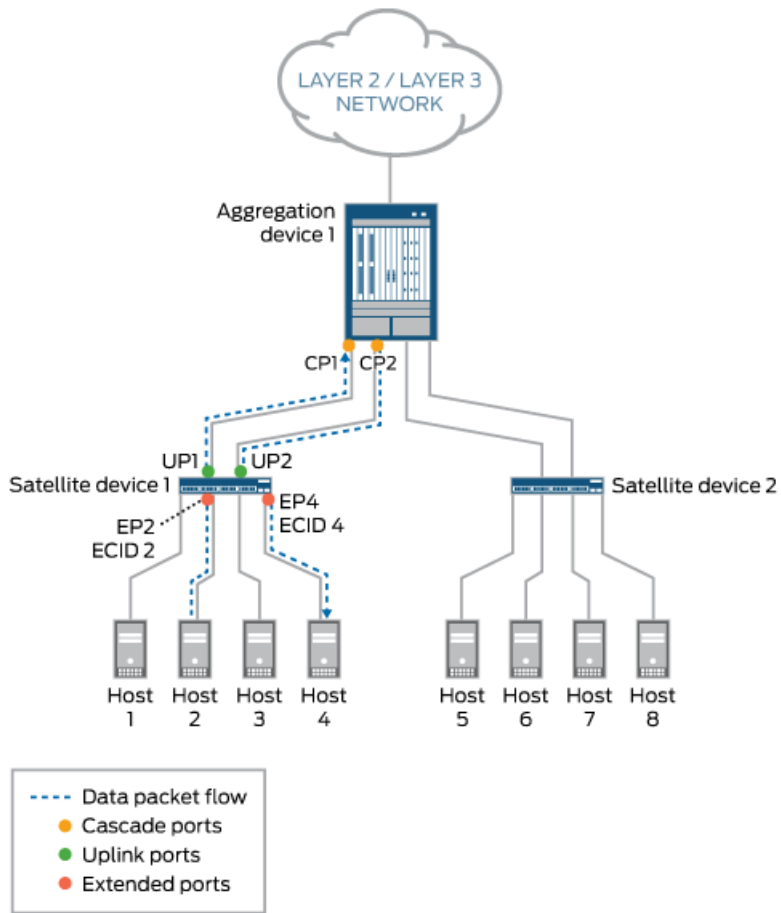
## Understanding the Flow of Data Packets in a Junos Fusion Topology

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 29](#).)
- 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 30](#).)

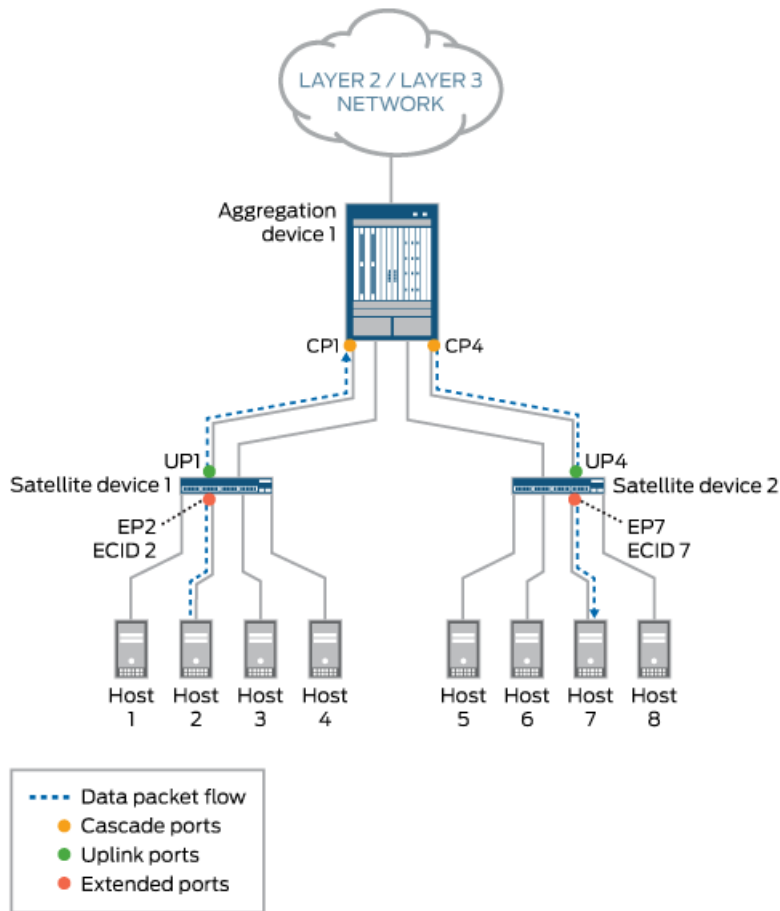
Figure 6: Layer 2 Unicast Data Packet Flow Through a Junos Fusion Topology—Scenario 1



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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 Satellite Policies in a Junos Fusion

### IN THIS SECTION

- [Satellite Policies Overview | 32](#)
- [Understanding Environment Monitoring Satellite Policies | 32](#)

### Satellite Policies Overview

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

Environment monitoring of the satellite devices, uplink failure detection for satellite device uplink ports, and remapping uplinks—with port pinning, uplink selection, and local port mirroring—are configured using satellite policies. See “[Understanding Environment Monitoring Satellite Policies](#)” on page 32, [\[Unresolved xref\]](#), and [\[Unresolved xref\]](#).

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 | 44](#)

*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 | 33](#)
- [Multicast Protocols Supported on Junos Fusion Provider Edge | 35](#)
- [VPN Protocols Supported on Junos Fusion Provider Edge | 36](#)

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

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 742](#) and *Configuring Aggregated Ethernet Interfaces and LACP*.

## **Multicast Protocols Supported on Junos Fusion Provider Edge**

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

- PIM
- IGMP
- MLD

### ***PIM on Junos Fusion Provider Edge***

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

### ***IGMP on Junos Fusion Provider Edge***

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

### ***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 793](#).

### **VPN Protocols Supported on Junos Fusion Provider Edge**

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

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

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

### ***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*.

### **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*

## **RELATED DOCUMENTATION**

[Understanding the Flow of Data Packets in a Junos Fusion Topology | 28](#)

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

## **Local Switching on Junos Fusion Provider Edge**

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

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

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



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

## Selective VLAN Local Switching

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

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

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

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

## Policer

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

You can limit the flow of Layer 2 traffic that is sent to the aggregation device by applying an ingress policer at the satellite device. You configure the Layer 2 ingress policer by using the **input-policer** statement at

the **[edit interfaces interface-name layer2-policer]** hierarchy level. Because the satellite device is only aware of locally switched logical interface, the ingress policer is applied to Layer 2 input traffic at the satellite device ports.

### Example: Configuring Selective VLAN Local Switching

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

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

```

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

```

```

    }
  }
}

```

```

routing-instances {
  vs-1 {
    instance-type virtual-switch;
    interface xe-100/0/0.0;
    interface xe-100/0/2.0;
    interface xe-100/0/2.0;
    bridge-domains {
      bd-1 {
        vlan-id 101;
        no-local-switching;
      }
      bd-2 {
        vlan-id 102;
        no-local-switching;
      }
      bd-3 {
        vlan-id 103;
      }
      bd-4 {
        vlan-id 104;
      }
    }
  }
}
forwarding-options {
  satellite {
    fpc 100 {
      sd-vlan-switching {
        routing-instance vs-1;
      }
    }
  }
}
}
}

```

## RELATED DOCUMENTATION

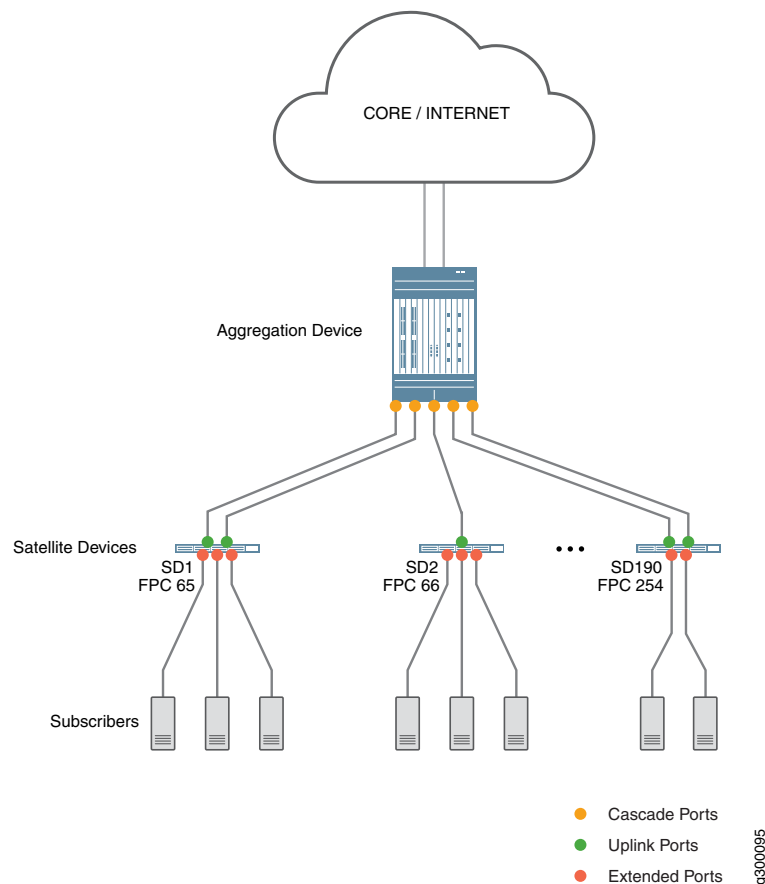
Two-Color Policer Configuration Overview

## Broadband Subscription Services on Junos Fusion

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

Figure 8 on page 41 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 8: 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



# Junos Fusion Provider Edge Configuration

## IN THIS CHAPTER

- [Configuring Junos Fusion Provider Edge | 44](#)
- [Configuring Satellite Device Alarm Handling Using an Environment Monitoring Satellite Policy in a Junos Fusion | 59](#)

## Configuring Junos Fusion Provider Edge

### IN THIS SECTION

- [Preparing the Aggregation Device | 45](#)
- [Configuring the Cascade Ports on the Aggregation Device | 46](#)
- [Configuring the FPC Slot Identifiers | 47](#)
- [Configuring Software Upgrade Groups on the Aggregation Device | 49](#)
- [Preparing the Satellite Device | 50](#)
- [Adding Satellite Devices to the Junos Fusion Provider Edge | 51](#)

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 46](#), [“Configuring the FPC Slot Identifiers” on page 47](#), and [“Configuring Software Upgrade Groups on the Aggregation Device” on page 49](#). 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
ABCDEF GHIJKL
```

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

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

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

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

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

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

## Configuring Software Upgrade Groups on the Aggregation Device

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

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

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

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

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

To configure a software upgrade group:

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

```
[edit]
```

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

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

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

```
[edit]
```

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

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

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

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

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

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

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

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

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

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

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

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

## Preparing the Satellite Device

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

To perform this procedure:

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

1. Log in to the device using the console port.

## 2. Zeroize the device:

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

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

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

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

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

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

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

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

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

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

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

## Adding Satellite Devices to the Junos Fusion Provider Edge

### IN THIS SECTION

- [Autoconverting a Switch into a Satellite Device | 52](#)
- [Manually Converting a Switch into a Satellite Device | 55](#)
- [Configuring a Switch into a Satellite Device Before Interconnecting It into a Junos Fusion Provider Edge | 57](#)

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 50](#).

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 46](#).

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 47](#).

Examples:

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

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

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

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

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

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

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

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

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

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

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

6. Configure an FPC slot ID into a software upgrade group. See [“Configuring Software Upgrade Groups on the Aggregation Device” on page 49](#).

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 50](#) 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 46](#).

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 47](#).

Examples:

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

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

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

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

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

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

5. Configure the interface on the aggregation device into a software upgrade group. See [“Configuring Software Upgrade Groups on the Aggregation Device” on page 49](#).

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

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

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

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

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

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

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

6. Commit the configuration:

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

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

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

7. Manually configure the switch into a satellite device:

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

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

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

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

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

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

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

Before you begin:

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

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

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

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

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

The device will reboot to complete the satellite software installation.

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

1. Log in to the aggregation device.
2. Configure the link on the aggregation device into a cascade port, if you have not done so already. See [“Configuring the Cascade Ports on the Aggregation Device” on page 46](#).

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 47](#).

Examples:

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

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

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

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

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

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

4. Configure the satellite switch into a satellite software upgrade group that is using the same version of satellite software that was manually installed onto the switch. See [“Configuring Software Upgrade Groups on the Aggregation Device” on page 49](#).

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 | 100](#)

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

[Understanding Software in a Junos Fusion Provider Edge | 19](#)

## 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 | 44](#)

*Configuring or Expanding a Junos Fusion Enterprise*



# Junos Fusion Provider Edge Configuration Statements

## IN THIS CHAPTER

- aging-timer (Junos Fusion) | 63
- alarm (Satellite Policies) | 64
- alias (Junos Fusion) | 65
- auto-satellite-conversion (Junos Fusion) | 66
- cascade-port | 67
- cascade-ports | 68
- description (Junos Fusion) | 70
- environment-monitoring-policy (satellite-management) | 71
- environment-monitoring-policy (satellite-policies) | 73
- fpc (Junos Fusion) | 75
- linkdown (satellite-policies alarm) | 77
- network-services | 78
- satellite (Junos Fusion Automatic Satellite Conversion) | 80
- satellite (Junos Fusion Satellite Software Upgrade Groups) | 82
- satellite-management (Junos Fusion) | 83
- serial-number (Junos Fusion) | 86
- selective-vlan-switching | 87
- single-home (Junos Fusion) | 88
- system-id (Junos Fusion) | 89
- term (satellite-policies) | 91
- upgrade-groups (Junos Fusion) | 93

## aging-timer (Junos Fusion)

### Syntax

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

### Hierarchy Level

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

### Release Information

Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

### 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.

## RELATED DOCUMENTATION

*Configuring or Expanding a Junos Fusion Enterprise*

[Configuring Junos Fusion Provider Edge](#) | 44

## alarm (Satellite Policies)

### Syntax

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

### Hierarchy Level

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

### Release Information

Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### 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.

## RELATED DOCUMENTATION

[Configuring Satellite Device Alarm Handling Using an Environment Monitoring Satellite Policy in a Junos Fusion](#) | 59

[Understanding Satellite Policies in a Junos Fusion](#) | 32

## alias (Junos Fusion)

### Syntax

```
alias alias;
```

### Hierarchy Level

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

### Release Information

Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### 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.

## RELATED DOCUMENTATION

*Configuring or Expanding a Junos Fusion Enterprise*

[Configuring Junos Fusion Provider Edge](#) | 44

## auto-satellite-conversion (Junos Fusion)

### Syntax

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

### Hierarchy Level

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

### Release Information

Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### 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 44](#) 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.

## RELATED DOCUMENTATION

*Configuring or Expanding a Junos Fusion Enterprise*

[Configuring Junos Fusion Provider Edge](#) | 44

## cascade-port

### Syntax

```
cascade-port;
```

### Hierarchy Level

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

### Release Information

Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### 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 44](#) 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.

## RELATED DOCUMENTATION

*Configuring or Expanding a Junos Fusion Enterprise*

[Configuring Junos Fusion Provider Edge | 44](#)

## cascade-ports

### Syntax

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

### Hierarchy Level

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

### Release Information

Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### 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.

## RELATED DOCUMENTATION

*Configuring or Expanding a Junos Fusion Enterprise*

[Configuring Junos Fusion Provider Edge](#) | 44



## description (Junos Fusion)

### Syntax

```
description description;
```

### Hierarchy Level

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

### Release Information

Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### 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.

## RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 44](#)

*Configuring or Expanding a Junos Fusion Enterprise*

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

### Syntax

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

### Hierarchy Level

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

### Release Information

Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### 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.

## RELATED DOCUMENTATION

[Configuring Satellite Device Alarm Handling Using an Environment Monitoring Satellite Policy in a Junos Fusion](#) | 59

---

[Understanding Satellite Policies in a Junos Fusion](#) | 32

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

### 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]
```

### Release Information

Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### 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.

## RELATED DOCUMENTATION

Configuring Satellite Device Alarm Handling Using an Environment Monitoring Satellite Policy in a Junos Fusion | 59

---

Understanding Satellite Policies in a Junos Fusion | 32

## fpc (Junos Fusion)

### Syntax

```
fpc slot-id{
  alias alias;
  cascade-ports interface-name;
  description description;
  environment-monitoring-policy policy;
  serial-numbers 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](#)]

### Release Information

Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

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

### 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.

#### RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 44](#)

*Configuring or Expanding a Junos Fusion Enterprise*

## linkdown (satellite-policies alarm)

### Syntax

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

### Hierarchy Level

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

### Release Information

Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### 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.

## RELATED DOCUMENTATION

[Configuring Satellite Device Alarm Handling Using an Environment Monitoring Satellite Policy in a Junos Fusion](#) | 59

[Understanding Satellite Policies in a Junos Fusion](#) | 32



## network-services

### Syntax

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

### Hierarchy Level

```
[edit chassis]
```

### 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.

### 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.

## 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)

### Syntax

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

### Hierarchy Level

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

### Release Information

Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### 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 44](#).

### 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 44](#).

**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.

## RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 44](#)

*Configuring or Expanding a Junos Fusion Enterprise*

## satellite (Junos Fusion Satellite Software Upgrade Groups)

### Syntax

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

### Hierarchy Level

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

### Release Information

Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### 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.

## RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 44](#)

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

## satellite-management (Junos Fusion)

### Syntax

```

satellite-management {
  aging-timer aging-timer;
  auto-satellite-conversion {
    satellite [slot-id | range | all];
  }
  cluster cluster-name{
    cascade-ports interface-name;
    cluster-id cluster-id-number;
    fpc slot-id{
      alias alias;
      description description;
      member-id member-id-number;
      system-id mac-address;
    }
  }
  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]

## Release Information

Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

## 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.

**RELATED DOCUMENTATION**

*Configuring or Expanding a Junos Fusion Enterprise*

[Configuring Junos Fusion Provider Edge](#) | 44



## serial-number (Junos Fusion)

### Syntax

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

### Hierarchy Level

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

### Release Information

Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### 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.

## RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 44](#)

*Configuring or Expanding a Junos Fusion Enterprise*

## selective-vlan-switching

### Syntax

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

### Hierarchy Level

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

### Release Information

Statement introduced in Junos OS Release 17.2R1 for Junos Fusion Provider Edge..

### 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.

## RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 44](#)

## single-home (Junos Fusion)

### Syntax

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

### Hierarchy Level

[edit chassis [satellite-management](#)]

### Release Information

Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### 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.

## RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 44](#)

*Configuring or Expanding a Junos Fusion Enterprise*

## system-id (Junos Fusion)

### Syntax

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

### Hierarchy Level

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

### Release Information

Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### 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.

**RELATED DOCUMENTATION**

[Configuring Junos Fusion Provider Edge | 44](#)

*Configuring or Expanding a Junos Fusion Enterprise*

## term (satellite-policies)

### 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]
```

### Release Information

Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### 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 *term-name***—Specifies the user-defined name of the term.

A *term* 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.

**from**—(Optional) Defines the match criteria for the satellite policy.

The only match criteria available for a satellite policy is the product model.

If you omit the **from** option, the satellite policy is applied globally.

**product-model *model-name***—Defines the product model of the satellite device that uses the satellite policy.

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

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

#### Required Privilege Level

admin—To view this statement in the configuration.

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

#### RELATED DOCUMENTATION

[Configuring Satellite Device Alarm Handling Using an Environment Monitoring Satellite Policy in a Junos Fusion](#) | 59

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[Understanding Satellite Policies in a Junos Fusion](#) | 32

## upgrade-groups (Junos Fusion)

### Syntax

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

### Hierarchy Level

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

### Release Information

Statement introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### 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.

## RELATED DOCUMENTATION

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*Configuring or Expanding a Junos Fusion Enterprise*

[Configuring Junos Fusion Provider Edge](#) | 44

# Junos Fusion Provider Edge Administration

## IN THIS CHAPTER

- Managing Satellite Software Upgrade Groups in a Junos Fusion | 95
- Verifying Connectivity, Device States, Satellite Software Versions, and Operations in a Junos Fusion | 100
- Converting a Satellite Device in a Junos Fusion to a Standalone Device | 114
- Installing Junos OS Software on a Standalone Device Running Satellite Software | 119

## Managing Satellite Software Upgrade Groups in a Junos Fusion

### IN THIS SECTION

- Creating a Satellite Software Upgrade Group | 96
- Adding Satellite Devices to a Satellite Software Upgrade Group | 96
- Removing a Satellite Device from a Satellite Software Upgrade Group | 97
- Modifying the Satellite Software Used by a Satellite Software Upgrade Group | 98
- Deleting Associated Satellite Software from a Satellite Software Upgrade Group | 99
- Deleting Satellite Software on the Aggregation Device | 99

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 44](#) 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 44](#) 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 44](#) or *Configuring or Expanding a Junos Fusion Enterprise*.

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

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

Before you begin:

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

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

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

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

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

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

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

For instance:

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

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

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

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

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

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

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

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

This process disassociates the specified satellite software package from the list of potential packages used by a satellite software upgrade group. It is useful for maintenance purposes only, like if you wanted to ensure a satellite software upgrade group was never associated with a specific satellite software package.

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

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

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

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

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

## Deleting Satellite Software on the Aggregation Device

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

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

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

For example:

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

## RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 44](#)

*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 | 101](#)
- [Verifying Basic Junos Fusion Connectivity | 101](#)
- [Verifying the Satellite Device Hardware Model | 103](#)
- [Verifying Cascade Port and Uplink Port State | 104](#)
- [Verifying That a Cascade Port Recognizes a Satellite Device | 107](#)
- [Verifying Extended Port Operation | 110](#)
- [Verifying the Satellite Software Version | 112](#)
- [Verifying the Devices and Software Used in a Satellite Software Upgrade Group | 113](#)

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

### 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
```

Alias	Slot	Device State	Cascade Ports	Port State	Extended Ports 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

### 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
```



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

### Meaning

The output confirms:

- Each listed satellite device—the satellite devices are listed by alias-name in the **Alias** column or by FPC slot ID in the **Slot** column—is recognized by the aggregation device, because the **Device State** output is **Online** for every listed satellite device.
- Each cascade port is operational, because **Port State** is **online** for every cascade port. The cascade port is the port on the aggregation device that connects to the satellite device.
- The number of available and active extended ports for each satellite device, using the **Extended Ports total** and **Extended Ports up** outputs. The number of extended ports varies by satellite devices, and in this output the total number of extended ports includes both network-facing extended ports as well as uplink ports.

## Verifying the Satellite Device Hardware Model

### Purpose

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

### Action

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

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

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

### Meaning

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

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

## Verifying Cascade Port and Uplink Port State

### Purpose

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

### Action

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

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

Interface	State	Type
lo0	Up	Loopback
sd-101/0/0	Up	Satellite
sd-102/0/0	Up	Satellite
sd-103/0/0	Up	Satellite
sd-104/0/0	Up	Satellite
sd-105/0/0	Up	Satellite
sd-106/0/0	Up	Satellite
sd-107/0/0	Up	Satellite
sd-108/0/0	Up	Satellite
sd-109/0/0	Up	Satellite
sd-110/0/0	Up	Satellite
sd-111/0/0	Up	Satellite
sd-112/0/0	Up	Satellite
sd-113/0/0	Up	Satellite

sd-114/0/0	Up	Satellite
xe-0/0/1	Up	Cascade
xe-0/0/2	Up	Cascade
xe-0/0/3	Up	Cascade
xe-0/0/4	Up	Cascade
xe-0/0/5	Up	Cascade
xe-0/0/6	Up	Cascade
xe-0/0/7	Up	Cascade
xe-0/0/8	Up	Cascade
xe-0/0/9	Up	Cascade
xe-0/2/0	Up	Cascade
xe-0/2/1	Up	Cascade
xe-0/2/2	Up	Cascade
xe-0/2/3	Up	Cascade
xe-0/2/4	Up	Cascade
xe-0/2/5	Up	Cascade
xe-0/2/6	Up	Cascade
xe-0/2/7	Up	Cascade
xe-1/0/1	Up	Cascade
xe-1/0/2	Up	Cascade
xe-1/0/3	Up	Cascade
xe-1/2/1	Up	Cascade

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

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

### Meaning

The output shows:

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

## Verifying That a Cascade Port Recognizes a Satellite Device

### Purpose

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

### Action

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

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

Interface	State	Port Info	System Name	Model	SW Version
xe-2/3/7	Init				
xe-2/3/6	Init				
xe-2/3/5	Init				

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

```

7_dc-builder
xe-1/2/1      Two-Way    xe-0/2/0          ex4300-30 EX4300-48T    0.1I20150224_182
7_dc-builder
xe-1/0/3      Two-Way    xe-0/2/0          ex4300-29 EX4300-48T    0.1I20150224_182
7_dc-builder
xe-1/0/2      Two-Way    xe-0/2/0          ex4300-28 EX4300-48T    0.1I20150224_182
7_dc-builder
xe-1/0/1      Two-Way    xe-0/2/0          ex4300-27 EX4300-48T    0.1I20150224_182
7_dc-builder
xe-0/2/7      Two-Way    xe-0/0/0:1 qfx5100-24q-09 QFX5100-24Q-2P 0.1I20150224_18
27_dc-builder
xe-0/2/6      Init
xe-0/2/5      Init
xe-0/2/4      Two-Way    xe-0/0/48:1 qfx5100-48s-05 QFX5100-48S-6Q 0.1I20150224_18
27_dc-builder
xe-0/2/3      Two-Way    xe-0/0/48:1 qfx5100-48s-04 QFX5100-48S-6Q 0.1I20150224_18
27_dc-builder
xe-0/2/2      Two-Way    xe-0/0/48:1 qfx5100-48s-03 QFX5100-48S-6Q 0.1I20150224_18
27_dc-builder
xe-0/2/1      Init
xe-0/2/0      Init
xe-0/0/9      Two-Way    xe-0/2/0          ex4300-26 EX4300-48T    0.1I20150224_182
7_dc-builder
xe-0/0/8      Two-Way    xe-0/2/0          ex4300-25 EX4300-48T    0.1I20150224_182
7_dc-builder
xe-0/0/7      Two-Way    xe-0/0/48:0 qfx5100-48s-07 QFX5100-48S-6Q 0.1I20150224_18
27_dc-builder
xe-0/0/6      Two-Way    xe-0/0/48:0 qfx5100-48s-06 QFX5100-48S-6Q 0.1I20150224_18
27_dc-builder
xe-0/0/5      Two-Way    xe-0/0/48:0 qfx5100-48s-05 QFX5100-48S-6Q 0.1I20150224_18
27_dc-builder
xe-0/0/4      Two-Way    xe-0/0/48:0 qfx5100-48s-04 QFX5100-48S-6Q 0.1I20150224_18
27_dc-builder
xe-0/0/3      Two-Way    xe-0/0/48:0 qfx5100-48s-03 QFX5100-48S-6Q 0.1I20150224_18
27_dc-builder
xe-0/0/2      Two-Way    xe-0/0/48:0 qfx5100-48s-02 QFX5100-48S-6Q 0.1I20150224_18
27_dc-builder
xe-0/0/1      Init

```

### Meaning

The output confirms:



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

## Verifying Extended Port Operation

### Purpose

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

### Action

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

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

Legend for interface types:

\* -- Uplink interface

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

ge-109/0/21	AddComplete	None	Ready	Up/Dn	423	126
ge-109/0/22	AddComplete	None	Ready	Up/Dn	424	129
ge-109/0/23	AddComplete	None	Ready	Up/Dn	425	128
ge-109/0/24	AddComplete	None	Ready	Up/Dn	426	103
ge-109/0/25	AddComplete	None	Ready	Up/Dn	427	102
ge-109/0/26	AddComplete	None	Ready	Up/Dn	428	105
ge-109/0/27	AddComplete	None	Ready	Up/Dn	429	104
ge-109/0/28	AddComplete	None	Ready	Up/Dn	430	107
ge-109/0/29	AddComplete	None	Ready	Up/Dn	431	106
ge-109/0/3	AddComplete	None	Ready	Up/Dn	405	116
ge-109/0/30	AddComplete	None	Ready	Up/Dn	432	109
ge-109/0/31	AddComplete	None	Ready	Up/Dn	433	108
ge-109/0/32	AddComplete	None	Ready	Up/Dn	434	135
ge-109/0/33	AddComplete	None	Ready	Up/Dn	435	134
ge-109/0/34	AddComplete	None	Ready	Up/Dn	436	137
ge-109/0/35	AddComplete	None	Ready	Up/Dn	437	136
ge-109/0/36	AddComplete	None	Ready	Up/Dn	438	144
ge-109/0/37	AddComplete	None	Ready	Up/Dn	439	143
ge-109/0/38	AddComplete	None	Ready	Up/Dn	440	146
ge-109/0/39	AddComplete	None	Ready	Up/Dn	441	145
ge-109/0/4	AddComplete	None	Ready	Up/Dn	406	119
ge-109/0/40	AddComplete	None	Ready	Up/Dn	442	140
ge-109/0/41	AddComplete	None	Ready	Up/Dn	443	139
ge-109/0/42	AddComplete	None	Ready	Up/Dn	444	142
ge-109/0/43	AddComplete	None	Ready	Up/Dn	445	141
ge-109/0/44	AddComplete	None	Ready	Up/Dn	446	148
ge-109/0/45	AddComplete	None	Ready	Up/Dn	447	147
ge-109/0/46	AddComplete	None	Ready	Up/Dn	448	150
ge-109/0/47	AddComplete	None	Ready	Up/Dn	449	149
ge-109/0/5	AddComplete	None	Ready	Up/Dn	407	118
ge-109/0/6	AddComplete	None	Ready	Up/Dn	408	121
ge-109/0/7	AddComplete	None	Ready	Up/Dn	409	120
ge-109/0/8	AddComplete	None	Ready	Up/Dn	410	111
ge-109/0/9	AddComplete	None	Ready	Up/Dn	411	110
ge-110/0/0	AddComplete	None	Ready	Up/Up	728	115
ge-110/0/1	AddComplete	None	Ready	Up/Dn	729	114

## Meaning

The output confirms:

- That an extended port is recognized by the aggregation device. All extended ports are listed in the **Name** column of the output.

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

### Verifying the Satellite Software Version

#### Purpose

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

#### Action

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

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

Version	Platforms	Group
3.0R1.1	i386 ppc	group1
		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

arm	1.0.0	EX4300-48T-DC
		EX4300-48T-DC-BF
		EX2300-24P
		EX2300-24T-DC
		EX2300-C-12T
arm563xx	1.0.0	EX4300-C-12P
		EX3400-24P
		EX3400-24T
		EX3400-48T
		EX3400-48P
Current Groups: group1		
group2		
group3		
group4		
group5		

### Meaning

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

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

### Purpose

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

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

### Action

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

### show chassis satellite upgrade-group

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

Group	Sw-Version	Group State	Slot	Device State
__ungrouped__				
group1	3.0R1.1	in-sync	107	version-in-sync
			108	version-in-sync
			109	version-in-sync
			110	version-in-sync

group2	3.0R1.1	in-sync	111	version-in-sync
			112	version-in-sync
			113	version-in-sync
			102	version-in-sync
			103	version-in-sync
			104	version-in-sync
			105	version-in-sync
			106	version-in-sync
			114	version-in-sync

### Meaning

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

### RELATED DOCUMENTATION

<a href="#">Configuring Junos Fusion Provider Edge   44</a>
<i>Configuring or Expanding a Junos Fusion Enterprise</i>

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

### IN THIS SECTION

- [Download Junos OS Software | 115](#)
- [Disable the Automatic Conversion Configuration | 116](#)
- [Install Junos OS Software on the Satellite Device | 118](#)

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

The following steps explain how to convert a satellite device that is participating in a Junos Fusion to a standalone device running Junos OS. If you have a standalone switch that is not part of a Junos Fusion but is running satellite software, and you want the switch to run Junos OS software, see “[Installing Junos OS Software on a Standalone Device Running Satellite Software](#)” on page 119.

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

Conversion of EX2300 and EX3400 switches from satellite devices to standalone devices cannot be initiated from the aggregation device. To install Junos OS software on an EX2300 or EX3400 switch acting as a satellite device, see “[Installing Junos OS Software on a Standalone Device Running Satellite Software](#)” on page 119.

## Download Junos OS Software

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

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

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

1. Using a Web browser, navigate to the Junos OS software download URL on the Juniper Networks webpage:  
<https://www.juniper.net/support/downloads>
2. Log in to the Juniper Networks authentication system using the username (generally your e-mail address) and password supplied by Juniper Networks representatives.

3. Select **By Technology > Junos Platform > Junos Fusion** from the drop-down list and select the switch platform series and model for your satellite device.
4. Select the version of Junos OS that you want to run on the satellite device after removing it from the Junos Fusion.
5. Review and accept the End User License Agreement.
6. Download the software to a local host.
7. Copy the software to the routing platform or to your internal software distribution site.

### Disable the Automatic Conversion Configuration

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

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

```
[edit]
user@aggregation-device> request chassis satellite install fpc-slot 103
/var/tmp/jinstall-ex-4300-14.1X53-D43.7-domestic-signed.tgz

Convert satellite device to Junos standalone device? [yes,no] (no) yes

Verified jinstall-ex-4300-14.1X53-D43.7-domestic.tgz signed by
PackageProductionEc_2017 method ECDSA256+SHA256

Satellite 103 is configured in the auto-satellite-conversion list

Please remove it from the list before converting to standalone
```

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

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

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

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

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

2. Commit the configuration.

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

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

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

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



## Install Junos OS Software on the Satellite Device

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

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

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

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

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

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

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

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

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

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

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

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

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

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

#### Release History Table

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

#### RELATED DOCUMENTATION

[Understanding Software in a Junos Fusion Provider Edge](#) | 19

*Understanding Software in a Junos Fusion Enterprise*

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

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

- It was removed from a Junos Fusion without following the instructions in [“Converting a Satellite Device in a Junos Fusion to a Standalone Device” on page 114](#), which include a Junos OS installation.

- Satellite software was installed on the device but the device was never provisioned into a Junos Fusion.

**NOTE:** If you are removing a satellite device from a Junos Fusion, you must first make sure that automatic satellite conversion is disabled for the satellite device's FPC slot ID. See [“Converting a Satellite Device in a Junos Fusion to a Standalone Device” on page 114](#).

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 [Bootting 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\nl\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 | 114](#)

# Junos Fusion Provider Edge Operational Commands

## IN THIS CHAPTER

- request chassis device-mode satellite | 124
- request chassis satellite disable | 125
- request chassis satellite enable | 127
- request chassis satellite file-copy | 129
- request chassis satellite install | 131
- request chassis satellite interface | 134
- request chassis satellite login | 136
- request chassis satellite reboot | 137
- request chassis satellite restart | 139
- request chassis satellite shell-command | 140
- request system software add | 141
- request system software delete | 164
- request system software rollback | 169
- request system storage cleanup | 175
- show chassis alarms | 195
- show chassis environment | 219
- show chassis environment fpc | 332
- show chassis environment pem | 412
- show chassis environment routing-engine | 432
- show chassis firmware | 442
- show chassis fan | 462
- show chassis hardware | 479
- show chassis led satellite | 496
- show chassis routing-engine | 501
- show chassis satellite | 530
- show chassis satellite extended-port | 544
- show chassis satellite interface | 549
- show chassis satellite neighbor | 556

- [show chassis satellite software | 562](#)
- [show chassis satellite statistics | 565](#)
- [show chassis satellite unprovision | 572](#)
- [show chassis satellite upgrade-group | 578](#)
- [show chassis temperature-thresholds | 582](#)
- [show interfaces extensive satellite-device | 617](#)
- [show interfaces satellite-device | 641](#)
- [show interfaces statistics | 647](#)
- [show interfaces terse satellite-device | 664](#)
- [show system core-dumps | 668](#)
- [show system storage satellite | 686](#)

## request chassis device-mode satellite

### Syntax

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

### Release Information

Command introduced in Junos OS Release 14.1X53-D16.

### 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 44](#) 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

## RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 44](#)

*Configuring or Expanding a Junos Fusion Enterprise*

### List of Sample Output

[request chassis device-mode satellite /var/tmp/satellite-3.0R1.1-signed.tgz on page 124](#)

## Sample Output

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

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

## request chassis satellite disable

### Syntax

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

### Release Information

Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### 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

## RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 44](#)

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

### List of Sample Output

[request chassis satellite disable device-alias satellite-01 on page 126](#)

[request chassis satellite disable fpc-slot 101 on page 126](#)



## Sample Output

```
request chassis satellite disable device-alias satellite-01
```

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

## Sample Output

```
request chassis satellite disable fpc-slot 101
```

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

## request chassis satellite enable

### Syntax

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

### Release Information

Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### 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 *alias-name***—Enable the satellite device with the specified alias name in the Junos Fusion.

**fpc *fpc-slot***—Enable the device with the specified FPC slot ID as a satellite device in the Junos Fusion.

### Required Privilege Level

system-control

## RELATED DOCUMENTATION

*Configuring or Expanding a Junos Fusion Enterprise*

[Configuring Junos Fusion Provider Edge | 44](#)

### List of Sample Output

[request chassis satellite enable device-alias satellite-01 on page 127](#)

[request chassis satellite enable fpc-slot 101 on page 128](#)

## Sample Output

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

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

## Sample Output

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

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

## request chassis satellite file-copy

### Syntax

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

### Release Information

Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### 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.

**source-URL**—Specify the URL of the file that is copied.

If no device is specified as the *source-URL*, the file is copied from the aggregation device.

To specify a satellite device in the *source-URL*, enter **sdslot-id-number** at the beginning of the *source-URL*. For example, enter **sd101:/var/tmp/filename.txt** to specify that filename.txt in the /var/tmp directory on the satellite device using FPC slot ID number 101 is the *source-URL*.

**destination-URL**—Specify the destination URL where the file is copied into.

If no device is specified as the *destination-URL*, the file is copied into the aggregation device.

To specify a satellite device in the *destination-URL*, enter **sdslot-id-number** at the beginning of the *destination-URL*. For example, enter **sd101:/var/tmp/** to specify the /var/tmp directory on the satellite device using FPC slot ID number 101 as the *source-URL*.

### Required Privilege Level

system-control

### RELATED DOCUMENTATION

*Configuring or Expanding a Junos Fusion Enterprise*

[Configuring Junos Fusion Provider Edge](#) | 44

### List of Sample Output

[request chassis satellite file-copy on page 130](#)

## Sample Output

**request chassis satellite file-copy**

user@aggregation-device> **request chassis satellite file-copy /var/tmp/file\_name sd101:/var/tmp/**

## request chassis satellite install

### Syntax

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

### Release Information

Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### Description

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

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

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

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

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

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

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

### Options

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

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

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

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

### Required Privilege Level

system-control

## RELATED DOCUMENTATION

*Configuring or Expanding a Junos Fusion Enterprise*

[Configuring Junos Fusion Provider Edge | 44](#)

### List of Sample Output

[request chassis satellite install /var/tmp/jinstall-ex-4300-14.1X53-D16.1-domestic-signed.tgz fpc-slot 101 \(EX4300 switch as satellite device\) on page 132](#)

[request chassis satellite install /var/tmp/install-media-pxe-qfx-5-14.1X53-D16.2.tgz fpc-slot 102 \(QFX5100 switch as satellite device\) on page 132](#)

## Sample Output

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

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

```
Response from device:
  Conversion Started
```

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

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

Response from device:  
Conversion Started



## request chassis satellite interface

### Syntax

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

### Release Information

Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### 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 44](#) 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

## RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 44](#)

*Configuring or Expanding a Junos Fusion Enterprise*

### List of Sample Output

[request chassis satellite interface xe-0/0/1 device-mode satellite on page 135](#)

## Sample Output

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

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

## request chassis satellite login

### Syntax

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

### Release Information

Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### 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 *fpc-slot***—Log in to the satellite device with the specified FPC slot ID.

**interface-name *interface-name***—Log in to the satellite device connected to the specified interface. The *interface-name* is the cascade port on the aggregation device.

### Required Privilege Level

system-control

## RELATED DOCUMENTATION

*Configuring or Expanding a Junos Fusion Enterprise*

[Configuring Junos Fusion Provider Edge | 44](#)

### List of Sample Output

[request chassis satellite login fpc-slot 101 on page 136](#)

## Sample Output

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

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

## request chassis satellite reboot

### Syntax

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

### Release Information

Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### 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

## RELATED DOCUMENTATION

*Configuring or Expanding a Junos Fusion Enterprise*

[Configuring Junos Fusion Provider Edge](#) | 44

### List of Sample Output

[request chassis satellite reboot fpc 101 on page 137](#)

[request chassis satellite reboot range 101-103 on page 138](#)

## Sample Output

**request chassis satellite reboot fpc 101**

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

## Sample Output

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

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

## request chassis satellite restart

### Syntax

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

### Release Information

Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### 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

**fpc *fpc-slot***—Restart the specified process on the satellite device in the specified FPC slot ID only.

**range**—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 *range* of **101-103**.

***process-name***—Restart the specified process on the specified FPC slot ID or range of FPC slot IDs.

### Required Privilege Level

system-control

### RELATED DOCUMENTATION

*Configuring or Expanding a Junos Fusion Enterprise*

[Configuring Junos Fusion Provider Edge](#) | 44

## request chassis satellite shell-command

### Syntax

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

### Release Information

Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### Description

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

### Options

**fpc *fpc-slot***—Run the shell command on the satellite device using the specified FPC slot identifier only.

***range***—Run the shell command on the satellite devices in the specified range of FPC slot identifiers only.

For instance, you can run the shell command on the satellite devices in FPC slot identifiers 101, 102, and 103 by entering a *range* of **101-103**.

***remote-command***—Specify the UNIX shell command to run on the satellite device or devices.

### Required Privilege Level

system-control

## RELATED DOCUMENTATION

*Configuring or Expanding a Junos Fusion Enterprise*

[Configuring Junos Fusion Provider Edge](#) | 44

## request system software add

### List of Syntax

[Syntax on page 141](#)

[Syntax \(EX Series Switches\) on page 141](#)

[Syntax \(TX Matrix Router\) on page 142](#)

[Syntax \(TX Matrix Plus Router\) on page 142](#)

[Syntax \(MX Series Router\) on page 142](#)

[Syntax \(QFX Series\) on page 143](#)

[Syntax \(OCX Series\) on page 143](#)

[Syntax \(Junos OS Evolved\) on page 144](#)

### Syntax

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

### Syntax (EX Series Switches)

```
request system software add package-name
<best-effort-load>
<delay-restart>
<force>
<no-copy>
<no-validate>
<re0 | re1>
<reboot>
<set [package-name1 package-name2]>
```



```

<upgrade-with-config>
<validate>
<validate-on-host hostname>
<validate-on-routing-engine routing-engine>

```

### Syntax (TX Matrix Router)

```

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

```

### Syntax (TX Matrix Plus Router)

```

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

```

### Syntax (MX Series Router)

```

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

```

### Syntax (QFX Series)

```

request system software add package-name
<best-effort-load>
<component all>
<delay-restart>
<force>
<force-host>
<no-copy>
<partition>
<reboot>
<unlink>
<upgrade-with-config>

```

### Syntax (OCX Series)

```

request system software add package-name
<best-effort-load>
<delay-restart>
<force>
<force-host>
<no-copy>
<no-validate>

```

```
<reboot>
<unlink>
<upgrade-with-config>
<validate>
```

### Syntax (Junos OS Evolved)

```
request system software add package-name
<force>
<no-validate>
<reboot>
<restart>
```

### Release Information

Command introduced before Junos OS Release 7.4.

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

Command introduced in Junos OS Release 9.0 for EX Series switches.

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

Command introduced in Junos OS Release 11.1 for the QFX Series.

**set [package-name1 package-name2]** option added in Junos OS Release 11.1 for EX Series switches. Added in Junos OS Release 12.2 for M Series, MX Series, and T Series routers.

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

**upgrade-with-config** and **upgrade-with-config-format** *format* options added in Junos OS Release 12.3 for M Series routers, MX Series routers, and T Series routers, EX Series Ethernet switches, and QFX Series devices.

Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

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

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

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

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

## Description

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

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

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

For information on valid filename and URL formats, see *Format for Specifying Filenames and URLs in Junos OS CLI Commands*.



**CAUTION:** Any configuration changes performed after inputting the **request system software add** command will be lost when the system reboots with an upgraded version of Junos OS.

**NOTE:** Starting from Junos OS Release 17.2R1, PTX10008 routers do not support the **request system software add** command. Starting from Junos OS Release 17.4R1, PTX10016 routers do not support the **request system software add** command. Use the **request vmhost software add** command instead of the **request system software add** command on the PTX10008 and PTX10016 routers to install or upgrade the Junos OS software package or bundle on the router. See *request vmhost software add*.

**NOTE:** When graceful Routing Engine switchover (GRES) is enabled on a device, you must perform a unified in-service software upgrade (ISSU) operation to update the software running on the device. With GRES enabled, if you attempt to perform a software upgrade by entering the **request system software add package-name** command, an error message is displayed stating that only in-service software upgrades are supported when GRES is configured. In such a case, you must either remove the GRES configuration before you attempt the upgrade or perform a unified ISSU.

**NOTE:** Starting with Junos OS Release 15.1F3, the statement **request system software add** installs a software package for the guest OS only for the PTX5000 router with RE-DUO-C2600-16G, and for MX240, MX480, and MX960 routers with RE-S-1800X4-32G-S.

Starting with Junos OS Release 15.1F5, the statement **request system software add** installs a software package for the guest OS only for the MX2010 and MX2020 routers with REMX2K-1800-32G-S.

On these routers, in order to install both Junos software and host software packages, use the **request vmhost software add** command.

### Options

**package-name**—Location from which the software package or bundle is to be installed.

**NOTE:** In Junos OS, **package-name** can be 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**.

**NOTE:**

- The **pathname** in the protocol is the relative path to the user's home directory on the remote system and not the root directory.
- Do not use the **scp** protocol in the **request system software add** command to download and install a software package or bundle from a remote location. The previous statement does not apply to the QFabric switch. The software upgrade is handled by the management process (mgd), which does not support scp.

Use the **file copy** command to copy the software package or bundle from the remote location to the **/var/tmp** directory on the hard disk:

**file copy scp://source/package-name /var/tmp**

Then install the software package or bundle using the **request system software add** command:

**request system software add /var/tmp/package-name**

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

**component all**—(QFabric systems only) (Optional) Install the software package on all of the QFabric components.

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

**device-alias alias-name**—(Junos Fusion only) (Optional) Install the satellite software package onto the specified satellite device using the satellite device's alias name.

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

**NOTE:** For Junos OS Evolved, if you are trying to reinstall an already installed application, use the **force** option. The **force** option will cause the program to remove the existing application before reinstalling it.

**force-host**—(Optional) Force the addition of the host software package or bundle (ignore warnings) on the QFX5100 device.

**lcc number** —(TX Matrix routers and TX Matrix Plus routers only) (Optional) In a routing matrix based on the TX Matrix router, install a software package or bundle on a T640 router that is connected to the TX Matrix router. In a routing matrix based on the TX Matrix Plus router, install a software package or bundle on a router that is connected to the TX Matrix Plus router.

Replace *number* with the following values depending on the LCC configuration:

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

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

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

**satellite *slot-id***—(Junos Fusion only) (Optional) Install the satellite software package onto the specified satellite device using the satellite devices FPC slot identifier.

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

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

**no-copy**—(Optional) Install a software package or bundle, but do not save copies of the package or bundle files.

**no-validate**—(Optional) When loading a software package or bundle with a different release, suppress the default behavior of the **validate** option.

**NOTE:** Software packages from unidentified providers cannot be loaded. To authorize providers, include the **provider-id** statement at the **[edit system extensions provider]** hierarchy level.

**re0 | re1**—(Optional) On routers or switches that support dual or redundant Routing Engines, load a software package or bundle on the Routing Engine in slot 0 (re0) or the Routing Engine in slot 1 (re1).

**reboot**—(Optional) After adding the software package or bundle, reboot the system. On a QFabric switch, the software installation is not complete until you reboot the component for which you have installed the software.

**NOTE:** The **reboot** command is not needed to install third-party applications on devices running Junos OS Evolved.

**restart**—(Optional) (For Junos OS Evolved only) This option allows you to upgrade the system using an application-level restart without requiring a reboot when possible. First the system determines how many applications need to restart (start with a new version), and then, after sending output to the CLI session, it restarts those applications. Restarted applications resync their state from the system. You can use the *request system software validate-restart* command before using the **request system software add restart** command to determine if the upgrade to the new image can be done by application-restart or if it requires a reboot.

**set [package-name1 package-name2]**—(Mixed EX4200 and EX4500 Virtual Chassis, M Series, MX Series, and T Series routers only) (Optional) Install multiple packages at same time:

- In the case of mixed EX4200 and EX4500 Virtual Chassis, install two software packages—a package for an EX4200 switch and the same release of the package for an EX4500 switch—to upgrade all member switches in a mixed EX4200 and EX4500 Virtual Chassis.
- In the case of M Series, MX Series, and T Series routers, install multiple (two or more) software packages and software add-on packages at the same time. The variable **package-name** can either be a list of installation packages, each separated by a blank space, or the full URL to the directory or tar file containing the list of installation packages.

In each case, **installation-package** can either be a list of installation packages, each separated by a blank space, or the full URL to the directory or tar file containing the list of installation packages.

Use the **request system software add set** command to retain any SDK configuration by installing the SDK add-on packages along with the core Junos OS installation package.

**unlink**—(Optional) On M Series, T Series, and MX Series routers, use the unlink option to remove the software package from this directory after a successful upgrade is completed.

**upgrade-group [ all |upgrade-group-name]**—(Junos Fusion only) (Required to configure a Junos Fusion using autoconversion or manual conversion) Associate a satellite software image with a satellite software upgrade group. The satellite software package is associated with the specified satellite software upgrade group using the *upgrade-group-name*, or for all satellite software upgrade groups in a Junos Fusion when the all keyword is specified.

A satellite software upgrade group is a group of satellite devices in a Junos Fusion that are designated to upgrade to the same satellite software version using the same satellite software package. See [“Understanding Software in a Junos Fusion Provider Edge” on page 19](#), *Understanding Software in a Junos Fusion Enterprise*, and [“Managing Satellite Software Upgrade Groups in a Junos Fusion” on page 95](#).



**upgrade-with-config**—(Optional) Install one or more configuration files.

**NOTE:** Configuration files specified with this option must have the extension **.text** or **.xml** and have the extension specified. Using the extension **.txt** will not work.

**validate**—(Optional) Validate the software package or bundle against the current configuration as a prerequisite to adding the software package or bundle. This is the default behavior when the software package or bundle being added is a different release.

**NOTE:** The **validate** option only works on systems that do not have **graceful-switchover** (GRES) enabled. To use the **validate** option on a system with GRES, either disable GRES for the duration of the installation, or install using the command **request system software in-service-upgrade**, which requires nonstop active routing (NSR) to be enabled when using GRES.

**validate-on-host *hostname***—(Optional) Validate the software package by comparing it to the running configuration on a remote Junos OS host. Specify a host, replacing ***hostname*** with the remote hostname. You can optionally provide the username that will be used to log in to the remote host by specifying the hostname in the format **user@hostname**.

**validate-on-routing-engine *routing-engine***—(Optional) Validate the software bundle or package by comparing it to the running configuration on a Junos OS Routing Engine on the same chassis. Specify a Routing Engine, replacing ***routing-engine*** with the routing engine name.

### Additional Information

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

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

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

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

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

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

Likewise, when you issue the **request system software add *package-name*** command on a TX Matrix Plus master Routing Engine, all the T1600 or T4000 master Routing Engines that are connected to it are upgraded to the same version of software. If you issue the same command on the TX Matrix Plus backup Routing Engine, all the T1600 or T4000 backup Routing Engines that are connected to it are upgraded to the same version of software.

Before installing software on a device that has one or more custom YANG data models added to it, back up and remove the configuration data corresponding to the custom YANG data models from the active configuration. For more information see *Managing YANG Packages and Configurations During a Software Upgrade or Downgrade*.

### Required Privilege Level

maintenance

## RELATED DOCUMENTATION

*Format for Specifying Filenames and URLs in Junos OS CLI Commands*

[request system software delete | 164](#)

[request system software rollback | 169](#)

[request system storage cleanup | 175](#)

*Installing Software Packages on QFX Series Devices*

*Upgrading Software on a QFabric System*

[Managing Satellite Software Upgrade Groups in a Junos Fusion | 95](#)

*request system software add (Maintenance)*

[Routing Matrix with a TX Matrix Plus Router Solutions Page](#)

## List of Sample Output

[request system software add validate on page 152](#)

[request system software add /var/tmp/ no-validate on page 153](#)

[request system software add no-copy no-validate reboot on page 154](#)

[request system software add validate-on-host on page 154](#)

[request system software add \(Mixed EX4200 and EX4500 Virtual Chassis\) on page 156](#)

[request system software add component all \(QFabric Systems\) on page 156](#)

[request system software add upgrade-group \(Junos Fusion\) on page 156](#)

[request system software add restart \(Junos OS Evolved for fixed form platforms\) on page 156](#)

[request system software add restart \(Junos OS Evolved for chassis-based platforms\) on page 160](#)

## 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-indeb.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 restart (Junos OS Evolved for fixed form platforms)**

```

user@device> request system software add restart /var/tmp/qfx-ms-fixed-1-target1-ifmanarpcos.iso

```

```

Adding software images. This process can take several minutes. Please be patient...
Download and Validate in Progress

```

```

re0: Starting upgrade : /var/tmp/qfx-ms-fixed-1-target1-ifmanarpcos.iso
re0: Single RE upgrade detected.
re0: Installing IMA keys of the incoming ISO image...
re0: Validating existing configs. See /var/log/validation_config.log for config
validation logs.
re0: Validation Passed. Going ahead with Installation
re0: Starting the installation...
re0: Copying files to
//soft/junos-evo-install-qfx-ms-fixed-x86-64-19.2R1-20190522.4-EVOI20190523235333-1...
re0: Running post install commands...
re0: Post install sequence was successful.
re0: Installation of image
junos-evo-install-qfx-ms-fixed-x86-64-19.2R1-20190522.4-EVOI20190523235333-1 done.
re0: Boot version is now
'junos-evo-install-qfx-ms-fixed-x86-64-19.2R1-20190522.4-EVOI20190523235333-1'
Image validation and installation succeeded. Restarting Applications.

*** Restart Apps list ***
arpd
ifmand
cosd
Activating active instance of app arpd on node re0
Activating active instance of app ifmand on node re0
Activating active instance of app cosd on node re0
Image activation succeeded for arpd on node re0
Stopping active instance of app arpd on node re0
Image activation succeeded for ifmand on node re0
Stopping active instance of app ifmand on node re0
Image activation succeeded for cosd on node re0
Stopping active instance of app cosd on node re0
App arpd stopped on node re0
Starting active instance of app arpd on node re0
App ifmand stopped on node re0
Starting active instance of app ifmand on node re0
App cosd stopped on node re0
Starting active instance of app cosd on node re0
App cosd started/restarted on node re0
App ifmand started/restarted on node re0
App arpd started/restarted on node re0
*** Restart Summary ***
    *** Restart Success ***
    arpd
    ifmand

```



```
cosd
```

```
Please check the status of applications using 'show system alarms'
```

```
user@device> request system software add restart
/var/tmp/qfx-ms-fixed-1-target2-ifmanarpcossysman.iso
```

```
Adding software images. This process can take several minutes. Please be patient...
Download and Validate in Progress
re0: Starting upgrade : /var/tmp/qfx-ms-fixed-1-target2-ifmanarpcossysman.iso
re0: Single RE upgrade detected.
re0: Installing IMA keys of the incoming ISO image...
re0: Validating existing configs. See /var/log/validation_config.log for config
validation logs.
re0: Validation Passed. Going ahead with Installation
re0: Starting the installation...
re0: Copying files to
//soft/junos-evo-install-qfx-ms-fixed-x86-64-19.2R1-20190522.4-EVOI20190523235731-1...
re0: Running post install commands...
re0: Post install sequence was successful.
re0: Installation of image
junos-evo-install-qfx-ms-fixed-x86-64-19.2R1-20190522.4-EVOI20190523235731-1 done.
re0: Boot version is now
'junos-evo-install-qfx-ms-fixed-x86-64-19.2R1-20190522.4-EVOI20190523235731-1'
Image validation and installation succeeded. Restarting Applications.
```

```
*** Restart Apps list ***
```

```
sysman
```

```
arpd
```

```
ifmand
```

```
cosd
```

```
Activating active instance of app sysman on node re0
```

```
Image activation succeeded for sysman on node re0
```

```
Restarting active instance of app sysman on node re0
```

```
App sysman started/restarted on node re0
```

```
Activating active instance of app arpd on node re0
```

```
Activating active instance of app ifmand on node re0
```

```
Activating active instance of app cosd on node re0
```

```
Image activation succeeded for arpd on node re0
```

```
Stopping active instance of app arpd on node re0
```

```
Image activation succeeded for ifmand on node re0
```

```
Stopping active instance of app ifmand on node re0
```

```
Image activation succeeded for cosd on node re0
```

```
Stopping active instance of app cosd on node re0
```

```

App cosd stopped on node re0
Starting active instance of app cosd on node re0
App ifmand stopped on node re0
Starting active instance of app ifmand on node re0
App arpd stopped on node re0
Starting active instance of app arpd on node re0
App cosd started/restarted on node re0
App ifmand started/restarted on node re0
App arpd started/restarted on node re0
*** Restart Summary ***
    *** Restart Success ***
    sysman
    arpd
    ifmand
    cosd
Please check the status of applications using 'show system alarms'

```

user@device> **request system software add restart**  
**/var/tmp/qfx-ms-fixed-1-target3-ifmanarpcossysmanimgdorhd.iso**

```

ifmanarpcossysmanimgdor
Adding software images. This process can take several minutes. Please be patient...
Download and Validate in Progress
re0: Starting upgrade :
/var/tmp/qfx-ms-fixed-1-target3-ifmanarpcossysmanimgdorhd.iso
re0: Single RE upgrade detected.
re0: Installing IMA keys of the incoming ISO image...
re0: Validating existing configs. See /var/log/validation_config.log for config
validation logs.
re0: Validation Passed. Going ahead with Installation
re0: Starting the installation...
re0: Copying files to
//soft/junos-evo-install-qfx-ms-fixed-x86-64-19.2R1-20190522.4-EVOI20190524000025...
re0: Running post install commands...
re0: Post install sequence was successful.
re0: Installation of image
junos-evo-install-qfx-ms-fixed-x86-64-19.2R1-20190522.4-EVOI20190524000025-gsanka-1
done.
re0: Boot version is now
'junos-evo-install-qfx-ms-fixed-x86-64-19.2R1-20190522.4-EVOI20190524000025'
Image validation and installation succeeded. Restarting Applications.

*** Restart Apps list ***

```

```

sysman
arpd
ifmand
cosd
imgd
orchestrator
Activating active instance of app sysman on node re0
Image activation succeeded for sysman on node re0
Restarting active instance of app sysman on node re0
App sysman started/restarted on node re0
Activating active instance of app arpd on node re0
Activating active instance of app ifmand on node re0
Activating active instance of app cosd on node re0
Image activation succeeded for arpd on node re0
Stopping active instance of app arpd on node re0
Image activation succeeded for ifmand on node re0
Stopping active instance of app ifmand on node re0
Image activation succeeded for cosd on node re0
Stopping active instance of app cosd on node re0
App arpd stopped on node re0
Starting active instance of app arpd on node re0
App ifmand stopped on node re0
Starting active instance of app ifmand on node re0
App cosd stopped on node re0
Starting active instance of app cosd on node re0
App cosd started/restarted on node re0
App arpd started/restarted on node re0
App ifmand started/restarted on node re0
Activating active instance of app imgd on node re0
Activating active instance of app orchestrator on node re0
Image activation succeeded for imgd on node re0
Image activation succeeded for orchestrator on node re0
Restarting active instance of app imgd on node re0
Restarting active instance of app orchestrator on node re0

```

### request system software add restart (Junos OS Evolved for chassis-based platforms)

```
user@host> request system software add a.iso restart
```

```
Adding software images. This process can take several minutes. Please be patient...
```

```
*** List of Offlined FPCs ***
```

```

FPC0
FPC1
FPC2

Perform online for above FPCs (y/n) ? y

*** Incompatible FPCs ***

FPC0
FPC1

Warning: Perform offline for above incompatible FPCs

Perform offline for above incompatible FPCs (y/n) ? n

Aborting Software Upgrade

user@host>

```

```

Adding software images. This process can take several minutes. Please be patient...

*** Unsupported frus list ***
fpc0

Perform offline for above unsupported FPCs

Offline the incompatible FRUs before proceeding for upgrade?
Enter yes to proceed with offline for incompatible frus or no to abort the upgrade..
Proceed? [yes,no] (no) yes

*** Restart Apps list ***
sysman
arpd
mgd
orchestrator

*** Offlining of Unsupported frus may take few mins ***
fpc0 has been successfully offlined

*** Offlining of Unsupported frus are done ***

```

```

Activating active instance of app sysman on node re0
Activating active instance of app sysman on node rel
Activating active instance of app sysman on node fpc0
Image activation succeeded for sysman on node re0
Restarting active instance of app sysman on node re0
Image activation succeeded for sysman on node rel
Restarting active instance of app sysman on node rel
Image activation failed on node fpc0
App does not exist sysman on node fpc0
App sysman started/restarted on node re0
App sysman started/restarted on node rel
Activating active instance of app arpd on node re0
Image activation succeeded for arpd on node re0
Stopping active instance of app arpd on node re0
App arpd stopped on node re0
Starting active instance of app arpd on node re0
App arpd started/restarted on node re0
Activating active instance of app mgd on node re0
Activating active instance of app mgd on node rel
Activating active instance of app orchestrator on node re0
Image activation succeeded for mgd on node re0
Image activation succeeded for mgd on node rel
Image activation succeeded for orchestrator on node re0
Activating new version of the software on node fpc0
Activating new version of the software on node re0
Activating new version of the software on node rel
Image activation failed on node fpc0
Image activation succeeded on node re0
Image activation succeeded on node rel

*** Onlining of Unsupported frus may take few mins ***
fpc0 could not  to be onlined

*** Onlining of Unsupported frus are done ***
Restarting active instance of app mgd on node re0
Restarting active instance of app mgd on node rel
Restarting active instance of app orchestrator on node re0
*** Restart Summary ***
    *** Restart Success ***
    sysman
    sysman
    arpd
    *** Restart Failure ***
    sysman

```

```
Please restart the failed applications
Please check the status of applications using 'show system alarms'

WARNING: cli has been replaced by an updated version:
CLI release 20190916.173330_rbu-builder.r1055817 built by rbu-builder on 2019-09-16
 18:02:02 UTC
Restart cli using the new version ? [yes,no] (yes) yes

Restarting cli ...
{master}
root@scapa-infra-01-re0>
```

## request system software delete

### List of Syntax

[Syntax on page 164](#)

[Syntax \(TX Matrix Router\) on page 164](#)

[Syntax \(Junos OS Evolved \) on page 164](#)

### Syntax

```
request system software delete software-package
<force>
<reboot>
<set [package-name package-name]>
<upgrade-group [all |upgrade-group-name]>
<version version-string>
```

### Syntax (TX Matrix Router)

```
request system software delete software-package
<force>
<lcc number | scc>
<reboot>
<set [package-name package-name]>
```

### Syntax (Junos OS Evolved )

```
request system software delete
<force>
<package-name>
<all-third-party-packages>
```

### Release Information

Command introduced before Junos OS Release 7.4.

Command introduced in Junos OS Release 9.0 for EX Series switches.

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

Command introduced in Junos OS Release 11.1 for the QFX Series.

**set [*package-name package-name*]** option added in Junos OS Release 12.2 for M Series, MX Series, and T Series routers.

**reboot** option introduced in Junos OS Release 12.3.

Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

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

**all-third-party-packages** option introduced in Junos OS Evolved Release 19.4R2.

## Description

Remove a software package or bundle from the router or switch.



**CAUTION:** Before removing a software package or bundle, make sure that you have already placed the new software package or bundle that you intend to load onto the router or switch.

## Options

**package-name**—(Only for Junos OS Evolved) Name of the Junos OS Evolved package running on the device.

You can see this package name by using the **request system software list** command. Type the package-name explicitly and do not use the tab key to auto-complete the command.

**software-package**—(Not available on Junos OS Evolved) 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
- **crypto**—(Optional, in domestic version only) Junos security software
- **jdocs**—(Optional) Junos online documentation file
- **jkernel**—(Optional) Junos kernel software suite
- **jpfe**—(Optional) Junos Packet Forwarding Engine support
- **jroute**—(Optional) Junos routing software suite
- **junos**—(Optional) Junos base software

**NOTE:** On EX Series switches, some of the package names are different than those listed. To see the list of packages that you can delete on an EX Series switch, enter the command **show system software**.

**all-third-party-packages**—(Junos OS Evolved only) (Optional) Delete all third-party software on the device.

**force**—(Optional) Ignore warnings and force removal of the software.

**lcc number**—(TX Matrix routers and TX Matrix Plus routers only) (Optional) In a routing matrix, delete a software package or bundle on a T640 router indicated by **lcc number** that is connected to the TX Matrix router. In a routing matrix, delete a software package or bundle on a router indicated by **lcc number** that is connected to the TX Matrix Plus router.



Replace *number* with the following values depending on the LCC configuration:

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**re0 | re1**—(Optional) On routers or switches that support dual or redundant Routing Engines, delete a software package or bundle on the Routing Engine in slot 0 (re0) or the Routing Engine in slot 1 (re1).

**reboot**—As of Junos OS 12.3 and greater, automatically reboot upon completing the **request system software delete** command.

**scc**—(TX Matrix routers only) (Optional) Remove an extension or upgrade package from the TX Matrix router (or switch-card chassis).

**set [package-name package-name]**—(M Series, MX Series, and T Series routers only) (Optional) Install multiple software packages or software add-on packages at the same time.

**sfc number**—(TX Matrix Plus routers only) (Optional) Remove an extension or upgrade package from the TX Matrix Plus router. Replace *number* with 0.

**upgrade-group [ all [upgrade-group-name]**—(Junos Fusion only) Delete the satellite software image association with the specified satellite software upgrade group.

A satellite software upgrade group is a group of satellite devices in the same Junos Fusion that are designated to upgrade to the same satellite software version using the same satellite software package.

**version version-string**—(Junos Fusion only) (Optional) Delete a satellite software package association with a satellite software upgrade group by selecting the satellite software package's version.

### Additional Information

Before upgrading the software on the router or switch, when you have a known stable system, issue the **request system snapshot** command to back up the software, including the configuration, to the /altroot and /altconfig file systems (on routers) or the /, /altroot, /config, /var, and /var/tmp file systems (on switches). After you have upgraded the software on the router or switch and are satisfied that the new packages are successfully installed and running, issue the **request system snapshot** command again to back up the new software to the /altroot and /altconfig file systems (on routers) or the /, /altroot, /config, /var, and /var/tmp file systems (on switches). After you run the **request system snapshot** command, you cannot return to the previous version of the software, because the running and backup copies of the software are identical.

**Required Privilege Level**

maintenance

**RELATED DOCUMENTATION**[request system software add | 141](#)[request system software rollback | 169](#)[request system software validate](#)[Routing Matrix with a TX Matrix Plus Router Solutions Page](#)**List of Sample Output**[request system software delete jdocs on page 167](#)[request system software delete \(Junos OS Evolved\) on page 168](#)**Output Fields**

When you enter this command, you are provided feedback on the status of your request.

**Sample Output****request system software delete jdocs**

The following example displays the system software packages before and after the **jdocs** package is deleted through the **request system software delete** command:

```
user@host> show system software
```

```
Information for jbase:
```

```
Comment:
```

```
JUNOS Base OS Software Suite [7.2R1.7]
```

```
Information for jcrypto:
```

```
Comment:
```

```
JUNOS Crypto Software Suite [7.2R1.7]
```

```
Information for jdocs:
```

```
Comment:
```

```
JUNOS Online Documentation [7.2R1.7]
```

```
Information for jkernel:
```

```
Comment:
```

```
JUNOS Kernel Software Suite [7.2R1.7]
```

```
...
```

```
user@host> show system software
```

```
Information for jbase:
```

```
Comment:
```

```
JUNOS Base OS Software Suite [7.2R1.7]
```

```
Information for jcrypto:
```

```
Comment:
```

```
JUNOS Crypto Software Suite [7.2R1.7]
```

```
Information for jkernel:
```

```
Comment:
```

```
JUNOS Kernel Software Suite [7.2R1.7]
```

```
...
```

### **request system software delete (Junos OS Evolved)**

```
user@host> request system software delete junos-evo-install-qfx-fixed-x86-64-18.3I20180911102422
```

```
Removing version 'junos-evo-install-qfx-fixed-x86-64-18.3I20180911102422'.
```

```
Software ... done.
```

```
Data ... done.
```

```
Version 'junos-evo-evo-qfx-fixed-x86-64-18.3I20180911102422' removed successfully.
```

## request system software rollback

### List of Syntax

[Syntax on page 169](#)

[Syntax \(EX Series Switches\) on page 169](#)

[Syntax \(TX Matrix Router\) on page 169](#)

[Syntax \(TX Matrix Plus Router\) on page 169](#)

[Syntax \(MX Series Router\) on page 169](#)

[Syntax \(Junos OS Evolved\) on page 170](#)

### 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]>
```

### Syntax (Junos OS Evolved)

```
request system software rollback
<no-validate>
<package-name>
<reboot>
<validate>
<with-old-snapshot-config>
```

### Release Information

Command introduced before Junos OS Release 7.4.

Command introduced in Junos OS Release 9.0 for EX Series switches.

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

Command introduced in Junos OS Release 11.1 for the QFX Series.

Command behavior changed in Junos OS Release 12.1.

**reboot** option introduced in Junos OS Release 12.3.

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

**force** option deprecated in Junos OS Release 15.1 for Junos OS with Upgraded FreeBSD.

**NOTE:** To determine which platforms run Junos OS with Upgraded FreeBSD, see the table listing the platforms currently running Junos OS with upgraded FreeBSD in *Release Information for Junos OS with Upgraded FreeBSD*.

**validate** and **no-validate** options introduced for Junos OS Evolved Release 18.3R1.

**package-name version** option introduced for Junos OS Evolved Release 18.3R1.

**with-old-snapshot-config** option introduced for Junos OS Evolved Release 18.3R1.

### Description

This command reverts to the last successfully installed package before the **request system software (add | delete)** command. It uses the copy stored in the **/var/sw/pkg** directory.

### Additional Information

- On Junos Fusion, the **request system software rollback** command can be used to roll back the version of satellite software associated with a satellite software upgrade group. Rolling back the version of satellite software associated with a satellite software upgrade group triggers a satellite software upgrade.
- On M Series and T Series routers, if **request system software add <jinstall> reboot** was used for the previous installation, then **request system software rollback** has no effect. In this case, use **jinstall** to reinstall the required package.
- On M Series and T Series routers, if **request system software add <sdk1>** was used for the previous installation, then **request system software rollback** removes the last installed SDK package (**sdk1** in this example).
- On SRX Series devices with dual root systems, when **request system software rollback** is run, the system switches to the alternate root. Each root can have a different version of Junos OS. Roll back takes each root back to the previously installed image.
- On QFX3500 and QFX3600 devices in a mixed Virtual Chassis, when the **request system software rollback** command is issued, the system does not rollback to the image stored in the alternate partition.
- On QFX5100 switches, the **reboot** option has been removed. To reboot the switch after a software rollback, issue the **request system reboot** command as a separate, secondary command.
- On Junos OS Evolved, the **reboot** command is required in order to complete the rollback.

### Options

**all-members**—(EX4200 switches and MX Series routers only) (Optional) Attempt to roll back to the previous set of packages on all members of the Virtual Chassis configuration.

**device-alias *alias-name***—(Junos Fusion only) (Optional) Rollback the satellite software package onto the specified satellite device using the satellite devices FPC slot identifier.

**lcc *number***—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, attempt to roll back to the previous set of packages on a T640 router connected to the TX Matrix router. On a TX Matrix Plus router, attempt to roll back to the previous set of packages on a connected router connected to the TX Matrix Plus router.

Replace *number* with the following values depending on the LCC configuration:

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**local**—(EX4200 switches and MX Series routers only) (Optional) Attempt to roll back to the previous set of packages on the local Virtual Chassis member.

**member *member-id***—(EX4200 switches and MX Series routers only) (Optional) Attempt to roll back to the previous set of packages on the specified member of the Virtual Chassis configuration. For EX4200 switches, replace ***member-id*** with a value from 0 through 9. For an MX Series Virtual Chassis, replace ***member-id*** with a value of 0 or 1.

**no-validate | validate**—(Only for Junos OS Evolved) Check compatibility with current configuration, yes or no.

**none**—For all versions of Junos OS up to and including Junos OS 11.4, revert to the set of software as of the last successful **request system software add**. As of Junos OS 12.1 and later, revert to the last known good state before the most recent **request system software (add | delete)** command.

**package-name *version***—(Junos OS Evolved only) Select any installed version for the rollback. The **request system software rollback** command uses the version instead of the package-name. you can see the available versions by using the **show system software list** command. If a version is not specified, the system rolls back to the default rollback version (the one with the '<' before it on the **show system software list** command output). You can specify any previous Junos OS Evolved release as long as it is not the one that is currently running or the rollback version.

**reboot**—(Optional) For Junos OS 12.3 and later, the system reboots automatically to complete the rollback. However, for Junos OS Evolved, you must explicitly specify the **reboot** option to complete the rollback.

**satellite *slot-id***—(Junos Fusion only) (Optional) Roll back the satellite software package onto the specified satellite device using the satellite devices FPC slot identifier.

**scc**—(TX Matrix routers only) (Optional) Attempt to roll back to the previous set of packages on the TX Matrix router (or switch-card chassis).

**sfc *number***—(TX Matrix Plus routers only) (Optional) Attempt to roll back to the previous set of packages on the TX Matrix Plus router. Replace ***number*** with 0.

**upgrade-group [ all | *upgrade-group-name*]**—(Junos Fusion only) Roll back the satellite software image associated with the specified satellite software upgrade group, or for all satellite software upgrade groups in the Junos Fusion when **all** is entered.

**validate | no-validate**—(Junos OS Evolved only).

**with-old-snapshot-config**—(Optional) (Junos OS Evolved only) Rolls back system to the specified version with the old snapshot of the configuration used in that version. Otherwise, the rollback, by default, takes the current configuration.

#### Required Privilege Level

maintenance

## RELATED DOCUMENTATION

*request system software abort*

[request system software add | 141](#)

[request system software delete | 164](#)

*request system software validate*

*request system configuration rescue delete*

*request system configuration rescue save*

[Routing Matrix with a TX Matrix Plus Router Solutions Page](#)

### List of Sample Output

[request system software rollback on page 173](#)

### 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 pppoe2d ...
Restarting rdd ...
Restarting rmopd ...
Restarting rtspd ...
Restarting sampled ...
Restarting serviced ...
Restarting snmpd ...
Restarting spd ...
Restarting vrrpd ...
```

```
WARNING: cli has been replaced by an updated version:
CLI release 7.2R1.7 built by builder on 2005-04-22 02:03:44 UTC
Restart cli using the new version ? [yes,no] (yes) yes
```

```
Restarting cli ...
user@host
```

## request system storage cleanup

### List of Syntax

[Syntax on page 175](#)

[Syntax \(EX Series Switches\) on page 175](#)

[Syntax \(MX Series Router\) on page 175](#)

[Syntax \(QFX Series\) on page 175](#)

[Syntax \(SRX Series\) on page 176](#)

[Syntax \(Junos OS Evolved\) on page 176](#)

### 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)>

```

### Syntax (Junos OS Evolved)

```

request system storage cleanup (dry-run | force-deep | no-confirm)

```

### Release Information

Command introduced in Junos OS Release 7.4.

**dry-run** option introduced in Junos OS Release 7.6.

Command introduced in Junos OS Release 9.0 for EX Series switches.

Command introduced in Junos OS Release 9.2 for SRX Series.

Command introduced in Junos OS Release 11.1 for the QFX Series.

Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**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.

### Description

Free storage space on the router or switch by rotating log files and proposing a list of files for deletion. User input is required for file deletion. On a QFabric system, you can delete debug files located on individual devices or on the entire QFabric system.

The Junos OS Evolved implementation of the **request system storage cleanup** command is slightly different from the implementation on Junos OS:

- The user is prompted to specify the **dry-run** option:

```
Please check the list of files to be deleted using the dry-run option.
Continue anyway without checking? [yes,no] (yes)
```

- When **request system storage cleanup** is executed, Junos OS Evolved displays the types of files that are being deleted. See the Sample Output section below for an example.
- Prior to Junos OS Evolved Release 20.1R1, the command cleans up any ISO files on the system, rotates syslogs, and clears trace files. It does not remove user-created files. Starting in Junos OS Evolved Release 20.1R1, this command does not remove ISO images from the system. It removes all core files, log files from **/var/log/**, and all **/var/log/\*** files. To remove old images from the device, use the [request system software delete](#) command.
- In Junos OS Evolved, the system computes the available space and emits o/p on console for reference.

**NOTE:** In Junos OS Evolved, the **request system storage cleanup | display xml rpc** command displays different XML tags for different file types. In Junos OS, only the **file** tag is displayed for all types of files. For more information about the differences between Junos OS and Junos OS Evolved, see *How Junos OS Evolved Differs from Junos OS*.

## Options

**all-members**—(EX4200 switches and MX Series routers only) (Optional) Delete files on the Virtual Chassis master Routing Engine only.

**NOTE:** To delete files on the other members of the Virtual Chassis configuration, log in to each backup Routing Engine and delete the files using the **request system storage cleanup local** command.

**component (UUID | serial number | all)**—(QFabric systems only) (Optional) Delete files located on individual QFabric system devices or on the entire QFabric system.

**director-group name**—(QFabric systems only) (Optional) Delete files on the Director group.

**dry-run**—(Optional) List files proposed for deletion (without deleting them).

**force-deep**—(Junos OS Evolved only) Deep clean all temporary files and rotate logs. This option cleans up all the user-created files under **/tmp** and **/var/tmp** directories.

**infrastructure *name***—(QFabric systems only) (Optional) Delete files on the fabric control Routing Engine and fabric manager Routing Engine.

**interconnect-device *name***—(QFabric systems only) (Optional) Delete files on the Interconnect device.

**local**—(EX4200 switches and MX Series routers only) (Optional) Delete files on the local Virtual Chassis member.

**member *member-id***—(EX4200 switches and MX Series routers only) (Optional) Delete files on the specified member of the Virtual Chassis configuration. For EX4200 switches, replace ***member-id*** with a value from 0 through 9. For an MX Series Virtual Chassis, replace ***member-id*** with a value of 0 or 1.

**name-tag *name-tag***—(QFabric systems only) (Optional) Delete debug files that match a specific regular expression.

**node-group *name***—(QFabric systems only) (Optional) Delete files on the Node group.

**no-confirm**—(Optional) Do not ask for confirmation before doing the cleanup.

**prune**—(QFabric systems only) (Optional) Delete debug files located in either the core or log debug repositories of a QFabric system device.

**qfabric component *name***—(QFabric systems only) (Optional) Delete debug files located in the debug repositories of a QFabric system device.

**(re0 | re1 | routing-engine (backup | both | local | master | other))**—(Optional) Request operation on system storage on RE0, RE1, or on specified Routing Engine by these classifications: backup, both, local, master, or other.

When Routing Engine is specified, the below message is shown before listing the files and deleting them.

```
Please check the list of files to be deleted using the dry-run option. i.e.
request system storage cleanup dry-run
Do you want to proceed ? [yes,no] (no)
```

**repository (core | log)**—(QFabric systems only) (Optional) Specify the repository on the QFabric system device for which you want to delete debug files.

**satellite [slot-id *slot-id* | device-alias *alias-name*]**—(Junos Fusion only) (Optional) Specify the satellite device in the Junos Fusion by FPC ID or device alias name for which you want to delete debug files.

### Additional Information

If logging is configured and being used, the **dry-run** option rotates the log files. In that case, the output displays the message “Currently rotating log files, please wait.” If no logging is currently under way, the output displays only a list of files to delete.

## Required Privilege Level

maintenance

## List of Sample Output

[request system storage cleanup dry-run on page 180](#)

[request system storage cleanup on page 180](#)

[request system storage cleanup \(Junos OS Evolved\) on page 181](#)

[request system storage cleanup dry-run \(Junos OS Evolved\) on page 183](#)

[request system storage cleanup force-deep \(Junos OS Evolved\) on page 184](#)

[request system storage cleanup director-group \(QFabric Systems\) on page 187](#)

[request system storage cleanup infrastructure device-name \(QFabric Systems\) on page 189](#)

[request system storage cleanup interconnect-device device-name \(QFabric Systems\) on page 190](#)

[request system storage cleanup node-group group-name \(QFabric Systems\) on page 192](#)

[request system storage cleanup qfabric component device-name \(QFabric Systems\) on page 193](#)

[request system storage cleanup qfabric component device-name repository core \(QFabric Systems\) on page 194](#)

[request system storage cleanup qfabric component all \(QFabric Systems\) on page 194](#)

## Output Fields

[Table 7 on page 179](#) describes the output fields for the **request system storage cleanup** command. Output fields are listed in the approximate order in which they appear.

Table 7: request system storage cleanup Output Fields

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

Table 7: 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 (Junos OS Evolved)

user@host> **request system storage cleanup**

Please check the list of files to be deleted using the dry-run option.  
Continue anyway without checking? [yes,no] (no) yes

-----  
node: re0  
-----

Clearing all core files

Clearing all local host core files and files from /var/log/watchdog

Clearing node specific core files

Clearing FPC log files



Clearing logical-systems log files

Clearing journal logs

Clearing all /var/log/\* files

Size	Date	Name
4.0K	Thu Nov 21 11:25	/var/log/__policy_names_rpdn__
4.0K	Thu Nov 21 11:27	/var/log/__policy_names_rpdn__
8.0K	Thu Nov 21 11:27	/var/log/alarm-mgmt
4.0K	Thu Nov 21 11:24	/var/log/boot_init.log
4.0K	Thu Nov 21 11:25	/var/log/charonctl_trace.log
4.0K	Thu Nov 21 11:23	/var/log/check_restore_recovery_bios.log
4.0K	Thu Nov 21 11:29	/var/log/clksyncd.log
80K	Thu Nov 21 11:27	/var/log/configd-streamer.log
4.0K	Thu Nov 21 11:25	/var/log/core_mgr.log
0	Thu Nov 21 11:24	/var/log/cscript.log
4.0K	Thu Nov 21 11:29	/var/log/ddosd.log
4.0K	Thu Nov 21 11:25	/var/log/disk_mgmt
4.0K	Thu Nov 21 11:29	/var/log/eth_linkmon.log
960K	Thu Nov 21 11:48	/var/log/evo-cda-zx.log
2.9M	Thu Nov 21 15:27	/var/log/evo_dns_relay.log
12K	Thu Nov 21 11:29	/var/log/evoinit.log
8.0K	Thu Nov 21 15:24	/var/log/fibd-proxy.log
4.0K	Thu Nov 21 11:25	/var/log/imgd.log
4.0K	Thu Nov 21 11:28	/var/log/interactive-commands
16K	Thu Nov 21 11:29	/var/log/kfirewall-agent.log
0	Thu Nov 21 11:27	/var/log/mcelog.log
12K	Thu Nov 21 11:29	/var/log/mem_mgmt.log
0	Thu Nov 21 11:26	/var/log/mem_monitor.dat
84K	Thu Nov 21 15:27	/var/log/messages
0	Thu Nov 21 11:26	/var/log/mgd-api
4.0K	Thu Nov 21 11:25	/var/log/mgmt-ethd-helper.log
44K	Thu Nov 21 11:28	/var/log/mib2d
4.0K	Thu Nov 21 11:25	/var/log/mstr.log
84K	Thu Nov 21 11:28	/var/log/packetio-cout.log
1.4M	Thu Nov 21 11:48	/var/log/picd.log
4.0K	Thu Nov 21 11:29	/var/log/platform_mon.log
4.0K	Thu Nov 21 11:29	/var/log/ptp_fpga.log
4.0K	Thu Nov 21 15:27	/var/log/security
4.0K	Thu Nov 21 11:29	/var/log/set_mgmt_mac.log

```

92K  Thu Nov 21 15:25  /var/log/sinet.log
16K  Thu Nov 21 11:28  /var/log/snmpd
4.0K Thu Nov 21 11:29  /var/log/ss.log
4.0K Thu Nov 21 11:24  /var/log/ssh-key-utils.log
4.0K Thu Nov 21 11:28  /var/log/sshd_lua.log
4.0K Thu Nov 21 11:29  /var/log/sysconfig.log
4.0K Thu Nov 21 11:29  /var/log/sysstart.log
4.0K Thu Nov 21 11:28  /var/log/system-events
20K  Thu Nov 21 11:24  /var/log/uswitch.log
24K  Thu Nov 21 11:23  /var/log/uswitch.log.prev
4.0K Thu Nov 21 11:26  /var/log/validator_debug.log
8.0K Thu Nov 21 15:24  /var/log/wtmp
4.2M Thu Nov 21 11:48  /var/log/zookeeper--server-re0.log
4.0K Thu Nov 21 11:25  /var/log/zookeeper--server-re0.out
4.0K Thu Nov 21 11:27  /var/log/ztp.log

```

Clearing all JSON files in /var/log/objmon

Cleared traces for application all node all pid all

Clearing SI traces

Removing any ISO files in /data

Current list of software versions installed

Active boot device is primary : /dev/vda

List of installed version(s) :

'-' running version





```

- junos-evo-install-ptx-fixed-x86-64-20.1-201911201458.0-EVO - [2019-11-21
11:23:21]

```

Current space available in /soft: 14752420 K and /data: 2788736 K

### request system storage cleanup dry-run (Junos OS Evolved)

```
user@host> request system storage cleanup dry-run
```

```

-----
node:  re0
-----
List of all core files to be cleared:

List of local_host core files to be cleared:

List of core sub directory files to be cleared:

List of log files from FPCs to be cleared:

List of log files from logical systems to be cleared:

Clears all App logs, App traces, App SI traces and App core files from /var/log/*,
/var/log/traces/*, /var/log/si_traces/* and /var/core/*

Clears all JSON files in /var/log/objmon/ during cleanup

List of ISO files from /data partition to be cleared:

Current list of software versions installed
Removes older software versions - Minimum two versions would be left around

Active boot device is primary : /dev/vda
List of installed version(s) :

    '-' running version
    '>' next boot version after upgrade/downgrade
    '<' rollback boot version

-   junos-evo-install-ptx-fixed-x86-64-20.1-201911201458.0-EVO - [2019-11-21
11:23:21]

```

### request system storage cleanup force-deep (Junos OS Evolved)

```
user@host> request system storage cleanup force-deep
```

Please check the list of files to be deleted using the dry-run option.  
Continue anyway without checking? [yes,no] (no) yes

```

-----
node: re0
-----
.....
===== Start cleanup now =====
=== Start removing other logs, traces, core files ===
Clearing core files
Clearing FPC logs
Clearing logical-systems logs
=== Clearing journal logs ===
Clearing log: /var/log/RE_journal.log
Clearing log: /var/log/RE_journal_boot.log
Clearing log: /var/log/alarm-mgmt
Clearing log: /var/log/appDemo_stdout
Clearing log: /var/log/charonctl_trace.log
Clearing log: /var/log/configd-streamer.log
Clearing log: /var/log/core_mgr.log
Clearing log: /var/log/cscript.log
Clearing log: /var/log/eth_linkmon.log
Clearing log: /var/log/evo-cda-zx.log
Clearing log: /var/log/evoinit.log
Clearing log: /var/log/fibd-proxy.log
Clearing log: /var/log/i2ctrace.log
Clearing log: /var/log/i2ctrace_spmb0.log
Clearing log: /var/log/i2ctrace_spmb1.log
Clearing log: /var/log/icmpd.log
Clearing log: /var/log/ifinfo.log
Clearing log: /var/log/imgd_svr.log
Clearing log: /var/log/install
Clearing log: /var/log/interactive-commands
Clearing log: /var/log/jsd
Clearing log: /var/log/lastlog
Clearing log: /var/log/mcelog.log
Clearing log: /var/log/messages
Clearing log: /var/log/mgd-api
Clearing log: /var/log/mgmt-ethd-helper.log
Clearing log: /var/log/mib2d
Clearing log: /var/log/na-grpcd
Clearing log: /var/log/objmon_sync.json
Clearing log: /var/log/packetio-cout.log
Clearing log: /var/log/picd.log

```

```

Clearing log: /var/log/platform_mon.log
Clearing log: /var/log/policerd.log
Clearing log: /var/log/postinstall.log
Clearing log: /var/log/ptp_fpga.log
Clearing log: /var/log/reboot_node.log
Clearing log: /var/log/rollback.log
Clearing log: /var/log/security
Clearing log: /var/log/semctl.log
Clearing log: /var/log/set_mgmt_mac.log
Clearing log: /var/log/shutdown_complete.log
Clearing log: /var/log/sinet.log
Clearing log:
/var/log/smartd-attr-SFSA200GM3AA4TO_C_HC_636_JUN-000060139624B1000020.log
Clearing log:
/var/log/smartd-attr-SFSA200GM3AA4TO_C_HC_636_JUN-000060139624B1000022.log
Clearing log: /var/log/snmpd
Clearing log: /var/log/ss.log
Clearing log: /var/log/ssh-key-utils.log
Clearing log: /var/log/sshd_lua.log
Clearing log: /var/log/sysconfig.log
Clearing log: /var/log/sysman.conf
Clearing log: /var/log/system-events
Clearing log: /var/log/upgrade_master.log
Clearing log: /var/log/uswitch.log
Clearing log: /var/log/uswitch.log.prev
Clearing log: /var/log/validator_debug.log
Clearing log: /var/log/wtmp
Clearing log: /var/log/zookeeper--server-re.log
Clearing log: /var/log/zookeeper--server-re.out
Clearing log: /var/log/ztp.log
=== Clearing all traces ===
=== Clearing SI traces ===
=== Removing other logs, traces, core files completed ===
=== Started removing any ISO files in /data
=== Removing any ISO files in /data completed
=== Start Software versions cleanup ===
Removing older software versions except current and rollback
=== Software versions cleanup completed ===
===== Cleanup done =====
Current space available in /soft: 12372572 K
Current space available in /data: 2638752 K
Cannot delete junos-evo-install-qfx-fixed-x86-64-18.3I20180906130134_mkamil - It
is the rollback version
Cannot delete junos-evo-install-qfx-fixed-x86-64-18.3-20180906.3 - It is the current

```

```

version
Removing version junos-evo-install-qfx-x86-64-16.2I20180516093649...
Done.

```

### request system storage cleanup director-group (QFabric Systems)

```
user@switch> request system storage cleanup director-group
```

List of files to delete:

	Size	Date	Name
4.0K	2011-11-07 05:16:29	/tmp/2064.sfcauth	
4.0K	2011-11-07 05:07:34	/tmp/30804.sfcauth	
4.0K	2011-11-07 04:13:41	/tmp/26792.sfcauth	
4.0K	2011-11-07 04:13:39	/tmp/26432.sfcauth	
0	2011-11-07 07:45:40	/tmp/cluster_cleanup.log	
1.3M	2011-11-07 07:39:11	/tmp/cn_monitor.20111107-052401.log	
4.0K	2011-11-07 07:36:29	/tmp/clustat.28019.log	
4.0K	2011-11-07 07:36:29	/tmp/clustat_x.28019.log	
9.6M	2011-11-07 05:30:24	/tmp/sfc.2.log	
4.0K	2011-11-07 05:28:11	/tmp/mgd-init.1320672491.log	
248K	2011-11-07 05:19:24	/tmp/cn_monitor.20111107-045111.log	
4.0K	2011-11-07 05:17:18	/tmp/clustat.3401.log	
4.0K	2011-11-07 05:17:18	/tmp/clustat_x.3401.log	
8.0K	2011-11-07 04:58:25	/tmp/mgd-init.1320670633.log	
0	2011-11-07 04:54:01	/tmp/mysql_db_install_5.1.37.log	
4.0K	2011-11-07 04:52:08	/tmp/cn_send.log	
0	2011-11-07 04:52:00	/tmp/init_eth0.log	
4.0K	2011-11-07 04:49:35	/tmp/install_interfaces.sh.log	
4.0K	2011-11-07 04:48:15	/tmp/bootstrap.sh.log	
160K	2011-11-07 04:47:43	/tmp/bootstrap_cleanup.log	
38M	2011-11-07 04:42:42	/tmp/cn_monitor.20111104-110308.log	
4.0K	2011-11-07 04:38:47	/tmp/clustat.30913.log	
4.0K	2011-11-07 04:38:47	/tmp/clustat_x.30913.log	
4.0K	2011-11-07 04:38:03	/tmp/dcf_upgrade.sh.remove.log	
4.0K	2011-11-07 04:38:03	/tmp/peer_update.log	
4.0K	2011-11-07 04:38:02	/tmp/dcf_upgrade.log	
4.0K	2011-11-07 04:38:02	/tmp/perl_mark_upgrade.log	
8.0K	2011-11-07 04:13:42	/tmp/install_dcf_rpm.log	
4.0K	2011-11-07 04:13:06	/tmp/00_cleanup.sh.1320667986.log	
0	2011-11-07 04:13:06	/tmp/ccif_patch_4410_4450.sh.1320667986.log	
4.0K	2011-11-07 04:13:06	/tmp/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-rtssdb/env.lck
12.0K Nov  7 15:41 /var/tmp/if-rtssdb/env.mem
132.0K Nov  7 15:55 /var/tmp/if-rtssdb/shm_usr1.mem
2688.0K Nov  7 15:41 /var/tmp/if-rtssdb/shm_usr2.mem
2048.0K Nov  7 15:41 /var/tmp/if-rtssdb/trace.mem
 730B Nov  7 19:57 /var/tmp/juniper.conf+.gz
155B Nov  7 15:53 /var/tmp/krt_gencfg_filter.txt
  0B Nov  7 15:41 /var/tmp/rtssdb/if-rtssdb

```

re0:

-----

List of files to delete:

Size	Date	Name
11B	Nov 7 15:55	/var/jail/tmp/alarmd.ts
121B	Nov 8 19:06	/var/log/default-log-messages.0.gz
16.7K	Nov 8 19:06	/var/log/messages.0.gz
22.2K	Nov 8 17:45	/var/log/messages.1.gz
K	Nov 8 17:00	/var/log/messages.2.gz
21.6K	Nov 8 16:00	/var/log/messages.3.gz
17.9K	Nov 8 14:30	/var/log/messages.4.gz
19.4K	Nov 8 13:30	/var/log/messages.5.gz
18.2K	Nov 8 12:30	/var/log/messages.6.gz
20.4K	Nov 8 11:30	/var/log/messages.7.gz
21.4K	Nov 8 10:15	/var/log/messages.8.gz
21.0K	Nov 8 09:00	/var/log/messages.9.gz
19.9K	Nov 8 08:13	/var/log/snmp-traps.0.gz
203B	Nov 8 15:36	/var/log/wtmp.0.gz

```

57B Nov 7 12:41 /var/log/wtmp.1.gz
124.0K Nov 7 15:42 /var/tmp/gres-tp/env.dat
0B Nov 7 12:40 /var/tmp/gres-tp/lock
0B Nov 7 12:41 /var/tmp/if-rtbdb/env.lck
12.0K Nov 7 15:41 /var/tmp/if-rtbdb/env.mem
132.0K Nov 7 15:55 /var/tmp/if-rtbdb/shm_usr1.mem
2688.0K Nov 7 15:41 /var/tmp/if-rtbdb/shm_usr2.mem
2048.0K Nov 7 15:41 /var/tmp/if-rtbdb/trace.mem
727B Nov 7 15:54 /var/tmp/juniper.conf+.gz
155B Nov 7 15:55 /var/tmp/krt_gencfg_filter.txt
0B Nov 7 15:41 /var/tmp/rtbdb/if-rtbdb

```

### request system storage cleanup node-group group-name (QFabric Systems)

user@switch> request system storage cleanup node-group NW-NG

BBAK0372:

-----

List of files to delete:

Size	Date	Name
126B	Nov 8 19:07	/var/log/default-log-messages.0.gz
179B	Nov 7 13:32	/var/log/install.0.gz
22.9K	Nov 8 19:07	/var/log/messages.0.gz
26.5K	Nov 8 17:30	/var/log/messages.1.gz
20.5K	Nov 8 13:15	/var/log/messages.2.gz
33.2K	Nov 7 17:45	/var/log/messages.3.gz
35.5K	Nov 7 15:45	/var/log/messages.4.gz
339B	Nov 8 17:10	/var/log/wtmp.0.gz
58B	Nov 7 12:40	/var/log/wtmp.1.gz
124.0K	Nov 8 17:08	/var/tmp/gres-tp/env.dat
0B	Nov 7 12:39	/var/tmp/gres-tp/lock
0B	Nov 7 12:59	/var/tmp/if-rtbdb/env.lck
12.0K	Nov 8 17:09	/var/tmp/if-rtbdb/env.mem
2688.0K	Nov 8 17:09	/var/tmp/if-rtbdb/shm_usr1.mem
132.0K	Nov 8 17:09	/var/tmp/if-rtbdb/shm_usr2.mem
2048.0K	Nov 8 17:09	/var/tmp/if-rtbdb/trace.mem
1082B	Nov 8 17:09	/var/tmp/juniper.conf+.gz
155B	Nov 7 17:39	/var/tmp/krt_gencfg_filter.txt
0B	Nov 8 17:09	/var/tmp/rtbdb/if-rtbdb

EE3093:

-----

List of files to delete:

	Size	Date	Name
	11B	Nov 8 17:33	/var/jail/tmp/alarmd.ts
	119B	Nov 8 19:08	/var/log/default-log-messages.0.gz
	180B	Nov 7 17:41	/var/log/install.0.gz
	178B	Nov 7 13:32	/var/log/install.1.gz
	2739B	Nov 8 19:08	/var/log/messages.0.gz
	29.8K	Nov 8 18:45	/var/log/messages.1.gz
	31.8K	Nov 8 17:15	/var/log/messages.2.gz
	20.6K	Nov 8 16:00	/var/log/messages.3.gz
	15.4K	Nov 8 10:15	/var/log/messages.4.gz
	15.4K	Nov 8 02:15	/var/log/messages.5.gz
	25.5K	Nov 7 20:45	/var/log/messages.6.gz
	48.0K	Nov 7 17:45	/var/log/messages.7.gz
	32.8K	Nov 7 13:45	/var/log/messages.8.gz
	684B	Nov 8 17:02	/var/log/wtmp.0.gz
	58B	Nov 7 12:40	/var/log/wtmp.1.gz
	124.0K	Nov 7 17:34	/var/tmp/gres-tp/env.dat
	0B	Nov 7 12:40	/var/tmp/gres-tp/lock
	0B	Nov 7 12:59	/var/tmp/if-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/rtsdb/if-rtsdb

### 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/d0afdale-0710-11e1-a1d0-00e081c5297e/install-11072011125930.log
/pbdata/export/rlogs/d0afdale-0710-11e1-a1d0-00e081c5297e/install-11072011133211.log
/pbdata/export/rlogs/d0afdale-0710-11e1-a1d0-00e081c5297e/install-11072011155302.log
/pbdata/export/rlogs/d31ab7a6-0710-11e1-ad1b-00e081c5297e/install-11072011125931.log
/pbdata/export/rlogs/d4d0f254-0710-11e1-90c3-00e081c5297e/install-11072011125932.log

```

## show chassis alarms

### List of Syntax

[Syntax on page 195](#)

[Syntax \(MX Series Routers\) on page 195](#)

[Syntax \(TX Matrix Routers\) on page 195](#)

[Syntax \(TX Matrix Plus Routers\) on page 195](#)

[Syntax \(MX104, MX2010, MX2020, and MX2008 Universal Routing Platforms\) on page 195](#)

[Syntax \(MX10003, MX204, MX10008, OCX Series, PTX Series, ACX Series, EX9251, and EX9253\) on page 195](#)

[Syntax \(QFX Series\) on page 196](#)

### Syntax

```
show chassis alarms
```

### Syntax (MX Series Routers)

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

### 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>
```

## Release Information

Command introduced before Junos OS Release 7.4.

Command introduced in Junos OS Release 9.0 for EX Series switches.

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

Command introduced in Junos OS Release 11.1 for the QFX Series.

Command introduced in Junos OS Release 12.1 for the PTX Series Packet Transport Routers.

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

Command introduced in Junos OS Release 12.3 for MX 2010 and MX2020 Universal Routing Platforms.

Command introduced in Junos OS Release 13.2 for MX104 Universal Routing Platforms.

Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

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

Command introduced in Junos OS Release 17.2 for MX2008 and PTX10008 Routers.

Command introduced in Junos OS Release 17.3 for MX150 Router Appliance and MX10003 Universal Routing Platforms.

Command introduced in Junos OS Release 17.4 for MX204 Universal Routing Platforms.

Command introduced in Junos OS Release 18.1R1 for EX9251 Switches.

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

## 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 *name***—(QFabric systems only) (Optional) Display information about alarm conditions for the Interconnect device.

**lcc *number***—(TX Matrix router and TX Matrix Plus router only) (Optional) Line-card chassis number.

Replace *number* with the following values depending on the LCC configuration:

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**local**—(MX Series routers only) (Optional) Display information about alarm conditions for the local Virtual Chassis member.

**member *member-id***—(MX Series routers only) (Optional) Display information about alarm conditions for the specified member of the Virtual Chassis configuration. Replace *member-id* variable with a value of 0 or 1.

**node-device *name***—(QFabric systems only) (Optional) Display information about alarm conditions for the Node device.

**satellite [*slot-id slot-id*]**—(Junos Fusion only)(Optional) Display information about alarm conditions for the specified satellite device in a Junos Fusion, or for all satellite devices in the Junos Fusion if no satellite devices are specified.

**scc**—(TX Matrix router only) (Optional) Show information about the TX Matrix router (switch-card chassis).

**sfc *number***—(TX Matrix Plus router only) (Optional) Show information about the respective TX Matrix Plus router, which is the switch-fabric chassis. Replace *number* variable with 0.

### Additional Information

Chassis alarms are preset. You cannot modify them.

You cannot clear the alarms for chassis components. Instead, you must remedy the cause of the alarm. When a chassis alarm LED is lit, it indicates that you are running the router or switch in a manner that we do not recommend.

On routers, you can manually silence external devices connected to the alarm relay contacts by pressing the alarm cutoff button, located on the craft interface. Silencing the device does not remove the alarm messages from the display (if present on the router) or extinguish the alarm LEDs. In addition, new alarms that occur after you silence an external device reactivate the external device.

**NOTE:** MX10003 routers do not support craft interface.



In Junos OS release 11.1 and later, alarms for fans also show the slot number of the fans in the CLI output.

In Junos OS Release 11.2 and later, the command output on EX8200 switches shows the detailed location (**Plane/FPC/PFE**) for link errors in the chassis.

In Junos OS Release 10.2 and later, an alarm is shown on T Series routers for a standby SONET Clock Generator (SCG) that is offline or absent.

You may often see the following error messages, in which only the error code is shown and no other information is provided:

```
Apr 12 08:04:10 send: red alarm set, device FPC 6, reason FPC 6 Major Errors - Error
code: 257
Apr 12 08:04:19 send: red alarm set, device FPC 1, reason FPC 1 Major Errors - Error
code: 559
```

To understand what CM\_ALARM error codes mean, you need to first identify the structure of the CM Alarm codes. A CM\_ALARM code has the following structure:

Bits:	Error type:
1-31	Major (1)
0	Minor (0)

According to the table above, the LSB (bit 0) identifies the **Error Type** (major alarm, if the bit is set and minor alarm if the bit is unset). The rest of the bits (1 - 31) identify the actual error code.

Take an example of the following error code, which was logged on a T1600:

```
Apr 12 08:04:10 send: red alarm set, device FPC 1, reason FPC 1 Major Errors - Error
code: 559
```

First, you have to convert 559 to binary; that is **1000101111**. The LSB in this case is **1**, which means that this is a major alarm. After removing the LSB, you are left with **100010111**, which is equal to 279 in decimal. This is the actual error code, its meaning can be found from the following list:

Chip Type: L Chip	Code
CMALARM_LCHIP_LOUT_DESRD_PARITY_ERR	1
CMALARM_LCHIP_LOUT_DESRD_UNINIT_ERR	2
CMALARM_LCHIP_LOUT_DESRD_ILLEGALLINK_ERR	3

CMALARM_LCHIP_LOUT_DESRD_ILLEGALSIZERR	4
CMALARM_LCHIP_LOUT_HDRF_TOERRERR	5
CMALARM_LCHIP_LOUT_HDRF_PARITYERR	6
CMALARM_LCHIP_LOUT_HDRF_UCERRERR	7
CMALARM_LCHIP_LOUT_NLIF_CRCDROPERR	8
CMALARM_LCHIP_LOUT_NLIF_CRCERRERR	9
CMALARM_LCHIP_UCODE_TIMEOUTERR	10
CMALARM_LCHIP_LIN_SRCTL_ACCT_DROPERR	11
CMALARM_LCHIP_LIN_SRCTL_ACCT_ADDR_SIZEERR	12
CMALARM_LCHIP_SRAM_PARITYERR	13
CMALARM_LCHIP_UCODE_OVFLWERR	14
CMALARM_LCHIP_LOUT_HDRF_MTUERR	15

Chip Type: M Chip	Code
CMALARM_MCHIP_ECC_UNCORRECTERR	128

Chip Type: N Chip	Code
CMALARM_NCHIP_RDDMA_JBUS_TIMEOUTERR	256
CMALARM_NCHIP_RDDMA_FIFO_OVFLWERR	257
CMALARM_NCHIP_RDDMA_FIFO_UNFLWERR	258
CMALARM_NCHIP_RDDMA_SIZEERR	259
CMALARM_NCHIP_RDDMA_JBUS_CRCERR	260
CMALARM_NCHIP_WRDMA_PKTRERR	261
CMALARM_NCHIP_WRDMA_PKT_CRCERR	262

CMALARM_NCHIP_WRDMA_JBUS_TIMEOUT_ERR	263
CMALARM_NCHIP_WRDMA_FIFO_OVFLW_ERR	264
CMALARM_NCHIP_WRDMA_FIFO_UNFLW_ERR	265
CMALARM_NCHIP_WRDMA_PKT_LEN_ERR	266
CMALARM_NCHIP_WRDMA_JBUS_CRC_ERR	267
CMALARM_NCHIP_PKTR_DMA_AGE_ERR	268
CMALARM_NCHIP_PKTR_ICELLSIG_ERR	269
CMALARM_NCHIP_PKTR_FTTL_ERR	270
CMALARM_NCHIP_RODR_OFFSET_OVFLW_ERR	271
CMALARM_NCHIP_PKTR_TMO_CELL_ERR	272
CMALARM_NCHIP_PKTR_TMO_OUTRANGE_ERR	273
CMALARM_NCHIP_PKTR_MD_REQUEST_Q_OVFLW_ERR	274
CMALARM_NCHIP_PKTR_DMA_BUFFER_OVFLW_ERR	275
CMALARM_NCHIP_PKTR_GRT_OVFLW_ERR	276
CMALARM_NCHIP_FRQ_ERR	277
CMALARM_NCHIP_RODR_IN_Q_OVFLW_ERR	278
CMALARM_NCHIP_DBUF_CRC_ERR	279

Chip Type: R Chip	Code
CMALARM_RCHIP_SRAM_PARITY_ERR	512

Chip Type: R Chip	Code
CMALARM_ICHIP_WO_DESRD_ID_ERR	601
CMALARM_ICHIP_WO_DESRD_DATA_ERR	602

CMALARM_ICHIP_WO_DESRD_OFLOW_ERR	603
CMALARM_ICHIP_WO_HDRF_UCERR_ERR	604
CMALARM_ICHIP_WO_HDRF_MTUERR_ERR	605
CMALARM_ICHIP_WO_HDRF_PARITY_ERR	606
CMALARM_ICHIP_WO_HDRF_TOERR_ERR	607
CMALARM_ICHIP_WO_IP_CRC_ERR	608
CMALARM_ICHIP_WO_IP_INTER_ERR	609
CMALARM_ICHIP_WI_WAN_TIMEOUT_ERR	625
CMALARM_ICHIP_WI_FAB_TIMEOUT_ERR	626
CMALARM_ICHIP_RLDRAM_BIST_ERR	630
CMALARM_ICHIP_SDRAM_BIST_ERR	631
CMALARM_ICHIP_RLDRAM_PARITY_ERR	632
CMALARM_ICHIP_SDRAM_UNCORRECT_ERR	633
CMALARM_ICHIP_SDRAM_CORRECT_ERR	634
CMALARM_ICHIP_FUSE_DONE_ERR	635

According to the table above, the **279** error code corresponds to **CMALARM\_NCHIP\_DBUF\_CRC\_ERR**; this means that new CRC errors were seen on the NCHIP of this particular FPC, which is FPC as per the logs.

If you do not want to convert decimal to binary and vice versa, you may use the following shortcut:

For major alarms, the **Actual Error Code = (Error Code - 1)/2**, where **Error Code** is the code that you get in the log message. For example, if you get the following log:

```
Apr 12 08:04:10 send: red alarm set, device FPC 6, reason FPC 6 Major Errors -
Error code: 257
```

Actual Error Code =  $(257-1)/2 = 128$ . Similarly, for minor alarms, Actual Error Code =  $(\text{Error Code})/2$

**NOTE:** Starting in Junos OS Release 18.2R1, on MX Series routers, the **show chassis alarms** output does not display error codes for PFE-related errors. You can use the following commands to view more details of the errors that caused the alarms:

- **show chassis errors active**
- **show chassis errors active detail**

### Required Privilege Level

view

### RELATED DOCUMENTATION

*Configuring an RMON Alarm Entry and Its Attributes*

*Chassis Conditions That Trigger Alarms*

### List of Sample Output

[show chassis alarms \(Alarms Active\) on page 203](#)

[show chassis alarms \(No Alarms Active\) on page 204](#)

[show chassis alarms \(Fan Tray\) on page 204](#)

[show chassis alarms \(MX150\) on page 204](#)

[show chassis alarms \(MX104 Router\) on page 204](#)

[show chassis alarms \(MX2010 Router\) on page 204](#)

[show chassis alarms \(MX2020 Router\) on page 205](#)

[show chassis alarms \(MX10003 Router\) on page 205](#)

[show chassis alarms \(MX204 Router\) on page 205](#)

[show chassis alarms \(MX2008 Router\) on page 206](#)

[show chassis alarms \(MX960, MX480, and MX240 Routers showing Major CB Failure\) on page 206](#)

[show chassis alarms \(PTX10008 Router\) on page 206](#)

[show chassis alarms \(T4000 Router\) on page 207](#)

[show chassis alarms \(Unreachable Destinations Present on a T Series Router\) on page 207](#)

[show chassis alarms \(FPC Offline Due to Unreachable Destinations on a T Series Router\) on page 207](#)

[show chassis alarms \(SCG Absent on a T Series Router\) on page 208](#)

[show chassis alarms \(Alarms Active on a TX Matrix Router\) on page 208](#)

[show chassis alarms \(TX Matrix Plus router with 3D SIBs\) on page 209](#)

[show chassis alarms \(Alarms on a T4000 Router After the enhanced-mode Statement is Enabled\) on page 211](#)

[show chassis alarms \(Backup Routing Engine\) on page 212](#)

[show chassis alarms \(EX Series Switch\) on page 212](#)

[show chassis alarms \(Alarms Active on the QFX Series and OCX Series Switches\) on page 212](#)

[show chassis alarms node-device \(Alarms Active on the QFabric System\) on page 212](#)

[show chassis alarms \(Alarms Active on the QFabric System\) on page 212](#)  
[show chassis alarms \(Alarms Active on an EX8200 Switch\) on page 213](#)  
[show chassis alarms \(EX9251 Switch\) on page 213](#)  
[show chassis alarms \(EX9253 Switch\) on page 214](#)  
[show chassis alarms \(Alarms Active on a PTX5000 Packet Transport Router\) on page 214](#)  
[show chassis alarms \(Mix of PDUs Alarm on a PTX5000 Packet Transport Router with FPC2-PTX-P1A\) on page 214](#)  
[show chassis alarms \(PDU Converter Failed Alarm on a PTX5000 Packet Transport Router with FPC2-PTX-P1A\) on page 215](#)  
[show chassis alarms \(No Power for System Alarm on a PTX5000 Packet Transport Router with FPC2-PTX-P1A\) on page 215](#)  
[show chassis alarms \(Alarms Active on an ACX2000 Universal Metro Router\) on page 216](#)  
[show chassis alarms \(Active Alarm to Indicate Status of the Bad SCB Clock on MX Series\) on page 216](#)  
[show chassis alarms \(Alarms active on a PTX1000 Packet Transport Router\) on page 216](#)  
[show chassis alarms \(MX10003 Router\) on page 216](#)  
[show chassis alarms \(Alarms active on a MX10008 Router\) on page 218](#)

## Output Fields

Table 8 on page 203 lists the output fields for the **show chassis alarms** command. Output fields are listed in the approximate order in which they appear.

Table 8: show chassis alarms Output Fields

Field Name	Field Description
Alarm time	Date and time the alarm was first recorded.
Class	Severity class for this alarm: <b>Minor</b> or <b>Major</b> .
Description	Information about the alarm.

## Sample Output

**show chassis alarms (Alarms Active)**

```
user@host> show chassis alarms
```

```

3 alarms are currently active
Alarm time          Class  Description
2000-02-07 10:12:22 UTC Major fxp0: ethernet link down
2000-02-07 10:11:54 UTC Minor YELLOW ALARM - PEM 1 Removed
2000-02-07 10:11:03 UTC Minor YELLOW ALARM - Lower Fan Tray Removed

```

**show chassis alarms (No Alarms Active)**

```
user@host> show chassis alarms
```

```
No alarms are currently active
```

**show chassis alarms (Fan Tray)**

```
user@host> show chassis alarms
```

```
4 alarms currently active
Alarm time           Class Description
2010-11-11 20:27:38 UTC Major Side Fan Tray 7 Failure
2010-11-11 20:27:13 UTC Minor Side Fan Tray 7 Overspeed
2010-11-11 20:27:13 UTC Major Side Fan Tray 5 Failure
2010-11-11 20:27:13 UTC Major Side Fan Tray 0 Failure
```

**show chassis alarms (MX150)**

```
user@host > show chassis alarms
```

```
1 alarms currently active
Alarm time           Class Description
2016-06-04 01:49:43 PDT Major Fan Tray 1 Fan 0 failed
```

**show chassis alarms (MX104 Router)**

```
user@host >show chassis alarms
```

```
1 alarms currently active
Alarm time           Class Description
2013-06-05 14:43:31 IST Minor Backup RE Active
```

**show chassis alarms (MX2010 Router)**

```
user@host> show chassis alarms
```

```
7 alarms currently active
Alarm time           Class Description
2012-08-07 00:46:06 PDT Major Fan Tray 2 Failure
2012-08-06 18:24:36 PDT Minor Redundant feed missing for PSM 6
2012-08-06 07:41:04 PDT Minor Redundant feed missing for PSM 8
```

```

2012-08-04 02:42:06 PDT Minor Redundant feed missing for PSM 5
2012-08-03 21:14:24 PDT Minor Loss of communication with Backup RE
2012-08-03 12:26:03 PDT Minor Redundant feed missing for PSM 4
2012-08-03 10:40:18 PDT Minor Redundant feed missing for PSM 7

```

### show chassis alarms (MX2020 Router)

```
user@host> show chassis alarms
```

```

1 alarms currently active
Alarm time Class Description
2012-10-03 12:14:59 PDT Minor Plane 0 not online

```

### show chassis alarms (MX10003 Router)

```
user@host> show chassis alarms
```

```

9 alarms currently active
Alarm time          Class Description
2017-07-13 21:50:31 PDT Major FPC 1 Temperature Hot
2017-07-13 21:50:04 PDT Minor FPC 1 PIC 1 Invalid port profile configuration
2017-07-13 21:49:13 PDT Minor FPC 1 PIC 0 Invalid port profile configuration
2017-07-13 21:48:54 PDT Major FPC 0 Temperature Hot
2017-07-13 21:43:54 PDT Minor CB 1 Voltage Sensor ADS7830_0x4B Sensor Failed
2017-07-13 21:43:54 PDT Minor CB 0 Voltage Sensor ADS7830_0x4B Sensor Failed
2017-07-13 21:43:31 PDT Minor Loss of communication with Backup RE

```

Starting in Junos OS Release 19.2R1, the MX10003 routers do not raise an alarm if a Power Entry Module (PEM) slot is empty. However, when the number of operational PEMs goes below 2, the router raises a major alarm. This alarm is cleared when the required number of PEMs are made available.

### show chassis alarms (MX204 Router)

```
user@host> show chassis alarms
```

```

1 alarms currently active
Alarm time          Class Description
2017-11-05 22:13:03 PST Major PEM 0 Not Present

```



**show chassis alarms (MX2008 Router)**

```
user@host>show chassis alarms
```

```
No alarms currently active
```

**show chassis alarms (MX960, MX480, and MX240 Routers showing Major CB Failure)**

A major CB 0 failure alarm occurs in the event of a bad CB (unknown or mismatched CBs do not trigger this alarm in Junos Release OS 12.3R9 and later). Following GRES or recovery, if the hardware issue persists, the traffic moves to the good CB and continues. If the alarm was triggered by something transient like a power zone budget on GRES, bringing the CB back online can clear the alarm. Otherwise, replace the bad CB. Note that fabric link speed is not impacted by an offline SCB. The alarm might be raised on CB0, CB1, and CB2.

```
user@host> show chassis alarms
```

```
6 alarms currently active
```

Alarm time	Class	Description
2014-10-31 16:49:41 EDT	Major	PEM 3 Not OK
2014-10-31 16:49:41 EDT	Major	PEM 2 Not OK
2014-10-31 16:49:31 EDT	Major	CB 0 Failure
2014-10-31 16:49:31 EDT	Minor	CB 0 Fabric Chip 0 Not Online
2014-10-31 16:49:31 EDT	Minor	CB 0 Fabric Chip 1 Not Online
2014-10-31 16:49:31 EDT	Minor	Backup RE Active

**show chassis alarms (PTX10008 Router)**

```
user@host>show chassis alarms
```

```
12 alarms currently active
```

Alarm time	Class	Description
2017-05-09 01:38:55 PDT	Minor	Loss of communication with Backup RE
2017-05-05 06:49:57 PDT	Major	FPC 5 LCPU Temp Sensor Access Failed
2017-05-05 06:49:57 PDT	Major	FPC 5 PE2 Temp Sensor Hot
2017-05-05 06:49:57 PDT	Major	FPC 5 PE1 Temp Sensor Hot
2017-05-05 06:49:57 PDT	Major	FPC 5 PE0 Temp Sensor Hot
2017-05-05 06:49:57 PDT	Major	FPC 5 Exhaust-C Temp Sensor Hot
2017-05-05 06:49:57 PDT	Major	FPC 5 Exhaust-B Temp Sensor Hot
2017-05-05 06:49:57 PDT	Major	FPC 5 Exhaust-A Temp Sensor Hot
2017-05-05 06:49:57 PDT	Major	FPC 5 Intake-B Temp Sensor Access Failed
2017-05-05 06:49:57 PDT	Major	FPC 5 Intake-A Temp Sensor Access Failed
2017-05-05 06:49:57 PDT	Major	Fan Tray 0 Fan 5 running at lower speed
2017-05-05 06:49:57 PDT	Major	Fan Tray 0 Fan 4 running at lower speed

**show chassis alarms (T4000 Router)**

```
user@host> show chassis alarms
```

```
9 alarms currently active
Alarm time           Class  Description
2007-06-02 01:41:10 UTC Minor  RE 0 Not Supported
2007-06-02 01:41:10 UTC Minor  CB 0 Not Supported
2007-06-02 01:41:10 UTC Minor  Mixed Master and Backup RE types
2007-05-30 19:37:33 UTC Major  SPMB 1 not online
2007-05-30 19:37:29 UTC Minor  Front Bottom Fan Tray Absent
2007-05-30 19:37:13 UTC Major  PEM 1 Input Failure
2007-05-30 19:37:13 UTC Major  PEM 0 Not OK
2007-05-30 19:37:03 UTC Major  PEM 0 Improper for Platform
2007-05-30 19:37:03 UTC Minor  Backup RE Active
```

**show chassis alarms (Unreachable Destinations Present on a T Series Router)**

```
user@host> show chassis alarms
```

```
10 alarms currently active
Alarm time           Class  Description
2011-08-30 18:43:53 PDT Major  FPC 7 has unreachable destinations
2011-08-30 18:43:53 PDT Major  FPC 5 has unreachable destinations
2011-08-30 18:43:52 PDT Major  FPC 3 has unreachable destinations
2011-08-30 18:43:52 PDT Major  FPC 2 has unreachable destinations
2011-08-30 18:43:52 PDT Minor  SIB 0 Not Online
2011-08-30 18:43:33 PDT Minor  SIB 4 Not Online
2011-08-30 18:43:28 PDT Minor  SIB 3 Not Online
2011-08-30 18:43:05 PDT Minor  SIB 2 Not Online
2011-08-30 18:43:28 PDT Minor  SIB 1 Not Online
2011-08-30 18:43:05 PDT Major  PEM 1 Not Ok
```

**show chassis alarms (FPC Offline Due to Unreachable Destinations on a T Series Router)**

```
user@host> show chassis alarms
```

```
10 alarms currently active
Alarm time           Class  Description
2011-08-30 18:43:53 PDT Major  FPC 7 offline due to unreachable destinations
2011-08-30 18:43:53 PDT Major  FPC 5 offline due to unreachable destinations
2011-08-30 18:43:52 PDT Major  FPC 3 offline due to unreachable destinations
2011-08-30 18:43:52 PDT Major  FPC 2 offline due to unreachable destinations
2011-08-30 18:43:52 PDT Minor  SIB 0 Not Online
```

```

2011-08-30 18:43:33 PDT Minor SIB 4 Not Online
2011-08-30 18:43:28 PDT Minor SIB 3 Not Online
2011-08-30 18:43:05 PDT Minor SIB 2 Not Online
2011-08-30 18:43:28 PDT Minor SIB 1 Not Online
2011-08-30 18:43:05 PDT Major PEM 1 Not Ok

```

### show chassis alarms (SCG Absent on a T Series Router)

```
user@host> show chassis alarms
```

```

4 alarms currently active
Alarm time           Class Description
2011-01-23 21:42:46 PST Major SCG 0 NO EXT CLK MEAS-BKUP SCG ABS

```

### show chassis alarms (Alarms Active on a TX Matrix Router)

```
user@host> show chassis alarms
```

```

scc-re0:
-----
8 alarms currently active
Alarm time           Class Description
2004-08-05 18:43:53 PDT Minor LCC 0 Minor Errors
2004-08-05 18:43:53 PDT Minor SIB 3 Not Online
2004-08-05 18:43:52 PDT Major SIB 2 Absent
2004-08-05 18:43:52 PDT Major SIB 1 Absent
2004-08-05 18:43:52 PDT Major SIB 0 Absent
2004-08-05 18:43:33 PDT Major LCC 2 Major Errors
2004-08-05 18:43:28 PDT Major LCC 0 Major Errors
2004-08-05 18:43:05 PDT Minor LCC 2 Minor Errors
lcc0-re0:
-----
5 alarms currently active
Alarm time           Class Description
2004-08-05 18:43:53 PDT Minor SIB 3 Not Online
2004-08-05 18:43:49 PDT Major SIB 2 Absent
2004-08-05 18:43:49 PDT Major SIB 1 Absent
2004-08-05 18:43:49 PDT Major SIB 0 Absent
2004-08-05 18:43:28 PDT Major PEM 0 Not OK
lcc2-re0:
-----
5 alarms currently active
Alarm time           Class Description

```

```

2004-08-05 18:43:35 PDT Minor SIB 3 Not Online
2004-08-05 18:43:33 PDT Major SIB 2 Absent
2004-08-05 18:43:33 PDT Major SIB 1 Absent
2004-08-05 18:43:33 PDT Major SIB 0 Absent
2004-08-05 18:43:05 PDT Minor PEM 1 Absent

```

### show chassis alarms (TX Matrix Plus router with 3D SIBs)

user@host> show chassis alarms

```
sfc0-re0:
```

```

-----
Alarm time          Class Description

2014-04-08 14:35:13 IST Minor FPM 0 SFC Config Size Changed
2014-04-08 14:32:58 IST Major Fan Tray Failure
2014-04-08 14:31:53 IST Major SIB F13 6 Fault
2014-04-08 14:31:43 IST Major SIB F13 11 Fault
2014-04-08 14:31:08 IST Minor Check SIB F13 12 CXP 14 Fbr Cbl
2014-04-08 14:31:08 IST Minor Check SIB F13 12 CXP 8 Fbr Cbl
2014-04-08 14:31:08 IST Minor Check SIB F13 12 CXP 3 Fbr Cbl
2014-04-08 14:31:08 IST Major SIB F13 12 CXP 15 fault
2014-04-08 14:31:08 IST Minor SIB F13 12 CXP 14 LOL
2014-04-08 14:31:08 IST Minor Check SIB F13 12 CXP 14
2014-04-08 14:31:08 IST Major SIB F13 12 CXP 10 fault
2014-04-08 14:31:08 IST Minor SIB F13 12 CXP 8 LOL
2014-04-08 14:31:08 IST Minor Check SIB F13 12 CXP 8
2014-04-08 14:31:08 IST Major SIB F13 12 CXP 7 fault
2014-04-08 14:31:08 IST Major SIB F13 12 CXP 4 fault
2014-04-08 14:31:08 IST Minor SIB F13 12 CXP 3 LOL
2014-04-08 14:31:08 IST Minor Check SIB F13 12 CXP 3
2014-04-08 14:31:08 IST Minor Check SIB F13 6 CXP 14 Fbr Cbl
2014-04-08 14:31:08 IST Minor Check SIB F13 6 CXP 12 Fbr Cbl
2014-04-08 14:31:08 IST Minor Check SIB F13 6 CXP 8 Fbr Cbl
2014-04-08 14:31:08 IST Minor Check SIB F13 6 CXP 6 Fbr Cbl
2014-04-08 14:31:08 IST Minor Check SIB F13 6 CXP 4 Fbr Cbl
2014-04-08 14:31:08 IST Minor Check SIB F13 6 CXP 2 Fbr Cbl
2014-04-08 14:31:08 IST Minor Check SIB F13 6 CXP 0 Fbr Cbl
2014-04-08 14:31:08 IST Minor SIB F13 6 CXP 14 LOL
2014-04-08 14:31:08 IST Minor Check SIB F13 6 CXP 14
2014-04-08 14:31:08 IST Minor SIB F13 6 CXP 12 LOL
2014-04-08 14:31:08 IST Minor Check SIB F13 6 CXP 12
2014-04-08 14:31:08 IST Major SIB F13 6 CXP 10 fault
2014-04-08 14:31:08 IST Minor SIB F13 6 CXP 8 LOL

```

```

2014-04-08 14:31:08 IST Minor Check SIB F13 6 CXP 8
2014-04-08 14:31:08 IST Minor SIB F13 6 CXP 6 LOL
2014-04-08 14:31:08 IST Minor Check SIB F13 6 CXP 6
2014-04-08 14:31:08 IST Minor SIB F13 6 CXP 4 LOL
2014-04-08 14:31:08 IST Minor Check SIB F13 6 CXP 4
2014-04-08 14:31:08 IST Minor SIB F13 6 CXP 2 LOL
2014-04-08 14:31:08 IST Minor Check SIB F13 6 CXP 2
2014-04-08 14:31:08 IST Minor SIB F13 6 CXP 0 LOL
2014-04-08 14:31:08 IST Minor Check SIB F13 6 CXP 0
2014-04-08 14:31:08 IST Minor SIB F13 12 CXP 14 XC HSL Link Error
2014-04-08 14:29:27 IST Minor LCC 0 Minor Errors
2014-04-08 14:28:37 IST Major LCC 0 Major Errors
2014-04-08 14:28:37 IST Major LCC 2 Major Errors
2014-04-08 14:28:37 IST Minor LCC 2 Minor Errors
2014-04-08 14:28:24 IST Major SIB F2S 4/6 Absent
2014-04-08 14:28:24 IST Major SIB F2S 4/4 Absent
2014-04-08 14:28:24 IST Major SIB F2S 4/2 Absent
2014-04-08 14:28:24 IST Major SIB F2S 4/0 Absent
2014-04-08 14:28:24 IST Major SIB F2S 3/6 Absent
2014-04-08 14:28:24 IST Major SIB F2S 3/4 Absent
2014-04-08 14:28:24 IST Major SIB F2S 3/2 Absent
2014-04-08 14:28:24 IST Major SIB F2S 3/0 Absent
2014-04-08 14:28:24 IST Major SIB F13 9 Absent
2014-04-08 14:28:24 IST Major SIB F13 8 Absent
2014-04-08 14:28:24 IST Major SIB F13 7 Absent
2014-04-08 14:28:24 IST Major SIB F13 4 Absent
2014-04-08 14:28:24 IST Major SIB F13 1 Absent
2014-04-08 14:28:22 IST Major PEM 0 Input Failure
2014-04-08 14:28:22 IST Major PEM 0 Not OK

```

```
lcc0-re0:
```

```
-----
12 alarms currently active
```

Alarm time	Class	Description
2014-04-08 14:36:08 IST	Minor	CB 1 M/S Switch Changed
2014-04-08 14:36:08 IST	Minor	CB 1 CHASSIS ID Changed
2014-04-08 14:35:43 IST	Minor	CB 0 M/S Switch Changed
2014-04-08 14:35:43 IST	Minor	CB 0 CHASSIS ID Changed
2014-04-08 14:29:30 IST	Minor	SIB 4 Not Online
2014-04-08 14:29:30 IST	Minor	SIB 3 Not Online
2014-04-08 14:29:30 IST	Minor	SIB 2 Not Online
2014-04-08 14:29:24 IST	Major	Rear Fan Tray Failure
2014-04-08 14:29:24 IST	Major	Front Bottom Fan Tray Improper for Platform
2014-04-08 14:29:24 IST	Major	Front Top Fan Tray Improper for Platform

```

2014-04-08 14:28:37 IST Major SIB 4 Absent
2014-04-08 14:28:37 IST Major SIB 3 Absent

lcc2-re0:
-----

12 alarms currently active
Alarm time          Class Description
2014-04-08 14:36:02 IST Minor CB 1 M/S Switch Changed
2014-04-08 14:36:02 IST Minor CB 1 CHASSIS ID Changed
2014-04-08 14:35:42 IST Minor CB 0 M/S Switch Changed
2014-04-08 14:34:42 IST Minor CB 0 CHASSIS ID Changed
2014-04-08 14:29:29 IST Minor SIB 0 CXP 7 Unsupported Optics
2014-04-08 14:29:27 IST Major Front Bottom Fan Tray Improper for Platform
2014-04-08 14:29:27 IST Major Front Top Fan Tray Improper for Platform
2014-04-08 14:29:25 IST Minor SIB 4 Not Online
2014-04-08 14:29:25 IST Minor SIB 3 Not Online
2014-04-08 14:28:47 IST Major PEM 0 Not OK
2014-04-08 14:28:36 IST Major SIB 2 Absent
2014-04-08 14:28:36 IST Minor Host 0 Boot from alternate media

lcc6-re0:
-----

2 alarms currently active
Alarm time          Class Description
2013-11-06 04:03:56 PST Minor SIB 1 CXP 0 XC HSL Link Error
2013-11-06 03:49:32 PST Major PEM 1 Not OK

```

#### show chassis alarms (Alarms on a T4000 Router After the enhanced-mode Statement is Enabled)

To enable improved virtual private LAN service (VPLS) MAC address learning on T4000 routers, you must include the **enhanced-mode** statement at the **[edit chassis network-services]** hierarchy level and reboot the router. When router reboots, only the T4000 Type 5 FPCs are required to be present on the router. If there are any other FPCs (apart from T4000 Type 5 FPCs) on the T4000 router, such FPCs become offline, and FPC misconfiguration alarms are generated. The **show chassis alarm** command output displays FPC misconfiguration (**FPC fpc-slot misconfig**) as the reason for the generation of the alarms.

```
user@host> show chassis alarms
```

```

2 alarms currently active
Alarm time          Class Description
2011-10-22 10:10:47 PDT Major FPC 1 misconfig
2011-10-22 10:10:46 PDT Major FPC 0 misconfig

```

**show chassis alarms (Backup Routing Engine)**

```
user@host> show chassis alarms
```

```
2 alarms are currently active
Alarm time           Class  Description
2005-04-07 10:12:22 PDT  Minor  Host 1 Boot from alternate media
2005-04-07 10:11:54 PDT  Major  Host 1 compact-flash missing in Boot List
```

**show chassis alarms (EX Series Switch)**

```
user@switch> show chassis alarms
```

```
4 alarms currently active
Alarm time           Class  Description
2014-03-12 15:36:09 UTC  Minor  Require a Fan Tray upgrade
2014-03-12 15:00:02 UTC  Major  PEM 0 Input Failure
2014-03-12 15:00:02 UTC  Major  PEM 0 Not OK
2014-03-12 14:59:51 UTC  Minor  Host 1 Boot from alternate media
```

**show chassis alarms (Alarms Active on the QFX Series and OCX Series Switches)**

```
user@switch> show chassis alarms
```

```
1 alarms currently active
Alarm time           Class  Description
2012-03-05 2:10:24 UTC  Major  FPC 0 PEM 0 Airflow not matching Chassis Airflow
```

**show chassis alarms node-device (Alarms Active on the QFabric System)**

```
user@switch> show chassis alarms node-device Test
```

```
node-device ED3694
3 alarms currently active
Alarm time           Class  Description
2011-08-24 16:04:15 UTC  Major  Test:fte-0/1/2: Link down
2011-08-24 16:04:14 UTC  Major  Test:fte-0/1/0: Link down
2011-08-24 14:21:14 UTC  Major  Test PEM 0 is not supported/powered
```

**show chassis alarms (Alarms Active on the QFabric System)**

```
user@switch> show chassis alarms
```

IC-1:

-----

1 alarms currently active

Alarm time	Class	Description
2011-08-24 16:04:15 UTC	Minor	Backup RE Active

Test:

-----

3 alarms currently active

Alarm time	Class	Description
2011-08-24 16:04:15 UTC	Major	Test:fte-0/1/2: Link down
2011-08-24 16:04:14 UTC	Major	Test:fte-0/1/0: Link down
2011-08-24 14:21:14 UTC	Major	Test PEM 0 is not supported/powered

SNG-0:

-----

NW-NG-0:

-----

1 alarms currently active

Alarm time	Class	Description
2011-08-24 15:49:27 UTC	Major	Test PEM 0 is not supported/powered

### show chassis alarms (Alarms Active on an EX8200 Switch)

user@switch> show chassis alarms

6 alarms currently active

Alarm time	Class	Description
2010-12-02 19:15:22 UTC	Major	Fan Tray Failure
2010-12-02 19:15:22 UTC	Major	Fan Tray Failure
2010-12-02 19:15:14 UTC	Minor	Check CB 0 Fabric Chip 1 on Plane/FPC/PFE: 1/5/0, 1/5/1, 1/5/2, 1/5/3, 1/7/0, 1/7/1, 1/7/2, 1/7/3, 2/5/0, 2/5/1, ...
2010-12-02 19:15:14 UTC	Minor	Check CB 0 Fabric Chip 0 on Plane/FPC/PFE: 1/5/0, 1/5/1, 1/5/2, 1/5/3, 1/7/0, 1/7/1, 1/7/2, 1/7/3, 2/5/0, 2/5/1, ...
2010-12-02 19:14:18 UTC	Major	PSU 1 Output Failure
2010-12-02 19:14:18 UTC	Minor	Loss of communication with Backup RE

### show chassis alarms (EX9251 Switch)

user@switch> show chassis alarms



```

2 alarms currently active
Alarm time           Class Description
2018-03-08 05:13:10 PST Major PEM 0 Not Powered
2018-03-08 05:13:10 PST Major Fan Tray 2 is not present

```

### show chassis alarms (EX9253 Switch)

```
user@switch> show chassis alarms
```

```

6 alarms currently active
Alarm time           Class Description
2018-03-07 01:09:01 PST Major Power Budget:Insufficient Power
2018-03-06 23:56:34 PST Minor Loss of communication with Backup RE
2018-02-15 00:48:10 PST Minor PEM 3 Not Present
2018-02-15 00:48:10 PST Minor PEM 2 Not Present
2018-02-15 00:48:07 PST Major PEM 4 Not Powered
2018-02-15 00:48:07 PST Major PEM 1 Not Powered

```

### show chassis alarms (Alarms Active on a PTX5000 Packet Transport Router)

```
user@host> show chassis alarms
```

```

23 alarms currently active
Alarm time           Class Description
2011-07-12 16:22:05 PDT Minor No Redundant Power for Rear Chassis
2011-07-12 16:22:05 PDT Major PDU 0 PSM 1 Not OK
2011-07-12 16:21:57 PDT Minor No Redundant Power for Fan 0-2
2011-07-12 16:21:57 PDT Major PDU 0 PSM 0 Not OK
2011-07-12 15:56:06 PDT Major PDU 1 PSM 2 Not OK
2011-07-12 15:56:06 PDT Minor No Redundant Power for FPC 0-7
2011-07-12 15:56:06 PDT Major PDU 0 PSM 3 Not OK
2011-07-12 15:28:20 PDT Major PDU 0 PSM 2 Not OK
2011-07-12 15:19:14 PDT Minor Backup RE Active

```

### show chassis alarms (Mix of PDUs Alarm on a PTX5000 Packet Transport Router with FPC2-PTX-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 Master.

```
user@host> show chassis alarms
```

```

1 alarm currently active
Alarm time           Class  Description
2017-05-09 13:26:27 PDT Major  VMHost RE 1 host application failed

```

If LCMD is down on the master, then following alarms are displayed.

```
user@host> show chassis alarms
```

```

3 alarms currently active
Alarm time           Class  Description
2017-05-10 14:12:21 PDT Major  VMHost RE 0 host application failed
2017-05-10 14:12:16 PDT Minor  LCM Peer Absent
2017-05-09 13:26:27 PDT Major  VMHost RE 1 host application failed

```

If the LCMD process is crashing on the master, the system will switchover after one minute provided the backup RE LCMD connection is stable. The system will not switchover under the following conditions: if the backup RE LCMD connection is unstable or if the current master just gained mastership. When the master has just gained mastership, the switchover happens only after four minutes.

The LCM peer connection un-stable alarm is raised when the LCMD-CHASD IPC communication flaps three times within a small interval of two to three minutes. Once LCM peer connection un-stable alarm is raised, the connection status is monitored for two minutes.

```
user@host> show chassis alarms
```

```

7 alarms currently active
Alarm time           Class  Description
2017-05-29 10:12:17 PDT Minor  LCM Peer Connection un-stable
2017-05-29 09:04:17 PDT Minor  PEM 8 Not Powered
2017-05-29 09:04:17 PDT Minor  PEM 9 Not Powered
2017-05-29 09:04:17 PDT Minor  PEM 7 Not Powered
2017-05-29 09:04:17 PDT Minor  PEM 3 Not Powered
2017-05-29 09:04:17 PDT Minor  PEM 0 Not Powered
2017-05-29 09:04:08 PDT Minor  Loss of communication with Backup RE

```

If there are no more connection flaps within this two minutes time interval, the LCM peer connection un-stable alarm is cleared.

```

6 alarms currently active
Alarm time           Class  Description
2017-05-29 09:04:17 PDT Minor  PEM 8 Not Powered
2017-05-29 09:04:17 PDT Minor  PEM 9 Not Powered

```

```

2017-05-29 09:04:17 PDT Minor PEM 7 Not Powered
2017-05-29 09:04:17 PDT Minor PEM 3 Not Powered
2017-05-29 09:04:17 PDT Minor PEM 0 Not Powered
2017-05-29 09:04:08 PDT Minor Loss of communication with Backup RE

```

A major alarm is raised even if there is on one PLL lock error, and this alarm can be cleared only through an FPC restart.

user@host> **show chassis alarms**

```

4 alarms currently active
Alarm time          Class Description
2017-02-16 09:06:06 PDT Major FPC 0 Major Errors
2017-02-16 09:08:40 PDT Major FPC 1 Major Errors
2017-02-16 09:11:47 PST Minor Fan Tray 3 Pair 1 Outer Fan running at over speed
2017-02-16 09:11:47 PST Minor Fan Tray 3 Pair 1 Inner Fan running at over speed

```

#### show chassis alarms (Alarms active on a MX10008 Router)

user@host> **show chassis alarms**

```

13 alarms currently active
Alarm time          Class Description
2018-07-17 05:48:08 PDT Major FPC 2 I2C Failure
2018-07-17 05:47:02 PDT Minor Mixed Master and Backup RE types
2018-07-17 05:47:01 PDT Major Fan Tray 0 Fan 5 Failed
2018-07-17 05:47:01 PDT Major Fan Tray 0 Fan 4 Failed
2018-07-17 05:47:01 PDT Minor PEM 5 Not Powered
2018-07-17 05:47:01 PDT Minor PEM 5 Feed 2 has no input source
2018-07-17 05:47:01 PDT Minor PEM 5 Feed 1 has no input source
2018-07-17 05:47:01 PDT Minor PEM 4 Not Powered
2018-07-17 05:47:01 PDT Minor PEM 4 Feed 2 has no input source
2018-07-17 05:47:01 PDT Minor PEM 4 Feed 1 has no input source
2018-07-17 05:47:01 PDT Minor PEM 3 Not Powered
2018-07-17 05:47:01 PDT Minor PEM 3 Feed 2 has no input source
2018-07-17 05:47:01 PDT Minor PEM 3 Feed 1 has no input source

```

## show chassis environment

### List of Syntax

[Syntax \(T320, T640, T1600, and T4000 Routers\) on page 219](#)

[Syntax \(TX Matrix Routers\) on page 219](#)

[Syntax \(TX Matrix Plus Routers\) on page 219](#)

[Syntax \(MX Series Routers\) on page 220](#)

[Syntax \(MX104 Universal Routing Platforms\) on page 220](#)

[Syntax \(MX150 Router Appliance\) on page 220](#)

[Syntax \(MX2010, MX2020, and MX2008 Universal Routing Platforms\) on page 220](#)

[Syntax \(MX10003 and MX204 Universal Routing Platforms\) on page 221](#)

[Syntax \(EX8200 Switches\) on page 221](#)

[Syntax \(EX Series Switches except EX8200\) on page 221](#)

[Syntax \(QFX Series\) on page 221](#)

[Syntax \(OCX Series\) on page 222](#)

[Syntax \(PTX Series Packet Transport Routers\) on page 222](#)

[Syntax \(ACX Series Universal Metro Routers\) on page 222](#)

[Syntax \(ACX5048 and ACX5096 Routers\) on page 222](#)

[Syntax \(ACX500 Routers\) on page 222](#)

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

```
show chassis environment
<cb cb-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)

```
show chassis environment
<cb cb-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>
```

### Release Information

Command introduced before Junos OS Release 7.4.

Command introduced in Junos OS Release 9.0 for EX Series switches.

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

Command introduced in Junos OS Release 11.1 for QFX Series.

Command introduced in Junos OS Release 12.1x48 for PTX Series Packet Transport Routers.

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

Command introduced in Junos OS Release 12.1 for T4000 Core Routers.

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

Command introduced in Junos OS Release 12.3 for MX 2020 and MX2010 Universal Routing Platforms.

**pem** option introduced in Junos OS Release 12.3 for ACX4000 Universal Metro Routers.

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

**all-members**, **local**, and **member** *member-id* options introduced in Junos OS Release 15.1 for MX2010 and MX2020 routers.

Command introduced in Junos OS Release 15.1X54-D20 for ACX5048 and ACX5096 Routers.

Command introduced in Junos OS Release 17.2 for MX2008 Universal Routing Platforms and PTX10008 Routers.

Command introduced in Junos OS Release 17.3 for MX150 Router Appliance and MX10003 Universal Routing Platforms.

Command introduced in Junos OS Release 17.4 for MX204 Universal Routing Platforms.

Command introduced in Junos OS Release 18.1R1 for EX9251 Switches.

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

## Description

Display environmental information about the router or switch chassis, including the temperature and information about the fans, power supplies, and Routing Engine.

In addition, on ACX4000 routers, display temperature information about the different channels of a Modular Interface Card (MIC). The number of channels displayed depends on the type of MIC installed.

Starting with Junos OS Release 14.1, the **show chassis environment cb cb-slot-number | ccg ccg-slot-number | fpc fpc-slot-number | fpm | monitored | pdu pdu-slot-number | routing-engine re-slot-number | sib sib-slot-number** operational mode command output displays environmental information for the new DC power supply module (PSM) and power distribution unit (PDU) that are added to provide power to the high-density FPC (FPC2-PTX-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 adc-slot-number**—(MX2010, MX2020, and MX2008 routers only) (Optional) Display chassis environmental information for the adapter cards. For MX2020 routers, replace **adc-slot-number** with a value from 0 through 19. For MX2010 and MX2008 routers, replace **adc-slot-number** with a value from 0 through 9.

**cb cb-slot-number**—(ACX Series Universal Metro Routers, EX Series switches, M120, M320, and M40e routers, MX Series routers, MX2020 routers, MX2010 routers, MX2008 routers, PTX Series Packet

Transport Routers, QFX Series, and T Series routers, and TX Matrix Plus routers only) (Optional) Display chassis environmental information for the Control Board. On devices other than EX Series switches, replace **cb-slot** with **0** or **1**.

**cip cip-slot-number**—(TX Matrix Plus routers only) (Optional) Display chassis environmental information for the Connection Interface Panel (CIP). Replace the **cip-slot-number** variable with a value of **0** or **1**.

**cb interconnect-device name**—(QFabric systems only) (Optional) Display chassis environmental information for the Control Board on an Interconnect device.

**ccg ccg-slot-number**—(PTX Series only) (Optional) Display chassis environmental information for the Centralized Clock Generator. Replace **cb-slot** with a value of **0** or **1**.

**fan fantray-slot-number**—(MX2010, MX2020, and MX2008 routers only) (Optional) Display chassis environmental information for the fan trays. Replace **fantray-slot-number** with a value from **0** through **3**.

**fpc fpc-slot**—(EX Series switches, M120, M320, and M40e routers, MX Series routers, MX2010 routers, MX2020 routers, MX2008 routers, PTX Series Packet Transport Routers, QFX Series, QFX3500 switches, QFabric systems, T Series routers, and TX Matrix Plus routers) (Optional) Display chassis environmental information for a specified Flexible PIC Concentrator. For MX2010 and MX2008 routers, replace **fpc-slot** with a value from **0** through **9**. For MX2020 routers, replace **fpc-slot** with a value from **0** through **19**. For information about FPC numbering, see [show chassis environment fpc](#). On a QFabric system, display chassis environmental information for a specified Flexible PIC Concentrator on an Interconnect device. On an EX Series switch, display chassis environmental information for a specified Flexible PIC Concentrator; see the hardware documentation for your switch for information on FPC numbering. On a TX Matrix Plus router with 3D SIBs replace **fpc-slot** with a value from **0** through **63**.

**fpm**—(M120, M320, and M40e routers, MX2010 routers, MX2020 routers, MX2008 routers, PTX Series, Packet Transport Routers, T Series routers, and TX Matrix Plus routers only) (Optional) Display chassis environmental information for the craft interface (FPM).

**interconnect-device name**—(QFabric systems only) (Optional) Display chassis environmental information for the Interconnect device.

**lcc number**—(TX Matrix routers and TX Matrix Plus routers only) (Optional) Line-card chassis number.

Replace *number* with the following values depending on the LCC configuration:

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**local**—(MX Series routers and EX Series switches only) (Optional) Display chassis environmental information for the local Virtual Chassis member.

**member *member-id***—(MX Series routers and EX Series switches only) (Optional) Display chassis environmental information for the specified member of the Virtual Chassis configuration. On MX Series routers, replace *member-id* with a value of **0** or **1**. For EX Series switches, see *member* for member ID values.

**monitored**—(MX2020 routers and PTX Series Packet Transport Routers only) (Optional) Display chassis environmental information for monitored temperatures only. Temperatures that are not included in temperature alarm computations are not displayed.

**node-device *name***—(QFabric systems only) (Optional) Display chassis environmental information for the Node device.

**pdu *pdu-slot-number***—(PTX Series only) (Optional) Display chassis environmental information for the specified power distribution unit.

**pem**—(QFX3500 switches and QFabric systems only) (Optional) Display chassis environmental information for the Power Entry Module on the specified Interconnect device or Node device.

**pem *pem-slot-number***—(ACX Series Universal Metro Routers, M120, M320, and M40e routers, MX Series routers, MX104 routers, QFX Series, and T Series routers only) (Optional) Display chassis environmental information for the Power Entry Module on the specified Power Entry Module. For information about the options, see [show chassis environment pem](#).

**psm *psm-slot-number***—(MX2010, MX2020, and MX2008 routers only) (Optional) Display chassis environmental information for the power supply module. For MX2020 routers, replace *psm-slot-number* with a value from **0** through **17**. For MX2010 and MX2008 routers, replace *psm-slot-number* with a value from **0** through **8**.

**psu *psu-slot-number***—(EX Series switches only) (Optional) Display chassis environmental information for a specified power supply.

**routing-engine**—(QFX3500 switches and QFabric systems only) (Optional) Display chassis environmental information for the Routing Engine on the specified Interconnect device.

**routing-engine *re-slot-number***—(Optional) Display chassis environmental information for the specified Routing Engine. For information about the options, see [show chassis environment routing-engine](#).

**satellite [*fpc-slot slot-id* | device-alias *alias-name*]**—(Junos Fusion only)(Optional) Display chassis environmental information for the specified satellite device in a Junos Fusion, or for all satellite devices in the Junos Fusion if no satellite devices are specified.

**scg**—(T Series routers only) (Optional) Display chassis environmental information about the SONET Clock Generator.

**scc**—(TX Matrix routers only) (Optional) Display chassis environmental information about the TX Matrix router (switch-card chassis).

**sfb sfb-slot-number**—(MX2010, MX2020, and MX2008 routers only) (Optional) Display chassis environmental information for the switch fabric board. Replace **sfb-slot-number** with a value from **0** through **7**.

**sfc number**—(TX Matrix Plus routers only) (Optional) Display chassis environmental information about the respective TX Matrix Plus router ( switch-fabric chassis). Replace **number** variable with **0**.

**sib sib-slot-number**—(M320 routers, PTX Series Packet Transport Routers, and T Series routers only) (Optional) Display chassis environmental information about the specified switch interface board. For information about the options, see *show chassis environment sib*.

### Required Privilege Level

view

### RELATED DOCUMENTATION

*show chassis environment adc*

*show chassis environment cb*

*show chassis environment ccg*

*show chassis environment cip*

[show chassis environment fpc | 332](#)

*show chassis environment fpm*

*show chassis environment lcc*

*show chassis environment mcs*

*show chassis environment monitored*

*show chassis environment pcg*

*show chassis environment pdu*

[show chassis environment pem | 412](#)

*show chassis environment psm*

*show chassis environment psu*

[show chassis environment routing-engine | 432](#)

*show chassis environment scg*

*show chassis environment sfb*

*show chassis environment sib*

*show chassis environment sfc*

### List of Sample Output

[show chassis environment \(M5 Router\) on page 230](#)  
[show chassis environment \(M7i Router\) on page 231](#)  
[show chassis environment \(M10 Router\) on page 231](#)  
[show chassis environment \(M10i Router\) on page 232](#)  
[show chassis environment \(M20 Router\) on page 233](#)  
[show chassis environment \(M40 Router\) on page 233](#)  
[show chassis environment \(M40e Router\) on page 234](#)  
[show chassis environment \(M120 Router\) on page 234](#)  
[show chassis environment \(M160 Router\) on page 236](#)  
[show chassis environment \(M320 Router\) on page 237](#)  
[show chassis environment \(MX150\) on page 238](#)  
[show chassis environment \(MX104 Router\) on page 238](#)  
[show chassis environment \(MX240 Router\) on page 238](#)  
[show chassis environment \(MX240 Router with SCBE\) on page 240](#)  
[show chassis environment \(MX480 Router\) on page 241](#)  
[show chassis environment \(MX480 Router with SCBE\) on page 242](#)  
[show chassis environment \(MX960 Router\) on page 244](#)  
[show chassis environment \(MX960 Router with SCBE\) on page 245](#)  
[show chassis environment \(MX960 Router with MPC5EQ\) on page 248](#)  
[show chassis environment \(MX2020 Router\) on page 254](#)  
[show chassis environment \(MX2020 Router with MPC5EQ and MPC6E\) on page 267](#)  
[show chassis environment \(MX2010 Router\) on page 273](#)  
[show chassis environment \(MX2008 Router\) on page 280](#)  
[show chassis environment \(T320 Router\) on page 285](#)  
[show chassis environment \(MX10003 Router\) on page 286](#)  
[show chassis environment \(MX10008 Router\) on page 288](#)  
[show chassis environment \(MX204 Router\) on page 294](#)  
[show chassis environment \(T640 Router\) on page 294](#)  
[show chassis environment \(T4000 Router\) on page 295](#)  
[show chassis environment \(TX Matrix Router\) on page 298](#)  
[show chassis environment \(T1600 Router\) on page 300](#)  
[show chassis environment \(TX Matrix Plus Router\) on page 301](#)  
[show chassis environment \(TX Matrix Plus router with 3D SIBs\) on page 304](#)  
[show chassis environment \(EX4200 Standalone Switch\) on page 308](#)  
[show chassis environment \(EX8216 Switch\) on page 309](#)  
[show chassis environment \(EX9200 Switch\) on page 310](#)  
[show chassis environment \(EX9251 Switch\) on page 311](#)  
[show chassis environment \(EX9253 Switch\) on page 311](#)  
[show chassis environment \(QFX Series and OCX Series\) on page 312](#)  
[show chassis environment interconnect-device \(QFabric System\) on page 313](#)  
[show chassis environment node-device \(QFabric System\) on page 316](#)  
[show chassis environment pem node-device \(QFabric System\) on page 316](#)  
[show chassis environment \(PTX5000 Packet Transport Router\) on page 316](#)

[show chassis environment \(PTX5000 Packet Transport Router with FPC2-PTX-P1A\) on page 320](#)

[show chassis environment \(PTX1000 Packet Transport Router\) on page 320](#)

[show chassis environment \(PTX10008 Router\) on page 321](#)

[show chassis environment \(PTX10016 Router\) on page 324](#)

[show chassis environment \(ACX2000 Universal Metro Router\) on page 328](#)

[show chassis environment \(ACX4000 Universal Metro Router\) on page 329](#)

[show chassis environment \(ACX5048 Router\) on page 330](#)

[show chassis environment \(ACX5096 Router\) on page 330](#)

[show chassis environment \(ACX500 Router\) on page 331](#)

## Output Fields

[Table 9 on page 229](#) lists the output fields for the **show chassis environment** command. Output fields are listed in the approximate order in which they appear.

Table 9: show chassis environment Output Fields

Field Name	Field Description
Class	<p>Information about the category or class of chassis component:</p> <ul style="list-style-type: none"> <li>• <b>Power:</b> Power information: <ul style="list-style-type: none"> <li>• (M5, M10, M20, and M40 routers and EX Series switches only) Power supply status: <b>OK</b>, <b>Testing</b>, (during initial power-on), <b>Failed</b>, or <b>Absent</b>.</li> <li>• (M7i, M10i, M40e, M120, M160, M320, and T Series routers and EX Series switches only) Power Entry Modules status: <b>OK</b>, <b>Testing</b>, (during initial power-on), <b>Check</b>, <b>Failed</b>, or <b>Absent</b>.</li> <li>• (PTX Series only) Power information is reported in PDU or PSM combinations. The status is: <b>OK</b>, <b>Testing</b>, (during initial power-on), <b>Check</b>, <b>Failed</b>, or <b>Absent</b>.</li> </ul> </li> <li>• <b>Temp:</b> Temperature of air flowing through the chassis in degrees Celsius (C) and Fahrenheit (F). <ul style="list-style-type: none"> <li>• On PTX Series Packet Transport Routers and MX2010, MX2020, and MX2008 Routers, multiple cooling zones are supported. FRU temperatures in each zone are coordinated with the fan speed of fan trays in those zones.</li> <li>• EX2200 switches have a side-to-rear cooling system. The <b>Local Intake</b> temperature is measured by the sensor on the right side of the chassis, and the <b>Remote Intake</b> temperature is measured by the sensor on the left side of the chassis.</li> </ul> </li> <li>• <b>Pic:</b> On ACX4000 routers, multiple temperature channels on a MIC. The status is: <b>OK</b> and the <b>Measurement</b> is in degrees Celsius (C) and Fahrenheit (F).</li> <li>• <b>Fan:</b> Fan status: <b>OK</b>, <b>Testing</b> (during initial power-on), <b>Failed</b>, or <b>Absent</b>. On PTX Series Packet Transport Routers and MX2010, MX2020, and MX2008 Routers, multiple fan trays are supported. Fan status is reported in Fan Tray or Fan combinations. <b>Measurement</b> indicates actual fan RPM (PTX and MX2010, MX2020, and MX2008 Routers only).</li> <li>• <b>Misc:</b> Information about other components of the chassis. <ul style="list-style-type: none"> <li>• On some routers, this field indicates the status of one or more additional components.</li> <li>• On the M40e, M160, and M320 router, <b>Misc</b> includes <b>CIP</b> (Connector Interface Panel). <b>OK</b> indicates that the CIP is present. <b>Absent</b> indicates that the CIP is not present.</li> <li>• On T Series routers, <b>Misc</b> includes <b>CIP</b> and <b>SPMB</b> (Switch Processor Mezzanine Board). <b>OK</b> indicates that the <b>CIP</b> or <b>SPMB</b> is present. <b>Absent</b> indicates that the <b>CIP</b> or <b>SPMB</b> is not present.</li> <li>• On PTX Series Packet Transport Routers, <b>Misc</b> includes the <b>SPMB</b> (Switch Processor Mezzanine Board). The SPMB is located on the control boards. <b>OK</b> indicates that the control board is present. <b>Absent</b> indicates that the control board is not present.</li> </ul> </li> </ul>



Table 9: show chassis environment Output Fields (*continued*)

Field Name	Field Description
<b>Item</b>	<p>(MX2010, MX2020, and MX2008 Routers) Information about the chassis component: Routing Engines, Controls Boards (CBs), Switch Fabric Boards (SFBs), PICs, Flexible PIC Concentrators (FPCs), and Adapter Cards (ADCs).</p> <p>(MX104 Routers) Information about the chassis components: Routing Engines, Control Board (CB), Power Entry Module (PEM), and Compact Forwarding Engine Board (AFEB).</p> <p>(QFabric Systems) Information about the chassis component: Control Boards, Routing Engines, Flexible PIC Concentrators (FPCs), and Power Entry Modules (PEMs), Node Devices, and Interconnect Devices.</p> <p>(QFX Series) Information about the chassis component: Flexible PIC Concentrators (FPCs), and Power Entry Modules (PEMs).</p>
<b>Status</b>	<p>(MX104, MX2010, MX2020, and MX2008 Routers) Status of the specified chassis component. For example, if the Class is Fan, the fan status can be:</p> <ul style="list-style-type: none"> <li>• <b>OK:</b> The fans are operational.</li> <li>• <b>Testing:</b> The fans are being tested during initial power-on.</li> <li>• <b>Failed:</b> The fans have failed or the fans are not spinning.</li> <li>• <b>Absent:</b> The fan tray is not installed.</li> </ul> <p>If the Class is Power, the power supply status can be:</p> <ul style="list-style-type: none"> <li>• <b>OK:</b> The power component is operational.</li> <li>• <b>Testing:</b> The power component is being tested during initial power-on.</li> <li>• <b>Check:</b> There is insufficient power---that is, fewer than the minimum required feeds are connected.</li> <li>• <b>Failed:</b> The inputs leads have failed.</li> <li>• <b>Absent:</b> The power component is not installed.</li> </ul>
<b>Measurement</b>	<p>(MX104, MX2010, MX2020, and MX2008 Routers) Dependant on the Class. For example, if the Class is Temp, indicates the temperature in degree Celsius and degrees Fahrenheit. If the Class is Fan, indicates actual fan RPM.</p>

## Sample Output

show chassis environment (M5 Router)

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

Class	Item	Status	Measurement
Power	Power Supply A	OK	
	Power Supply B	Absent	
Temp	FPC 0	OK	30 degrees C / 86 degrees F
	FEB	OK	33 degrees C / 91 degrees F
	PS Intake	OK	27 degrees C / 80 degrees F
	PS Exhaust	OK	27 degrees C / 80 degrees F
	Routing Engine	OK	34 degrees C / 93 degrees F
Fans	Left Fan 1	OK	Spinning at normal speed
	Left Fan 2	OK	Spinning at normal speed
	Left Fan 3	OK	Spinning at normal speed
	Left Fan 4	OK	Spinning at normal speed
Misc	Craft Interface	OK	

### show chassis environment (M7i Router)

user@host> show chassis environment

Class	Item	Status	Measurement
Power	Power Supply 0	OK	
	Power Supply 1	Absent	
Temp	Intake	OK	22 degrees C / 71 degrees F
	FPC 0	OK	23 degrees C / 73 degrees F
	Power Supplies	OK	23 degrees C / 73 degrees F
	CFEB Intake	OK	24 degrees C / 75 degrees F
	CFEB Exhaust	OK	29 degrees C / 84 degrees F
	Routing Engine	OK	26 degrees C / 78 degrees F
Fans	Fan 1	OK	Spinning at normal speed
	Fan 2	OK	Spinning at normal speed
	Fan 3	OK	Spinning at normal speed
	Fan 4	OK	Spinning at normal speed

### show chassis environment (M10 Router)

user@host> show chassis environment

Class	Item	Status	Measurement
Power	Power Supply A	OK	
	Power Supply B	Failed	
Temp	FPC 0	OK	36 degrees C / 96 degrees F
	FPC 1	OK	35 degrees C / 95 degrees F

	FEB	OK	34 degrees C / 93 degrees F
	PS Intake	OK	31 degrees C / 87 degrees F
	PS Exhaust	OK	34 degrees C / 93 degrees F
	Routing Engine	OK	35 degrees C / 95 degrees F
Fans	Left Fan 1	OK	Spinning at normal speed
	Left Fan 2	OK	Spinning at normal speed
	Left Fan 3	OK	Spinning at normal speed
	Left Fan 4	OK	Spinning at normal speed
Misc	Craft Interface	OK	

### show chassis environment (M10i Router)

user@host> show chassis environment

Class	Item	Status	Measurement
Power	Power Supply 0	OK	
	Power Supply 1	OK	
	Power Supply 2	Absent	
	Power Supply 3	Absent	
Temp	Intake	OK	26 degrees C / 78 degrees F
	FPC 0	OK	27 degrees C / 80 degrees F
	FPC 1	OK	28 degrees C / 82 degrees F
	Lower Power Supplies	OK	29 degrees C / 84 degrees F
	Upper Power Supplies	OK	28 degrees C / 82 degrees F
	CFEB Intake	OK	27 degrees C / 80 degrees F
	CFEB Exhaust	OK	36 degrees C / 96 degrees F
	Routing Engine 0	OK	31 degrees C / 87 degrees F
Fans	Routing Engine 1	OK	27 degrees C / 80 degrees F
	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)

user@host> show chassis environment

Class	Item	Status	Measurement
Temp	PEM 0	OK	50 degrees C / 122 degrees F
	PEM 1	OK	45 degrees C / 113 degrees F
	PEM 2	OK	45 degrees C / 113 degrees F
	PEM 3	Absent	

Routing Engine 0	OK	31 degrees C / 87 degrees F
Routing Engine 0 CPU	OK	30 degrees C / 86 degrees F
Routing Engine 1	Present	
Routing Engine 1 CPU	Present	
CB 0 Intake	OK	29 degrees C / 84 degrees F
CB 0 Exhaust A	OK	29 degrees C / 84 degrees F
CB 0 Exhaust B	OK	34 degrees C / 93 degrees F
CB 0 ACBC	OK	32 degrees C / 89 degrees F
CB 0 XF A	OK	49 degrees C / 120 degrees F
CB 0 XF B	OK	45 degrees C / 113 degrees F
CB 1 Intake	OK	26 degrees C / 78 degrees F
CB 1 Exhaust A	OK	26 degrees C / 78 degrees F
CB 1 Exhaust B	OK	27 degrees C / 80 degrees F
CB 1 ACBC	OK	26 degrees C / 78 degrees F
CB 1 XF A	OK	32 degrees C / 89 degrees F
CB 1 XF B	OK	32 degrees C / 89 degrees F
CB 2 Intake	OK	28 degrees C / 82 degrees F
CB 2 Exhaust A	OK	27 degrees C / 80 degrees F
CB 2 Exhaust B	OK	33 degrees C / 91 degrees F
CB 2 ACBC	OK	30 degrees C / 86 degrees F
CB 2 XF A	OK	48 degrees C / 118 degrees F
CB 2 XF B	OK	46 degrees C / 114 degrees F
FPC 0 Intake	OK	38 degrees C / 100 degrees F
FPC 0 Exhaust A	OK	48 degrees C / 118 degrees F
FPC 0 Exhaust B	OK	49 degrees C / 120 degrees F
FPC 0 XL TSen	OK	48 degrees C / 118 degrees F
FPC 0 XL Chip	OK	50 degrees C / 122 degrees F
FPC 0 XL_XR0 TSen	OK	48 degrees C / 118 degrees F
FPC 0 XL_XR0 Chip	OK	53 degrees C / 127 degrees F
FPC 0 XL_XR1 TSen	OK	48 degrees C / 118 degrees F
FPC 0 XL_XR1 Chip	OK	54 degrees C / 129 degrees F
FPC 0 XQ TSen	OK	48 degrees C / 118 degrees F
FPC 0 XQ Chip	OK	52 degrees C / 125 degrees F
FPC 0 XQ_XR0 TSen	OK	48 degrees C / 118 degrees F
FPC 0 XQ_XR0 Chip	OK	62 degrees C / 143 degrees F
FPC 0 XQ_XR1 TSen	OK	48 degrees C / 118 degrees F
FPC 0 XQ_XR1 Chip	OK	62 degrees C / 143 degrees F
FPC 0 XM 0 TSen	OK	53 degrees C / 127 degrees F
FPC 0 XM 0 Chip	OK	63 degrees C / 145 degrees F
FPC 0 XM 1 TSen	OK	53 degrees C / 127 degrees F
FPC 0 XM 1 Chip	OK	46 degrees C / 114 degrees F
FPC 0 PLX PCIe Switch TSe	OK	53 degrees C / 127 degrees F
FPC 0 PLX PCIe Switch Chi	OK	66 degrees C / 150 degrees F
FPC 1 Intake	OK	31 degrees C / 87 degrees F

FPC 1 Exhaust A	OK	38 degrees C / 100 degrees F
FPC 1 Exhaust B	OK	49 degrees C / 120 degrees F
FPC 1 LU 0 TSen	OK	41 degrees C / 105 degrees F
FPC 1 LU 0 Chip	OK	47 degrees C / 116 degrees F
FPC 1 LU 1 TSen	OK	41 degrees C / 105 degrees F
FPC 1 LU 1 Chip	OK	42 degrees C / 107 degrees F
FPC 1 LU 2 TSen	OK	41 degrees C / 105 degrees F
FPC 1 LU 2 Chip	OK	46 degrees C / 114 degrees F
FPC 1 LU 3 TSen	OK	41 degrees C / 105 degrees F
FPC 1 LU 3 Chip	OK	51 degrees C / 123 degrees F
FPC 1 XM 0 TSen	OK	41 degrees C / 105 degrees F
FPC 1 XM 0 Chip	OK	49 degrees C / 120 degrees F
FPC 1 XF 0 TSen	OK	41 degrees C / 105 degrees F
FPC 1 XF 0 Chip	OK	63 degrees C / 145 degrees F
FPC 1 PLX Switch TSen	OK	41 degrees C / 105 degrees F
FPC 1 PLX Switch Chip	OK	43 degrees C / 109 degrees F
FPC 3 Intake	OK	31 degrees C / 87 degrees F
FPC 3 Exhaust A	OK	37 degrees C / 98 degrees F
FPC 3 Exhaust B	OK	43 degrees C / 109 degrees F
FPC 3 LU 0 TSen	OK	42 degrees C / 107 degrees F
FPC 3 LU 0 Chip	OK	43 degrees C / 109 degrees F
FPC 3 LU 1 TSen	OK	42 degrees C / 107 degrees F
FPC 3 LU 1 Chip	OK	46 degrees C / 114 degrees F
FPC 3 LU 2 TSen	OK	42 degrees C / 107 degrees F
FPC 3 LU 2 Chip	OK	40 degrees C / 104 degrees F
FPC 3 LU 3 TSen	OK	42 degrees C / 107 degrees F
FPC 3 LU 3 Chip	OK	41 degrees C / 105 degrees F
FPC 3 MQ 0 TSen	OK	37 degrees C / 98 degrees F
FPC 3 MQ 0 Chip	OK	37 degrees C / 98 degrees F
FPC 3 MQ 1 TSen	OK	37 degrees C / 98 degrees F
FPC 3 MQ 1 Chip	OK	40 degrees C / 104 degrees F
FPC 3 MQ 2 TSen	OK	37 degrees C / 98 degrees F
FPC 3 MQ 2 Chip	OK	36 degrees C / 96 degrees F
FPC 3 MQ 3 TSen	OK	37 degrees C / 98 degrees F
FPC 3 MQ 3 Chip	OK	38 degrees C / 100 degrees F
FPC 4 Intake	OK	34 degrees C / 93 degrees F
FPC 4 Exhaust A	OK	45 degrees C / 113 degrees F
FPC 4 Exhaust B	OK	47 degrees C / 116 degrees F
FPC 4 XL TSen	OK	44 degrees C / 111 degrees F
FPC 4 XL Chip	OK	47 degrees C / 116 degrees F
FPC 4 XL_XR0 TSen	OK	44 degrees C / 111 degrees F
FPC 4 XL_XR0 Chip	OK	48 degrees C / 118 degrees F
FPC 4 XL_XR1 TSen	OK	44 degrees C / 111 degrees F
FPC 4 XL_XR1 Chip	OK	47 degrees C / 116 degrees F

FPC 4 XQ TSen	OK	44 degrees C / 111 degrees F
FPC 4 XQ Chip	OK	47 degrees C / 116 degrees F
FPC 4 XQ_XR0 TSen	OK	44 degrees C / 111 degrees F
FPC 4 XQ_XR0 Chip	OK	57 degrees C / 134 degrees F
FPC 4 XQ_XR1 TSen	OK	44 degrees C / 111 degrees F
FPC 4 XQ_XR1 Chip	OK	58 degrees C / 136 degrees F
FPC 4 XM 0 TSen	OK	51 degrees C / 123 degrees F
FPC 4 XM 0 Chip	OK	61 degrees C / 141 degrees F
FPC 4 XM 1 TSen	OK	51 degrees C / 123 degrees F
FPC 4 XM 1 Chip	OK	47 degrees C / 116 degrees F
FPC 4 PLX PCIe Switch TSe	OK	51 degrees C / 123 degrees F
FPC 4 PLX PCIe Switch Chi	OK	60 degrees C / 140 degrees F
FPC 5 Intake	OK	34 degrees C / 93 degrees F
FPC 5 Exhaust A	OK	45 degrees C / 113 degrees F
FPC 5 Exhaust B	OK	47 degrees C / 116 degrees F
FPC 5 XL TSen	OK	45 degrees C / 113 degrees F
FPC 5 XL Chip	OK	47 degrees C / 116 degrees F
FPC 5 XL_XR0 TSen	OK	45 degrees C / 113 degrees F
FPC 5 XL_XR0 Chip	OK	49 degrees C / 120 degrees F
FPC 5 XL_XR1 TSen	OK	45 degrees C / 113 degrees F
FPC 5 XL_XR1 Chip	OK	49 degrees C / 120 degrees F
FPC 5 XQ TSen	OK	45 degrees C / 113 degrees F
FPC 5 XQ Chip	OK	48 degrees C / 118 degrees F
FPC 5 XQ_XR0 TSen	OK	45 degrees C / 113 degrees F
FPC 5 XQ_XR0 Chip	OK	60 degrees C / 140 degrees F
FPC 5 XQ_XR1 TSen	OK	45 degrees C / 113 degrees F
FPC 5 XQ_XR1 Chip	OK	58 degrees C / 136 degrees F
FPC 5 XM 0 TSen	OK	50 degrees C / 122 degrees F
FPC 5 XM 0 Chip	OK	48 degrees C / 118 degrees F
FPC 5 XM 1 TSen	OK	50 degrees C / 122 degrees F
FPC 5 XM 1 Chip	OK	47 degrees C / 116 degrees F
FPC 5 PLX PCIe Switch TSe	OK	50 degrees C / 122 degrees F
FPC 5 PLX PCIe Switch Chi	OK	59 degrees C / 138 degrees F
FPC 7 Intake	OK	32 degrees C / 89 degrees F
FPC 7 Exhaust A	OK	32 degrees C / 89 degrees F
FPC 7 Exhaust B	OK	33 degrees C / 91 degrees F
FPC 7 LU 0 TSen	OK	49 degrees C / 120 degrees F
FPC 7 LU 0 Chip	OK	44 degrees C / 111 degrees F
FPC 7 LU 1 TSen	OK	49 degrees C / 120 degrees F
FPC 7 LU 1 Chip	OK	47 degrees C / 116 degrees F
FPC 7 LU 2 TSen	OK	49 degrees C / 120 degrees F
FPC 7 LU 2 Chip	OK	39 degrees C / 102 degrees F
FPC 7 LU 3 TSen	OK	49 degrees C / 120 degrees F
FPC 7 LU 3 Chip	OK	43 degrees C / 109 degrees F

FPC 7 XM 0 TSen	OK	49 degrees C / 120 degrees F
FPC 7 XM 0 Chip	OK	57 degrees C / 134 degrees F
FPC 7 XM 1 TSen	OK	49 degrees C / 120 degrees F
FPC 7 XM 1 Chip	OK	48 degrees C / 118 degrees F
FPC 7 PLX Switch TSen	OK	49 degrees C / 120 degrees F
FPC 7 PLX Switch Chip	OK	45 degrees C / 113 degrees F
FPC 8 Intake	OK	36 degrees C / 96 degrees F
FPC 8 Exhaust A	OK	51 degrees C / 123 degrees F
FPC 8 Exhaust B	OK	46 degrees C / 114 degrees F
FPC 8 XL TSen	OK	46 degrees C / 114 degrees F
FPC 8 XL Chip	OK	47 degrees C / 116 degrees F
FPC 8 XL_XR0 TSen	OK	46 degrees C / 114 degrees F
FPC 8 XL_XR0 Chip	OK	53 degrees C / 127 degrees F
FPC 8 XL_XR1 TSen	OK	46 degrees C / 114 degrees F
FPC 8 XL_XR1 Chip	OK	52 degrees C / 125 degrees F
FPC 8 XQ TSen	OK	46 degrees C / 114 degrees F
FPC 8 XQ Chip	OK	46 degrees C / 114 degrees F
FPC 8 XQ_XR0 TSen	OK	46 degrees C / 114 degrees F
FPC 8 XQ_XR0 Chip	OK	59 degrees C / 138 degrees F
FPC 8 XQ_XR1 TSen	OK	46 degrees C / 114 degrees F
FPC 8 XQ_XR1 Chip	OK	57 degrees C / 134 degrees F
FPC 8 XM 0 TSen	OK	52 degrees C / 125 degrees F
FPC 8 XM 0 Chip	OK	61 degrees C / 141 degrees F
FPC 8 XM 1 TSen	OK	52 degrees C / 125 degrees F
FPC 8 XM 1 Chip	OK	47 degrees C / 116 degrees F
FPC 8 PLX PCIe Switch TSe	OK	52 degrees C / 125 degrees F
FPC 8 PLX PCIe Switch Chi	OK	63 degrees C / 145 degrees F
FPC 9 Intake	OK	31 degrees C / 87 degrees F
FPC 9 Exhaust A	OK	34 degrees C / 93 degrees F
FPC 9 Exhaust B	OK	35 degrees C / 95 degrees F
FPC 9 QX 0 TSen	OK	42 degrees C / 107 degrees F
FPC 9 QX 0 Chip	OK	45 degrees C / 113 degrees F
FPC 9 LU 0 TCAM TSen	OK	42 degrees C / 107 degrees F
FPC 9 LU 0 TCAM Chip	OK	41 degrees C / 105 degrees F
FPC 9 LU 0 TSen	OK	42 degrees C / 107 degrees F
FPC 9 LU 0 Chip	OK	43 degrees C / 109 degrees F
FPC 9 MQ 0 TSen	OK	42 degrees C / 107 degrees F
FPC 9 MQ 0 Chip	OK	43 degrees C / 109 degrees F
FPC 9 QX 1 TSen	OK	38 degrees C / 100 degrees F
FPC 9 QX 1 Chip	OK	40 degrees C / 104 degrees F
FPC 9 LU 1 TCAM TSen	OK	38 degrees C / 100 degrees F
FPC 9 LU 1 TCAM Chip	OK	38 degrees C / 100 degrees F
FPC 9 LU 1 TSen	OK	38 degrees C / 100 degrees F
FPC 9 LU 1 Chip	OK	41 degrees C / 105 degrees F

	FPC 9 MQ 1 TSen	OK	38 degrees C / 100 degrees F
	FPC 9 MQ 1 Chip	OK	41 degrees C / 105 degrees F
	FPC 10 Intake	OK	35 degrees C / 95 degrees F
	FPC 10 Exhaust A	OK	51 degrees C / 123 degrees F
	FPC 10 Exhaust B	OK	46 degrees C / 114 degrees F
	FPC 10 XL TSen	OK	42 degrees C / 107 degrees F
	FPC 10 XL Chip	OK	44 degrees C / 111 degrees F
	FPC 10 XL_XR0 TSen	OK	42 degrees C / 107 degrees F
	FPC 10 XL_XR0 Chip	OK	47 degrees C / 116 degrees F
	FPC 10 XL_XR1 TSen	OK	42 degrees C / 107 degrees F
	FPC 10 XL_XR1 Chip	OK	48 degrees C / 118 degrees F
	FPC 10 XQ TSen	OK	42 degrees C / 107 degrees F
	FPC 10 XQ Chip	OK	46 degrees C / 114 degrees F
	FPC 10 XQ_XR0 TSen	OK	42 degrees C / 107 degrees F
	FPC 10 XQ_XR0 Chip	OK	57 degrees C / 134 degrees F
	FPC 10 XQ_XR1 TSen	OK	42 degrees C / 107 degrees F
	FPC 10 XQ_XR1 Chip	OK	53 degrees C / 127 degrees F
	FPC 10 XM 0 TSen	OK	51 degrees C / 123 degrees F
	FPC 10 XM 0 Chip	OK	61 degrees C / 141 degrees F
	FPC 10 XM 1 TSen	OK	51 degrees C / 123 degrees F
	FPC 10 XM 1 Chip	OK	49 degrees C / 120 degrees F
	FPC 10 PLX PCIe Switch TSe	OK	51 degrees C / 123 degrees F
	FPC 10 PLX PCIe Switch Chi	OK	61 degrees C / 141 degrees F
	FPC 11 Intake	OK	33 degrees C / 91 degrees F
	FPC 11 Exhaust A	OK	33 degrees C / 91 degrees F
	FPC 11 Exhaust B	OK	34 degrees C / 93 degrees F
	FPC 11 LU 0 TSen	OK	50 degrees C / 122 degrees F
	FPC 11 LU 0 Chip	OK	48 degrees C / 118 degrees F
	FPC 11 LU 1 TSen	OK	50 degrees C / 122 degrees F
	FPC 11 LU 1 Chip	OK	50 degrees C / 122 degrees F
	FPC 11 LU 2 TSen	OK	50 degrees C / 122 degrees F
	FPC 11 LU 2 Chip	OK	41 degrees C / 105 degrees F
	FPC 11 LU 3 TSen	OK	50 degrees C / 122 degrees F
	FPC 11 LU 3 Chip	OK	48 degrees C / 118 degrees F
	FPC 11 XM 0 TSen	OK	50 degrees C / 122 degrees F
	FPC 11 XM 0 Chip	OK	57 degrees C / 134 degrees F
	FPC 11 XM 1 TSen	OK	50 degrees C / 122 degrees F
	FPC 11 XM 1 Chip	OK	52 degrees C / 125 degrees F
	FPC 11 PLX Switch TSen	OK	50 degrees C / 122 degrees F
	FPC 11 PLX Switch Chip	OK	45 degrees C / 113 degrees F
Fans	Top Fan Tray Temp	OK	42 degrees C / 107 degrees F
	Top Tray Fan 1	OK	Spinning at high speed
Top Tray Fan 2	OK	Spinning at high speed	
Top Tray Fan 3	OK	Spinning at high speed	



Top Tray Fan 4	OK	Spinning at high speed
Top Tray Fan 5	OK	Spinning at high speed
Top Tray Fan 6	OK	Spinning at high speed
Top Tray Fan 7	OK	Spinning at high speed
Top Tray Fan 8	OK	Spinning at high speed
Top Tray Fan 9	OK	Spinning at high speed
Top Tray Fan 10	OK	Spinning at high speed
Top Tray Fan 11	OK	Spinning at high speed
Top Tray Fan 12	OK	Spinning at high speed
Bottom Fan Tray Temp	OK	33 degrees C / 91 degrees F
Bottom Tray Fan 1	OK	Spinning at high speed
Bottom Tray Fan 2	OK	Spinning at high speed
Bottom Tray Fan 3	OK	Spinning at high speed
Bottom Tray Fan 4	OK	Spinning at high speed
Bottom Tray Fan 5	OK	Spinning at high speed
Bottom Tray Fan 6	OK	Spinning at high speed
Bottom Tray Fan 7	OK	Spinning at high speed
Bottom Tray Fan 8	OK	Spinning at high speed
Bottom Tray Fan 9	OK	Spinning at high speed
Bottom Tray Fan 10	OK	Spinning at high speed
Bottom Tray Fan 11	OK	Spinning at high speed
Bottom Tray Fan 12	OK	Spinning at high speed

### show chassis environment (MX2020 Router)

user@host> show chassis environment

Class	Item	Status	Measurement
Temp	PSM 0	Absent	
	PSM 1	Absent	
	PSM 2	OK	41 degrees C / 105 degrees F
	PSM 3	OK	39 degrees C / 102 degrees F
	PSM 4	OK	39 degrees C / 102 degrees F
	PSM 5	OK	38 degrees C / 100 degrees F
	PSM 6	OK	38 degrees C / 100 degrees F
	PSM 7	OK	38 degrees C / 100 degrees F
	PSM 8	OK	37 degrees C / 98 degrees F
	PSM 9	Absent	
	PSM 10	Absent	
	PSM 11	OK	47 degrees C / 116 degrees F
	PSM 12	OK	45 degrees C / 113 degrees F
	PSM 13	OK	44 degrees C / 111 degrees F
	PSM 14	OK	44 degrees C / 111 degrees F
	PSM 15	OK	43 degrees C / 109 degrees F

PSM 16	OK	42 degrees C / 107 degrees F
PSM 17	OK	41 degrees C / 105 degrees F
PDM 0	OK	
PDM 1	Absent	
PDM 2	Absent	
PDM 3	OK	
CB 0 IntakeA-Zone0	OK	45 degrees C / 113 degrees F
CB 0 IntakeB-Zone1	OK	34 degrees C / 93 degrees F
CB 0 IntakeC-Zone0	OK	48 degrees C / 118 degrees F
CB 0 ExhaustA-Zone0	OK	45 degrees C / 113 degrees F
CB 0 ExhaustB-Zone1	OK	37 degrees C / 98 degrees F
CB 0 TCBC-Zone0	OK	41 degrees C / 105 degrees F
CB 1 IntakeA-Zone0	OK	46 degrees C / 114 degrees F
CB 1 IntakeB-Zone1	OK	42 degrees C / 107 degrees F
CB 1 IntakeC-Zone0	OK	49 degrees C / 120 degrees F
CB 1 ExhaustA-Zone0	OK	46 degrees C / 114 degrees F
CB 1 ExhaustB-Zone1	OK	41 degrees C / 105 degrees F
CB 1 TCBC-Zone0	OK	46 degrees C / 114 degrees F
SPMB 0 Intake	OK	33 degrees C / 91 degrees F
SPMB 1 Intake	OK	42 degrees C / 107 degrees F
Routing Engine 0	OK	35 degrees C / 95 degrees F
Routing Engine 0 CPU	OK	34 degrees C / 93 degrees F
Routing Engine 1	OK	44 degrees C / 111 degrees F
Routing Engine 1 CPU	OK	42 degrees C / 107 degrees F
SFB 0 Intake-Zone0	OK	55 degrees C / 131 degrees F
SFB 0 Exhaust-Zone1	OK	48 degrees C / 118 degrees F
SFB 0 IntakeA-Zone0	OK	50 degrees C / 122 degrees F
SFB 0 IntakeB-Zone1	OK	40 degrees C / 104 degrees F
SFB 0 Exhaust-Zone0	OK	52 degrees C / 125 degrees F
SFB 0 SFB-XF2-Zone1	OK	61 degrees C / 141 degrees F
SFB 0 SFB-XF1-Zone0	OK	69 degrees C / 156 degrees F
SFB 0 SFB-XF0-Zone0	OK	68 degrees C / 154 degrees F
SFB 1 Intake-Zone0	OK	56 degrees C / 132 degrees F
SFB 1 Exhaust-Zone1	OK	47 degrees C / 116 degrees F
SFB 1 IntakeA-Zone0	OK	51 degrees C / 123 degrees F
SFB 1 IntakeB-Zone1	OK	40 degrees C / 104 degrees F
SFB 1 Exhaust-Zone0	OK	51 degrees C / 123 degrees F
SFB 1 SFB-XF2-Zone1	OK	62 degrees C / 143 degrees F
SFB 1 SFB-XF1-Zone0	OK	67 degrees C / 152 degrees F
SFB 1 SFB-XF0-Zone0	OK	69 degrees C / 156 degrees F
SFB 2 Intake-Zone0	OK	56 degrees C / 132 degrees F
SFB 2 Exhaust-Zone1	OK	47 degrees C / 116 degrees F
SFB 2 IntakeA-Zone0	OK	51 degrees C / 123 degrees F
SFB 2 IntakeB-Zone1	OK	40 degrees C / 104 degrees F

SFB 2 Exhaust-Zone0	OK	53 degrees C / 127 degrees F
SFB 2 SFB-XF2-Zone1	OK	65 degrees C / 149 degrees F
SFB 2 SFB-XF1-Zone0	OK	69 degrees C / 156 degrees F
SFB 2 SFB-XF0-Zone0	OK	70 degrees C / 158 degrees F
SFB 3 Intake-Zone0	OK	57 degrees C / 134 degrees F
SFB 3 Exhaust-Zone1	OK	48 degrees C / 118 degrees F
SFB 3 IntakeA-Zone0	OK	52 degrees C / 125 degrees F
SFB 3 IntakeB-Zone1	OK	41 degrees C / 105 degrees F
SFB 3 Exhaust-Zone0	OK	53 degrees C / 127 degrees F
SFB 3 SFB-XF2-Zone1	OK	66 degrees C / 150 degrees F
SFB 3 SFB-XF1-Zone0	OK	69 degrees C / 156 degrees F
SFB 3 SFB-XF0-Zone0	OK	71 degrees C / 159 degrees F
SFB 4 Intake-Zone0	OK	58 degrees C / 136 degrees F
SFB 4 Exhaust-Zone1	OK	49 degrees C / 120 degrees F
SFB 4 IntakeA-Zone0	OK	54 degrees C / 129 degrees F
SFB 4 IntakeB-Zone1	OK	42 degrees C / 107 degrees F
SFB 4 Exhaust-Zone0	OK	53 degrees C / 127 degrees F
SFB 4 SFB-XF2-Zone1	OK	64 degrees C / 147 degrees F
SFB 4 SFB-XF1-Zone0	OK	68 degrees C / 154 degrees F
SFB 4 SFB-XF0-Zone0	OK	71 degrees C / 159 degrees F
SFB 5 Intake-Zone0	OK	58 degrees C / 136 degrees F
SFB 5 Exhaust-Zone1	OK	50 degrees C / 122 degrees F
SFB 5 IntakeA-Zone0	OK	53 degrees C / 127 degrees F
SFB 5 IntakeB-Zone1	OK	43 degrees C / 109 degrees F
SFB 5 Exhaust-Zone0	OK	54 degrees C / 129 degrees F
SFB 5 SFB-XF2-Zone1	OK	66 degrees C / 150 degrees F
SFB 5 SFB-XF1-Zone0	OK	69 degrees C / 156 degrees F
SFB 5 SFB-XF0-Zone0	OK	74 degrees C / 165 degrees F
SFB 6 Intake-Zone0	OK	58 degrees C / 136 degrees F
SFB 6 Exhaust-Zone1	OK	49 degrees C / 120 degrees F
SFB 6 IntakeA-Zone0	OK	53 degrees C / 127 degrees F
SFB 6 IntakeB-Zone1	OK	43 degrees C / 109 degrees F
SFB 6 Exhaust-Zone0	OK	53 degrees C / 127 degrees F
SFB 6 SFB-XF2-Zone1	OK	65 degrees C / 149 degrees F
SFB 6 SFB-XF1-Zone0	OK	68 degrees C / 154 degrees F
SFB 6 SFB-XF0-Zone0	OK	72 degrees C / 161 degrees F
SFB 7 Intake-Zone0	OK	57 degrees C / 134 degrees F
SFB 7 Exhaust-Zone1	OK	50 degrees C / 122 degrees F
SFB 7 IntakeA-Zone0	OK	53 degrees C / 127 degrees F
SFB 7 IntakeB-Zone1	OK	43 degrees C / 109 degrees F
SFB 7 Exhaust-Zone0	OK	54 degrees C / 129 degrees F
SFB 7 SFB-XF2-Zone1	OK	68 degrees C / 154 degrees F
SFB 7 SFB-XF1-Zone0	OK	69 degrees C / 156 degrees F
SFB 7 SFB-XF0-Zone0	OK	73 degrees C / 163 degrees F

FPC 0 Intake	OK	41 degrees C / 105 degrees F
FPC 0 Exhaust A	OK	48 degrees C / 118 degrees F
FPC 0 Exhaust B	OK	62 degrees C / 143 degrees F
FPC 0 LU 0 TSen	OK	59 degrees C / 138 degrees F
FPC 0 LU 0 Chip	OK	62 degrees C / 143 degrees F
FPC 0 LU 1 TSen	OK	59 degrees C / 138 degrees F
FPC 0 LU 1 Chip	OK	64 degrees C / 147 degrees F
FPC 0 LU 2 TSen	OK	59 degrees C / 138 degrees F
FPC 0 LU 2 Chip	OK	53 degrees C / 127 degrees F
FPC 0 LU 3 TSen	OK	59 degrees C / 138 degrees F
FPC 0 LU 3 Chip	OK	53 degrees C / 127 degrees F
FPC 0 MQ 0 TSen	OK	47 degrees C / 116 degrees F
FPC 0 MQ 0 Chip	OK	49 degrees C / 120 degrees F
FPC 0 MQ 1 TSen	OK	47 degrees C / 116 degrees F
FPC 0 MQ 1 Chip	OK	51 degrees C / 123 degrees F
FPC 0 MQ 2 TSen	OK	47 degrees C / 116 degrees F
FPC 0 MQ 2 Chip	OK	44 degrees C / 111 degrees F
FPC 0 MQ 3 TSen	OK	47 degrees C / 116 degrees F
FPC 0 MQ 3 Chip	OK	45 degrees C / 113 degrees F
FPC 1 Intake	OK	40 degrees C / 104 degrees F
FPC 1 Exhaust A	OK	49 degrees C / 120 degrees F
FPC 1 Exhaust B	OK	58 degrees C / 136 degrees F
FPC 1 LU 0 TSen	OK	55 degrees C / 131 degrees F
FPC 1 LU 0 Chip	OK	56 degrees C / 132 degrees F
FPC 1 LU 1 TSen	OK	55 degrees C / 131 degrees F
FPC 1 LU 1 Chip	OK	58 degrees C / 136 degrees F
FPC 1 LU 2 TSen	OK	55 degrees C / 131 degrees F
FPC 1 LU 2 Chip	OK	49 degrees C / 120 degrees F
FPC 1 LU 3 TSen	OK	55 degrees C / 131 degrees F
FPC 1 LU 3 Chip	OK	51 degrees C / 123 degrees F
FPC 1 MQ 0 TSen	OK	47 degrees C / 116 degrees F
FPC 1 MQ 0 Chip	OK	48 degrees C / 118 degrees F
FPC 1 MQ 1 TSen	OK	47 degrees C / 116 degrees F
FPC 1 MQ 1 Chip	OK	50 degrees C / 122 degrees F
FPC 1 MQ 2 TSen	OK	47 degrees C / 116 degrees F
FPC 1 MQ 2 Chip	OK	44 degrees C / 111 degrees F
FPC 1 MQ 3 TSen	OK	47 degrees C / 116 degrees F
FPC 1 MQ 3 Chip	OK	44 degrees C / 111 degrees F
FPC 2 Intake	OK	39 degrees C / 102 degrees F
FPC 2 Exhaust A	OK	49 degrees C / 120 degrees F
FPC 2 Exhaust B	OK	61 degrees C / 141 degrees F
FPC 2 LU 0 TSen	OK	58 degrees C / 136 degrees F
FPC 2 LU 0 Chip	OK	60 degrees C / 140 degrees F
FPC 2 LU 1 TSen	OK	58 degrees C / 136 degrees F

FPC 2 LU 1 Chip	OK	65 degrees C / 149 degrees F
FPC 2 LU 2 TSen	OK	58 degrees C / 136 degrees F
FPC 2 LU 2 Chip	OK	51 degrees C / 123 degrees F
FPC 2 LU 3 TSen	OK	58 degrees C / 136 degrees F
FPC 2 LU 3 Chip	OK	53 degrees C / 127 degrees F
FPC 2 MQ 0 TSen	OK	47 degrees C / 116 degrees F
FPC 2 MQ 0 Chip	OK	50 degrees C / 122 degrees F
FPC 2 MQ 1 TSen	OK	47 degrees C / 116 degrees F
FPC 2 MQ 1 Chip	OK	52 degrees C / 125 degrees F
FPC 2 MQ 2 TSen	OK	47 degrees C / 116 degrees F
FPC 2 MQ 2 Chip	OK	45 degrees C / 113 degrees F
FPC 2 MQ 3 TSen	OK	47 degrees C / 116 degrees F
FPC 2 MQ 3 Chip	OK	46 degrees C / 114 degrees F
FPC 3 Intake	OK	40 degrees C / 104 degrees F
FPC 3 Exhaust A	OK	49 degrees C / 120 degrees F
FPC 3 Exhaust B	OK	61 degrees C / 141 degrees F
FPC 3 LU 0 TSen	OK	58 degrees C / 136 degrees F
FPC 3 LU 0 Chip	OK	61 degrees C / 141 degrees F
FPC 3 LU 1 TSen	OK	58 degrees C / 136 degrees F
FPC 3 LU 1 Chip	OK	62 degrees C / 143 degrees F
FPC 3 LU 2 TSen	OK	58 degrees C / 136 degrees F
FPC 3 LU 2 Chip	OK	51 degrees C / 123 degrees F
FPC 3 LU 3 TSen	OK	58 degrees C / 136 degrees F
FPC 3 LU 3 Chip	OK	53 degrees C / 127 degrees F
FPC 3 MQ 0 TSen	OK	48 degrees C / 118 degrees F
FPC 3 MQ 0 Chip	OK	50 degrees C / 122 degrees F
FPC 3 MQ 1 TSen	OK	48 degrees C / 118 degrees F
FPC 3 MQ 1 Chip	OK	54 degrees C / 129 degrees F
FPC 3 MQ 2 TSen	OK	48 degrees C / 118 degrees F
FPC 3 MQ 2 Chip	OK	45 degrees C / 113 degrees F
FPC 3 MQ 3 TSen	OK	48 degrees C / 118 degrees F
FPC 3 MQ 3 Chip	OK	48 degrees C / 118 degrees F
FPC 4 Intake	OK	40 degrees C / 104 degrees F
FPC 4 Exhaust A	OK	49 degrees C / 120 degrees F
FPC 4 Exhaust B	OK	62 degrees C / 143 degrees F
FPC 4 LU 0 TSen	OK	59 degrees C / 138 degrees F
FPC 4 LU 0 Chip	OK	62 degrees C / 143 degrees F
FPC 4 LU 1 TSen	OK	59 degrees C / 138 degrees F
FPC 4 LU 1 Chip	OK	65 degrees C / 149 degrees F
FPC 4 LU 2 TSen	OK	59 degrees C / 138 degrees F
FPC 4 LU 2 Chip	OK	51 degrees C / 123 degrees F
FPC 4 LU 3 TSen	OK	59 degrees C / 138 degrees F
FPC 4 LU 3 Chip	OK	53 degrees C / 127 degrees F
FPC 4 MQ 0 TSen	OK	48 degrees C / 118 degrees F

FPC 4 MQ 0 Chip	OK	52 degrees C / 125 degrees F
FPC 4 MQ 1 TSen	OK	48 degrees C / 118 degrees F
FPC 4 MQ 1 Chip	OK	53 degrees C / 127 degrees F
FPC 4 MQ 2 TSen	OK	48 degrees C / 118 degrees F
FPC 4 MQ 2 Chip	OK	46 degrees C / 114 degrees F
FPC 4 MQ 3 TSen	OK	48 degrees C / 118 degrees F
FPC 4 MQ 3 Chip	OK	47 degrees C / 116 degrees F
FPC 5 Intake	OK	41 degrees C / 105 degrees F
FPC 5 Exhaust A	OK	50 degrees C / 122 degrees F
FPC 5 Exhaust B	OK	63 degrees C / 145 degrees F
FPC 5 LU 0 TSen	OK	60 degrees C / 140 degrees F
FPC 5 LU 0 Chip	OK	63 degrees C / 145 degrees F
FPC 5 LU 1 TSen	OK	60 degrees C / 140 degrees F
FPC 5 LU 1 Chip	OK	66 degrees C / 150 degrees F
FPC 5 LU 2 TSen	OK	60 degrees C / 140 degrees F
FPC 5 LU 2 Chip	OK	56 degrees C / 132 degrees F
FPC 5 LU 3 TSen	OK	60 degrees C / 140 degrees F
FPC 5 LU 3 Chip	OK	54 degrees C / 129 degrees F
FPC 5 MQ 0 TSen	OK	49 degrees C / 120 degrees F
FPC 5 MQ 0 Chip	OK	52 degrees C / 125 degrees F
FPC 5 MQ 1 TSen	OK	49 degrees C / 120 degrees F
FPC 5 MQ 1 Chip	OK	53 degrees C / 127 degrees F
FPC 5 MQ 2 TSen	OK	49 degrees C / 120 degrees F
FPC 5 MQ 2 Chip	OK	48 degrees C / 118 degrees F
FPC 5 MQ 3 TSen	OK	49 degrees C / 120 degrees F
FPC 5 MQ 3 Chip	OK	47 degrees C / 116 degrees F
FPC 6 Intake	OK	42 degrees C / 107 degrees F
FPC 6 Exhaust A	OK	51 degrees C / 123 degrees F
FPC 6 Exhaust B	OK	63 degrees C / 145 degrees F
FPC 6 LU 0 TSen	OK	61 degrees C / 141 degrees F
FPC 6 LU 0 Chip	OK	64 degrees C / 147 degrees F
FPC 6 LU 1 TSen	OK	61 degrees C / 141 degrees F
FPC 6 LU 1 Chip	OK	66 degrees C / 150 degrees F
FPC 6 LU 2 TSen	OK	61 degrees C / 141 degrees F
FPC 6 LU 2 Chip	OK	56 degrees C / 132 degrees F
FPC 6 LU 3 TSen	OK	61 degrees C / 141 degrees F
FPC 6 LU 3 Chip	OK	56 degrees C / 132 degrees F
FPC 6 MQ 0 TSen	OK	50 degrees C / 122 degrees F
FPC 6 MQ 0 Chip	OK	56 degrees C / 132 degrees F
FPC 6 MQ 1 TSen	OK	50 degrees C / 122 degrees F
FPC 6 MQ 1 Chip	OK	59 degrees C / 138 degrees F
FPC 6 MQ 2 TSen	OK	50 degrees C / 122 degrees F
FPC 6 MQ 2 Chip	OK	49 degrees C / 120 degrees F
FPC 6 MQ 3 TSen	OK	50 degrees C / 122 degrees F

FPC 6 MQ 3 Chip	OK	49 degrees C / 120 degrees F
FPC 7 Intake	OK	41 degrees C / 105 degrees F
FPC 7 Exhaust A	OK	51 degrees C / 123 degrees F
FPC 7 Exhaust B	OK	63 degrees C / 145 degrees F
FPC 7 LU 0 TSen	OK	60 degrees C / 140 degrees F
FPC 7 LU 0 Chip	OK	61 degrees C / 141 degrees F
FPC 7 LU 1 TSen	OK	60 degrees C / 140 degrees F
FPC 7 LU 1 Chip	OK	65 degrees C / 149 degrees F
FPC 7 LU 2 TSen	OK	60 degrees C / 140 degrees F
FPC 7 LU 2 Chip	OK	54 degrees C / 129 degrees F
FPC 7 LU 3 TSen	OK	60 degrees C / 140 degrees F
FPC 7 LU 3 Chip	OK	53 degrees C / 127 degrees F
FPC 7 MQ 0 TSen	OK	50 degrees C / 122 degrees F
FPC 7 MQ 0 Chip	OK	53 degrees C / 127 degrees F
FPC 7 MQ 1 TSen	OK	50 degrees C / 122 degrees F
FPC 7 MQ 1 Chip	OK	54 degrees C / 129 degrees F
FPC 7 MQ 2 TSen	OK	50 degrees C / 122 degrees F
FPC 7 MQ 2 Chip	OK	47 degrees C / 116 degrees F
FPC 7 MQ 3 TSen	OK	50 degrees C / 122 degrees F
FPC 7 MQ 3 Chip	OK	47 degrees C / 116 degrees F
FPC 8 Intake	OK	41 degrees C / 105 degrees F
FPC 8 Exhaust A	OK	50 degrees C / 122 degrees F
FPC 8 Exhaust B	OK	62 degrees C / 143 degrees F
FPC 8 LU 0 TSen	OK	59 degrees C / 138 degrees F
FPC 8 LU 0 Chip	OK	62 degrees C / 143 degrees F
FPC 8 LU 1 TSen	OK	59 degrees C / 138 degrees F
FPC 8 LU 1 Chip	OK	64 degrees C / 147 degrees F
FPC 8 LU 2 TSen	OK	59 degrees C / 138 degrees F
FPC 8 LU 2 Chip	OK	55 degrees C / 131 degrees F
FPC 8 LU 3 TSen	OK	59 degrees C / 138 degrees F
FPC 8 LU 3 Chip	OK	54 degrees C / 129 degrees F
FPC 8 MQ 0 TSen	OK	49 degrees C / 120 degrees F
FPC 8 MQ 0 Chip	OK	51 degrees C / 123 degrees F
FPC 8 MQ 1 TSen	OK	49 degrees C / 120 degrees F
FPC 8 MQ 1 Chip	OK	52 degrees C / 125 degrees F
FPC 8 MQ 2 TSen	OK	49 degrees C / 120 degrees F
FPC 8 MQ 2 Chip	OK	46 degrees C / 114 degrees F
FPC 8 MQ 3 TSen	OK	49 degrees C / 120 degrees F
FPC 8 MQ 3 Chip	OK	47 degrees C / 116 degrees F
FPC 9 Intake	OK	42 degrees C / 107 degrees F
FPC 9 Exhaust A	OK	51 degrees C / 123 degrees F
FPC 9 Exhaust B	OK	63 degrees C / 145 degrees F
FPC 9 LU 0 TSen	OK	60 degrees C / 140 degrees F
FPC 9 LU 0 Chip	OK	65 degrees C / 149 degrees F

FPC 9 LU 1 TSen	OK	60 degrees C / 140 degrees F
FPC 9 LU 1 Chip	OK	67 degrees C / 152 degrees F
FPC 9 LU 2 TSen	OK	60 degrees C / 140 degrees F
FPC 9 LU 2 Chip	OK	54 degrees C / 129 degrees F
FPC 9 LU 3 TSen	OK	60 degrees C / 140 degrees F
FPC 9 LU 3 Chip	OK	54 degrees C / 129 degrees F
FPC 9 MQ 0 TSen	OK	51 degrees C / 123 degrees F
FPC 9 MQ 0 Chip	OK	55 degrees C / 131 degrees F
FPC 9 MQ 1 TSen	OK	51 degrees C / 123 degrees F
FPC 9 MQ 1 Chip	OK	59 degrees C / 138 degrees F
FPC 9 MQ 2 TSen	OK	51 degrees C / 123 degrees F
FPC 9 MQ 2 Chip	OK	49 degrees C / 120 degrees F
FPC 9 MQ 3 TSen	OK	51 degrees C / 123 degrees F
FPC 9 MQ 3 Chip	OK	49 degrees C / 120 degrees F
FPC 10 Intake	OK	44 degrees C / 111 degrees F
FPC 10 Exhaust A	OK	49 degrees C / 120 degrees F
FPC 10 Exhaust B	OK	55 degrees C / 131 degrees F
FPC 10 LU 0 TSen	OK	54 degrees C / 129 degrees F
FPC 10 LU 0 Chip	OK	55 degrees C / 131 degrees F
FPC 10 LU 1 TSen	OK	54 degrees C / 129 degrees F
FPC 10 LU 1 Chip	OK	59 degrees C / 138 degrees F
FPC 10 LU 2 TSen	OK	54 degrees C / 129 degrees F
FPC 10 LU 2 Chip	OK	52 degrees C / 125 degrees F
FPC 10 LU 3 TSen	OK	54 degrees C / 129 degrees F
FPC 10 LU 3 Chip	OK	51 degrees C / 123 degrees F
FPC 10 MQ 0 TSen	OK	48 degrees C / 118 degrees F
FPC 10 MQ 0 Chip	OK	49 degrees C / 120 degrees F
FPC 10 MQ 1 TSen	OK	48 degrees C / 118 degrees F
FPC 10 MQ 1 Chip	OK	52 degrees C / 125 degrees F
FPC 10 MQ 2 TSen	OK	48 degrees C / 118 degrees F
FPC 10 MQ 2 Chip	OK	47 degrees C / 116 degrees F
FPC 10 MQ 3 TSen	OK	48 degrees C / 118 degrees F
FPC 10 MQ 3 Chip	OK	47 degrees C / 116 degrees F
FPC 11 Intake	OK	30 degrees C / 86 degrees F
FPC 11 Exhaust A	OK	35 degrees C / 95 degrees F
FPC 11 Exhaust B	OK	30 degrees C / 86 degrees F
FPC 11 LU 0 TSen	OK	57 degrees C / 134 degrees F
FPC 11 LU 0 Chip	OK	58 degrees C / 136 degrees F
FPC 11 LU 1 TSen	OK	57 degrees C / 134 degrees F
FPC 11 LU 1 Chip	OK	62 degrees C / 143 degrees F
FPC 11 LU 2 TSen	OK	57 degrees C / 134 degrees F
FPC 11 LU 2 Chip	OK	53 degrees C / 127 degrees F
FPC 11 LU 3 TSen	OK	57 degrees C / 134 degrees F
FPC 11 LU 3 Chip	OK	54 degrees C / 129 degrees F



FPC 11 MQ 0 TSen	OK	52 degrees C / 125 degrees F
FPC 11 MQ 0 Chip	OK	52 degrees C / 125 degrees F
FPC 11 MQ 1 TSen	OK	52 degrees C / 125 degrees F
FPC 11 MQ 1 Chip	OK	57 degrees C / 134 degrees F
FPC 11 MQ 2 TSen	OK	52 degrees C / 125 degrees F
FPC 11 MQ 2 Chip	OK	48 degrees C / 118 degrees F
FPC 11 MQ 3 TSen	OK	52 degrees C / 125 degrees F
FPC 11 MQ 3 Chip	OK	52 degrees C / 125 degrees F
FPC 12 Intake	OK	40 degrees C / 104 degrees F
FPC 12 Exhaust A	OK	47 degrees C / 116 degrees F
FPC 12 Exhaust B	OK	52 degrees C / 125 degrees F
FPC 12 LU 0 TSen	OK	51 degrees C / 123 degrees F
FPC 12 LU 0 Chip	OK	52 degrees C / 125 degrees F
FPC 12 LU 1 TSen	OK	51 degrees C / 123 degrees F
FPC 12 LU 1 Chip	OK	55 degrees C / 131 degrees F
FPC 12 LU 2 TSen	OK	51 degrees C / 123 degrees F
FPC 12 LU 2 Chip	OK	47 degrees C / 116 degrees F
FPC 12 LU 3 TSen	OK	51 degrees C / 123 degrees F
FPC 12 LU 3 Chip	OK	50 degrees C / 122 degrees F
FPC 12 MQ 0 TSen	OK	46 degrees C / 114 degrees F
FPC 12 MQ 0 Chip	OK	46 degrees C / 114 degrees F
FPC 12 MQ 1 TSen	OK	46 degrees C / 114 degrees F
FPC 12 MQ 1 Chip	OK	50 degrees C / 122 degrees F
FPC 12 MQ 2 TSen	OK	46 degrees C / 114 degrees F
FPC 12 MQ 2 Chip	OK	44 degrees C / 111 degrees F
FPC 12 MQ 3 TSen	OK	46 degrees C / 114 degrees F
FPC 12 MQ 3 Chip	OK	46 degrees C / 114 degrees F
FPC 13 Intake	OK	40 degrees C / 104 degrees F
FPC 13 Exhaust A	OK	48 degrees C / 118 degrees F
FPC 13 Exhaust B	OK	52 degrees C / 125 degrees F
FPC 13 LU 0 TSen	OK	51 degrees C / 123 degrees F
FPC 13 LU 0 Chip	OK	52 degrees C / 125 degrees F
FPC 13 LU 1 TSen	OK	51 degrees C / 123 degrees F
FPC 13 LU 1 Chip	OK	55 degrees C / 131 degrees F
FPC 13 LU 2 TSen	OK	51 degrees C / 123 degrees F
FPC 13 LU 2 Chip	OK	48 degrees C / 118 degrees F
FPC 13 LU 3 TSen	OK	51 degrees C / 123 degrees F
FPC 13 LU 3 Chip	OK	48 degrees C / 118 degrees F
FPC 13 MQ 0 TSen	OK	46 degrees C / 114 degrees F
FPC 13 MQ 0 Chip	OK	46 degrees C / 114 degrees F
FPC 13 MQ 1 TSen	OK	46 degrees C / 114 degrees F
FPC 13 MQ 1 Chip	OK	50 degrees C / 122 degrees F
FPC 13 MQ 2 TSen	OK	46 degrees C / 114 degrees F
FPC 13 MQ 2 Chip	OK	44 degrees C / 111 degrees F

FPC 13 MQ 3 TSen	OK	46 degrees C / 114 degrees F
FPC 13 MQ 3 Chip	OK	46 degrees C / 114 degrees F
FPC 14 Intake	OK	40 degrees C / 104 degrees F
FPC 14 Exhaust A	OK	50 degrees C / 122 degrees F
FPC 14 Exhaust B	OK	51 degrees C / 123 degrees F
FPC 14 LU 0 TSen	OK	50 degrees C / 122 degrees F
FPC 14 LU 0 Chip	OK	50 degrees C / 122 degrees F
FPC 14 LU 1 TSen	OK	50 degrees C / 122 degrees F
FPC 14 LU 1 Chip	OK	54 degrees C / 129 degrees F
FPC 14 LU 2 TSen	OK	50 degrees C / 122 degrees F
FPC 14 LU 2 Chip	OK	47 degrees C / 116 degrees F
FPC 14 LU 3 TSen	OK	50 degrees C / 122 degrees F
FPC 14 LU 3 Chip	OK	49 degrees C / 120 degrees F
FPC 14 MQ 0 TSen	OK	47 degrees C / 116 degrees F
FPC 14 MQ 0 Chip	OK	46 degrees C / 114 degrees F
FPC 14 MQ 1 TSen	OK	47 degrees C / 116 degrees F
FPC 14 MQ 1 Chip	OK	51 degrees C / 123 degrees F
FPC 14 MQ 2 TSen	OK	47 degrees C / 116 degrees F
FPC 14 MQ 2 Chip	OK	45 degrees C / 113 degrees F
FPC 14 MQ 3 TSen	OK	47 degrees C / 116 degrees F
FPC 14 MQ 3 Chip	OK	48 degrees C / 118 degrees F
FPC 15 Intake	OK	44 degrees C / 111 degrees F
FPC 15 Exhaust A	OK	49 degrees C / 120 degrees F
FPC 15 Exhaust B	OK	60 degrees C / 140 degrees F
FPC 15 LU 0 TSen	OK	50 degrees C / 122 degrees F
FPC 15 LU 0 Chip	OK	56 degrees C / 132 degrees F
FPC 15 LU 1 TSen	OK	50 degrees C / 122 degrees F
FPC 15 LU 1 Chip	OK	50 degrees C / 122 degrees F
FPC 15 LU 2 TSen	OK	50 degrees C / 122 degrees F
FPC 15 LU 2 Chip	OK	58 degrees C / 136 degrees F
FPC 15 LU 3 TSen	OK	50 degrees C / 122 degrees F
FPC 15 LU 3 Chip	OK	63 degrees C / 145 degrees F
FPC 15 XM 0 TSen	OK	50 degrees C / 122 degrees F
FPC 15 XM 0 Chip	OK	56 degrees C / 132 degrees F
FPC 15 XF 0 TSen	OK	50 degrees C / 122 degrees F
FPC 15 XF 0 Chip	OK	68 degrees C / 154 degrees F
FPC 15 PLX Switch TSen	OK	50 degrees C / 122 degrees F
FPC 15 PLX Switch Chip	OK	56 degrees C / 132 degrees F
FPC 16 Intake	OK	42 degrees C / 107 degrees F
FPC 16 Exhaust A	OK	51 degrees C / 123 degrees F
FPC 16 Exhaust B	OK	53 degrees C / 127 degrees F
FPC 16 LU 0 TSen	OK	51 degrees C / 123 degrees F
FPC 16 LU 0 Chip	OK	52 degrees C / 125 degrees F
FPC 16 LU 1 TSen	OK	51 degrees C / 123 degrees F

FPC 16 LU 1 Chip	OK	55 degrees C / 131 degrees F
FPC 16 LU 2 TSen	OK	51 degrees C / 123 degrees F
FPC 16 LU 2 Chip	OK	48 degrees C / 118 degrees F
FPC 16 LU 3 TSen	OK	51 degrees C / 123 degrees F
FPC 16 LU 3 Chip	OK	49 degrees C / 120 degrees F
FPC 16 MQ 0 TSen	OK	49 degrees C / 120 degrees F
FPC 16 MQ 0 Chip	OK	48 degrees C / 118 degrees F
FPC 16 MQ 1 TSen	OK	49 degrees C / 120 degrees F
FPC 16 MQ 1 Chip	OK	53 degrees C / 127 degrees F
FPC 16 MQ 2 TSen	OK	49 degrees C / 120 degrees F
FPC 16 MQ 2 Chip	OK	46 degrees C / 114 degrees F
FPC 16 MQ 3 TSen	OK	49 degrees C / 120 degrees F
FPC 16 MQ 3 Chip	OK	49 degrees C / 120 degrees F
FPC 17 Intake	OK	43 degrees C / 109 degrees F
FPC 17 Exhaust A	OK	51 degrees C / 123 degrees F
FPC 17 Exhaust B	OK	55 degrees C / 131 degrees F
FPC 17 LU 0 TSen	OK	54 degrees C / 129 degrees F
FPC 17 LU 0 Chip	OK	57 degrees C / 134 degrees F
FPC 17 LU 1 TSen	OK	54 degrees C / 129 degrees F
FPC 17 LU 1 Chip	OK	60 degrees C / 140 degrees F
FPC 17 LU 2 TSen	OK	54 degrees C / 129 degrees F
FPC 17 LU 2 Chip	OK	53 degrees C / 127 degrees F
FPC 17 LU 3 TSen	OK	54 degrees C / 129 degrees F
FPC 17 LU 3 Chip	OK	53 degrees C / 127 degrees F
FPC 17 MQ 0 TSen	OK	49 degrees C / 120 degrees F
FPC 17 MQ 0 Chip	OK	50 degrees C / 122 degrees F
FPC 17 MQ 1 TSen	OK	49 degrees C / 120 degrees F
FPC 17 MQ 1 Chip	OK	54 degrees C / 129 degrees F
FPC 17 MQ 2 TSen	OK	49 degrees C / 120 degrees F
FPC 17 MQ 2 Chip	OK	47 degrees C / 116 degrees F
FPC 17 MQ 3 TSen	OK	49 degrees C / 120 degrees F
FPC 17 MQ 3 Chip	OK	51 degrees C / 123 degrees F
FPC 18 Intake	OK	44 degrees C / 111 degrees F
FPC 18 Exhaust A	OK	53 degrees C / 127 degrees F
FPC 18 Exhaust B	OK	57 degrees C / 134 degrees F
FPC 18 LU 0 TSen	OK	56 degrees C / 132 degrees F
FPC 18 LU 0 Chip	OK	57 degrees C / 134 degrees F
FPC 18 LU 1 TSen	OK	56 degrees C / 132 degrees F
FPC 18 LU 1 Chip	OK	62 degrees C / 143 degrees F
FPC 18 LU 2 TSen	OK	56 degrees C / 132 degrees F
FPC 18 LU 2 Chip	OK	53 degrees C / 127 degrees F
FPC 18 LU 3 TSen	OK	56 degrees C / 132 degrees F
FPC 18 LU 3 Chip	OK	55 degrees C / 131 degrees F
FPC 18 MQ 0 TSen	OK	51 degrees C / 123 degrees F

FPC 18 MQ 0 Chip	OK	54 degrees C / 129 degrees F
FPC 18 MQ 1 TSen	OK	51 degrees C / 123 degrees F
FPC 18 MQ 1 Chip	OK	58 degrees C / 136 degrees F
FPC 18 MQ 2 TSen	OK	51 degrees C / 123 degrees F
FPC 18 MQ 2 Chip	OK	50 degrees C / 122 degrees F
FPC 18 MQ 3 TSen	OK	51 degrees C / 123 degrees F
FPC 18 MQ 3 Chip	OK	53 degrees C / 127 degrees F
FPC 19 Intake	OK	48 degrees C / 118 degrees F
FPC 19 Exhaust A	OK	56 degrees C / 132 degrees F
FPC 19 Exhaust B	OK	64 degrees C / 147 degrees F
FPC 19 LU 0 TSen	OK	63 degrees C / 145 degrees F
FPC 19 LU 0 Chip	OK	64 degrees C / 147 degrees F
FPC 19 LU 1 TSen	OK	63 degrees C / 145 degrees F
FPC 19 LU 1 Chip	OK	70 degrees C / 158 degrees F
FPC 19 LU 2 TSen	OK	63 degrees C / 145 degrees F
FPC 19 LU 2 Chip	OK	61 degrees C / 141 degrees F
FPC 19 LU 3 TSen	OK	63 degrees C / 145 degrees F
FPC 19 LU 3 Chip	OK	62 degrees C / 143 degrees F
FPC 19 MQ 0 TSen	OK	56 degrees C / 132 degrees F
FPC 19 MQ 0 Chip	OK	60 degrees C / 140 degrees F
FPC 19 MQ 1 TSen	OK	56 degrees C / 132 degrees F
FPC 19 MQ 1 Chip	OK	62 degrees C / 143 degrees F
FPC 19 MQ 2 TSen	OK	56 degrees C / 132 degrees F
FPC 19 MQ 2 Chip	OK	56 degrees C / 132 degrees F
FPC 19 MQ 3 TSen	OK	56 degrees C / 132 degrees F
FPC 19 MQ 3 Chip	OK	57 degrees C / 134 degrees F
ADC 0 Intake	OK	40 degrees C / 104 degrees F
ADC 0 Exhaust	OK	52 degrees C / 125 degrees F
ADC 0 ADC-XF1	OK	59 degrees C / 138 degrees F
ADC 0 ADC-XF0	OK	66 degrees C / 150 degrees F
ADC 1 Intake	OK	38 degrees C / 100 degrees F
ADC 1 Exhaust	OK	50 degrees C / 122 degrees F
ADC 1 ADC-XF1	OK	59 degrees C / 138 degrees F
ADC 1 ADC-XF0	OK	63 degrees C / 145 degrees F
ADC 2 Intake	OK	37 degrees C / 98 degrees F
ADC 2 Exhaust	OK	52 degrees C / 125 degrees F
ADC 2 ADC-XF1	OK	53 degrees C / 127 degrees F
ADC 2 ADC-XF0	OK	61 degrees C / 141 degrees F
ADC 3 Intake	OK	40 degrees C / 104 degrees F
ADC 3 Exhaust	OK	51 degrees C / 123 degrees F
ADC 3 ADC-XF1	OK	61 degrees C / 141 degrees F
ADC 3 ADC-XF0	OK	64 degrees C / 147 degrees F
ADC 4 Intake	OK	39 degrees C / 102 degrees F
ADC 4 Exhaust	OK	51 degrees C / 123 degrees F

ADC 4 ADC-XF1	OK	60 degrees C / 140 degrees F
ADC 4 ADC-XF0	OK	63 degrees C / 145 degrees F
ADC 5 Intake	OK	38 degrees C / 100 degrees F
ADC 5 Exhaust	OK	54 degrees C / 129 degrees F
ADC 5 ADC-XF1	OK	56 degrees C / 132 degrees F
ADC 5 ADC-XF0	OK	67 degrees C / 152 degrees F
ADC 6 Intake	OK	39 degrees C / 102 degrees F
ADC 6 Exhaust	OK	52 degrees C / 125 degrees F
ADC 6 ADC-XF1	OK	59 degrees C / 138 degrees F
ADC 6 ADC-XF0	OK	66 degrees C / 150 degrees F
ADC 7 Intake	OK	39 degrees C / 102 degrees F
ADC 7 Exhaust	OK	54 degrees C / 129 degrees F
ADC 7 ADC-XF1	OK	62 degrees C / 143 degrees F
ADC 7 ADC-XF0	OK	70 degrees C / 158 degrees F
ADC 8 Intake	OK	39 degrees C / 102 degrees F
ADC 8 Exhaust	OK	52 degrees C / 125 degrees F
ADC 8 ADC-XF1	OK	61 degrees C / 141 degrees F
ADC 8 ADC-XF0	OK	65 degrees C / 149 degrees F
ADC 9 Intake	OK	41 degrees C / 105 degrees F
ADC 9 Exhaust	OK	51 degrees C / 123 degrees F
ADC 9 ADC-XF1	OK	63 degrees C / 145 degrees F
ADC 9 ADC-XF0	OK	63 degrees C / 145 degrees F
ADC 10 Intake	OK	48 degrees C / 118 degrees F
ADC 10 Exhaust	OK	53 degrees C / 127 degrees F
ADC 10 ADC-XF1	OK	67 degrees C / 152 degrees F
ADC 10 ADC-XF0	OK	66 degrees C / 150 degrees F
ADC 12 Intake	OK	49 degrees C / 120 degrees F
ADC 12 Exhaust	OK	54 degrees C / 129 degrees F
ADC 12 ADC-XF1	OK	67 degrees C / 152 degrees F
ADC 12 ADC-XF0	OK	67 degrees C / 152 degrees F
ADC 13 Intake	OK	49 degrees C / 120 degrees F
ADC 13 Exhaust	OK	57 degrees C / 134 degrees F
ADC 13 ADC-XF1	OK	66 degrees C / 150 degrees F
ADC 13 ADC-XF0	OK	69 degrees C / 156 degrees F
ADC 14 Intake	OK	51 degrees C / 123 degrees F
ADC 14 Exhaust	OK	59 degrees C / 138 degrees F
ADC 14 ADC-XF1	OK	69 degrees C / 156 degrees F
ADC 14 ADC-XF0	OK	74 degrees C / 165 degrees F
ADC 15 Intake	OK	50 degrees C / 122 degrees F
ADC 15 Exhaust	OK	59 degrees C / 138 degrees F
ADC 15 ADC-XF1	OK	68 degrees C / 154 degrees F
ADC 15 ADC-XF0	OK	69 degrees C / 156 degrees F
ADC 16 Intake	OK	52 degrees C / 125 degrees F
ADC 16 Exhaust	OK	58 degrees C / 136 degrees F

	ADC 16 ADC-XF1	OK	68 degrees C / 154 degrees F
	ADC 16 ADC-XF0	OK	70 degrees C / 158 degrees F
	ADC 17 Intake	OK	52 degrees C / 125 degrees F
	ADC 17 Exhaust	OK	59 degrees C / 138 degrees F
	ADC 17 ADC-XF1	OK	69 degrees C / 156 degrees F
	ADC 17 ADC-XF0	OK	71 degrees C / 159 degrees F
	ADC 18 Intake	OK	53 degrees C / 127 degrees F
	ADC 18 Exhaust	OK	59 degrees C / 138 degrees F
	ADC 18 ADC-XF1	OK	68 degrees C / 154 degrees F
	ADC 18 ADC-XF0	OK	73 degrees C / 163 degrees F
	ADC 19 Intake	OK	50 degrees C / 122 degrees F
	ADC 19 Exhaust	OK	59 degrees C / 138 degrees F
	ADC 19 ADC-XF1	OK	68 degrees C / 154 degrees F
	ADC 19 ADC-XF0	OK	72 degrees C / 161 degrees F
Fans	Fan Tray 0 Fan 1	OK	7440 RPM
	Fan Tray 0 Fan 2	OK	7200 RPM
	Fan Tray 0 Fan 3	OK	6960 RPM
	Fan Tray 0 Fan 4	OK	7200 RPM
	Fan Tray 0 Fan 5	OK	7080 RPM
	Fan Tray 0 Fan 6	OK	6840 RPM
	Fan Tray 1 Fan 1	OK	6840 RPM
	Fan Tray 1 Fan 2	OK	6960 RPM
	Fan Tray 1 Fan 3	OK	6960 RPM
	Fan Tray 1 Fan 4	OK	7080 RPM
	Fan Tray 1 Fan 5	OK	6960 RPM
	Fan Tray 1 Fan 6	OK	6960 RPM
	Fan Tray 2 Fan 1	OK	8640 RPM
	Fan Tray 2 Fan 2	OK	8640 RPM
	Fan Tray 2 Fan 3	OK	8760 RPM
	Fan Tray 2 Fan 4	OK	8760 RPM
	Fan Tray 2 Fan 5	OK	8640 RPM
	Fan Tray 2 Fan 6	OK	8640 RPM
	Fan Tray 3 Fan 1	OK	8520 RPM
	Fan Tray 3 Fan 2	OK	8520 RPM
	Fan Tray 3 Fan 3	OK	8640 RPM
	Fan Tray 3 Fan 4	OK	8640 RPM
	Fan Tray 3 Fan 5	OK	8520 RPM
	Fan Tray 3 Fan 6	OK	8520 RPM

#### show chassis environment (MX2020 Router with MPC5EQ and MPC6E)

Class	Item	Status	Measurement
Temp	PSM 0	OK	32 degrees C / 89 degrees F

PSM 1	OK	32 degrees C / 89 degrees F
PSM 2	OK	32 degrees C / 89 degrees F
PSM 3	OK	32 degrees C / 89 degrees F
PSM 4	OK	32 degrees C / 89 degrees F
PSM 5	OK	33 degrees C / 91 degrees F
PSM 6	OK	32 degrees C / 89 degrees F
PSM 7	OK	32 degrees C / 89 degrees F
PSM 8	OK	32 degrees C / 89 degrees F
PSM 9	Absent	
PSM 10	Absent	
PSM 11	Absent	
PSM 12	OK	33 degrees C / 91 degrees F
PSM 13	OK	33 degrees C / 91 degrees F
PSM 14	OK	34 degrees C / 93 degrees F
PSM 15	OK	34 degrees C / 93 degrees F
PSM 16	OK	33 degrees C / 91 degrees F
PSM 17	OK	33 degrees C / 91 degrees F
PDM 0	OK	
PDM 1	OK	
PDM 2	OK	
PDM 3	OK	
CB 0 IntakeA-Zone0	OK	34 degrees C / 93 degrees F
CB 0 IntakeB-Zone1	OK	26 degrees C / 78 degrees F
CB 0 IntakeC-Zone0	OK	38 degrees C / 100 degrees F
CB 0 ExhaustA-Zone0	OK	34 degrees C / 93 degrees F
CB 0 ExhaustB-Zone1	OK	27 degrees C / 80 degrees F
CB 0 TCBC-Zone0	OK	32 degrees C / 89 degrees F
CB 1 IntakeA-Zone0	OK	24 degrees C / 75 degrees F
CB 1 IntakeB-Zone1	OK	22 degrees C / 71 degrees F
CB 1 IntakeC-Zone0	OK	34 degrees C / 93 degrees F
CB 1 ExhaustA-Zone0	OK	31 degrees C / 87 degrees F
CB 1 ExhaustB-Zone1	OK	24 degrees C / 75 degrees F
CB 1 TCBC-Zone0	OK	27 degrees C / 80 degrees F
SPMB 0 Intake	OK	25 degrees C / 77 degrees F
SPMB 1 Intake	OK	23 degrees C / 73 degrees F
Routing Engine 0	OK	28 degrees C / 82 degrees F
Routing Engine 0 CPU	OK	25 degrees C / 77 degrees F
Routing Engine 1	OK	25 degrees C / 77 degrees F
Routing Engine 1 CPU	OK	24 degrees C / 75 degrees F
SFB 0 Intake-Zone0	OK	45 degrees C / 113 degrees F
SFB 0 Exhaust-Zone1	OK	34 degrees C / 93 degrees F
SFB 0 IntakeA-Zone0	OK	32 degrees C / 89 degrees F
SFB 0 IntakeB-Zone1	OK	28 degrees C / 82 degrees F
SFB 0 Exhaust-Zone0	OK	36 degrees C / 96 degrees F

SFB 0	SFB-XF2-Zone1	OK	46 degrees C / 114 degrees F
SFB 0	SFB-XF1-Zone0	OK	48 degrees C / 118 degrees F
SFB 0	SFB-XF0-Zone0	OK	60 degrees C / 140 degrees F
SFB 1	Intake-Zone0	OK	44 degrees C / 111 degrees F
SFB 1	Exhaust-Zone1	OK	34 degrees C / 93 degrees F
SFB 1	IntakeA-Zone0	OK	35 degrees C / 95 degrees F
SFB 1	IntakeB-Zone1	OK	27 degrees C / 80 degrees F
SFB 1	Exhaust-Zone0	OK	37 degrees C / 98 degrees F
SFB 1	SFB-XF2-Zone1	OK	47 degrees C / 116 degrees F
SFB 1	SFB-XF1-Zone0	OK	49 degrees C / 120 degrees F
SFB 1	SFB-XF0-Zone0	OK	56 degrees C / 132 degrees F
SFB 2	Intake-Zone0	OK	41 degrees C / 105 degrees F
SFB 2	Exhaust-Zone1	OK	34 degrees C / 93 degrees F
SFB 2	IntakeA-Zone0	OK	35 degrees C / 95 degrees F
SFB 2	IntakeB-Zone1	OK	28 degrees C / 82 degrees F
SFB 2	Exhaust-Zone0	OK	37 degrees C / 98 degrees F
SFB 2	SFB-XF2-Zone1	OK	47 degrees C / 116 degrees F
SFB 2	SFB-XF1-Zone0	OK	55 degrees C / 131 degrees F
SFB 2	SFB-XF0-Zone0	OK	55 degrees C / 131 degrees F
SFB 3	Intake-Zone0	OK	43 degrees C / 109 degrees F
SFB 3	Exhaust-Zone1	OK	33 degrees C / 91 degrees F
SFB 3	IntakeA-Zone0	OK	35 degrees C / 95 degrees F
SFB 3	IntakeB-Zone1	OK	27 degrees C / 80 degrees F
SFB 3	Exhaust-Zone0	OK	36 degrees C / 96 degrees F
SFB 3	SFB-XF2-Zone1	OK	46 degrees C / 114 degrees F
SFB 3	SFB-XF1-Zone0	OK	46 degrees C / 114 degrees F
SFB 3	SFB-XF0-Zone0	OK	57 degrees C / 134 degrees F
SFB 4	Intake-Zone0	OK	36 degrees C / 96 degrees F
SFB 4	Exhaust-Zone1	OK	32 degrees C / 89 degrees F
SFB 4	IntakeA-Zone0	OK	31 degrees C / 87 degrees F
SFB 4	IntakeB-Zone1	OK	26 degrees C / 78 degrees F
SFB 4	Exhaust-Zone0	OK	32 degrees C / 89 degrees F
SFB 4	SFB-XF2-Zone1	OK	44 degrees C / 111 degrees F
SFB 4	SFB-XF1-Zone0	OK	45 degrees C / 113 degrees F
SFB 4	SFB-XF0-Zone0	OK	52 degrees C / 125 degrees F
SFB 5	Intake-Zone0	OK	31 degrees C / 87 degrees F
SFB 5	Exhaust-Zone1	OK	30 degrees C / 86 degrees F
SFB 5	IntakeA-Zone0	OK	26 degrees C / 78 degrees F
SFB 5	IntakeB-Zone1	OK	24 degrees C / 75 degrees F
SFB 5	Exhaust-Zone0	OK	29 degrees C / 84 degrees F
SFB 5	SFB-XF2-Zone1	OK	43 degrees C / 109 degrees F
SFB 5	SFB-XF1-Zone0	OK	47 degrees C / 116 degrees F
SFB 5	SFB-XF0-Zone0	OK	49 degrees C / 120 degrees F
SFB 6	Intake-Zone0	OK	30 degrees C / 86 degrees F



SFB 6 Exhaust-Zone1	OK	29 degrees C / 84 degrees F
SFB 6 IntakeA-Zone0	OK	25 degrees C / 77 degrees F
SFB 6 IntakeB-Zone1	OK	24 degrees C / 75 degrees F
SFB 6 Exhaust-Zone0	OK	29 degrees C / 84 degrees F
SFB 6 SFB-XF2-Zone1	OK	43 degrees C / 109 degrees F
SFB 6 SFB-XF1-Zone0	OK	44 degrees C / 111 degrees F
SFB 6 SFB-XF0-Zone0	OK	45 degrees C / 113 degrees F
SFB 7 Intake-Zone0	OK	31 degrees C / 87 degrees F
SFB 7 Exhaust-Zone1	OK	30 degrees C / 86 degrees F
SFB 7 IntakeA-Zone0	OK	26 degrees C / 78 degrees F
SFB 7 IntakeB-Zone1	OK	24 degrees C / 75 degrees F
SFB 7 Exhaust-Zone0	OK	28 degrees C / 82 degrees F
SFB 7 SFB-XF2-Zone1	OK	50 degrees C / 122 degrees F
SFB 7 SFB-XF1-Zone0	OK	43 degrees C / 109 degrees F
SFB 7 SFB-XF0-Zone0	OK	47 degrees C / 116 degrees F
FPC 0 Intake	OK	31 degrees C / 87 degrees F
FPC 0 Exhaust A	OK	49 degrees C / 120 degrees F
FPC 0 Exhaust B	OK	43 degrees C / 109 degrees F
FPC 0 XL TSen	OK	42 degrees C / 107 degrees F
FPC 0 XL Chip	OK	46 degrees C / 114 degrees F
FPC 0 XL_XR0 TSen	OK	42 degrees C / 107 degrees F
FPC 0 XL_XR0 Chip	OK	48 degrees C / 118 degrees F
FPC 0 XL_XR1 TSen	OK	42 degrees C / 107 degrees F
FPC 0 XL_XR1 Chip	OK	48 degrees C / 118 degrees F
FPC 0 XQ TSen	OK	42 degrees C / 107 degrees F
FPC 0 XQ Chip	OK	44 degrees C / 111 degrees F
FPC 0 XQ_XR0 TSen	OK	42 degrees C / 107 degrees F
FPC 0 XQ_XR0 Chip	OK	57 degrees C / 134 degrees F
FPC 0 XQ_XR1 TSen	OK	42 degrees C / 107 degrees F
FPC 0 XQ_XR1 Chip	OK	55 degrees C / 131 degrees F
FPC 0 XM 0 TSen	OK	48 degrees C / 118 degrees F
FPC 0 XM 0 Chip	OK	62 degrees C / 143 degrees F
FPC 0 XM 1 TSen	OK	48 degrees C / 118 degrees F
FPC 0 XM 1 Chip	OK	44 degrees C / 111 degrees F
FPC 0 PLX PCIe Switch TSe	OK	48 degrees C / 118 degrees F
FPC 0 PLX PCIe Switch Chi	OK	57 degrees C / 134 degrees F
FPC 1 Intake	OK	29 degrees C / 84 degrees F
FPC 1 Exhaust A	OK	36 degrees C / 96 degrees F
FPC 1 Exhaust B	OK	44 degrees C / 111 degrees F
FPC 1 LU 0 TSen	OK	38 degrees C / 100 degrees F
FPC 1 LU 0 Chip	OK	45 degrees C / 113 degrees F
FPC 1 LU 1 TSen	OK	38 degrees C / 100 degrees F
FPC 1 LU 1 Chip	OK	38 degrees C / 100 degrees F
FPC 1 LU 2 TSen	OK	38 degrees C / 100 degrees F

FPC 1 LU 2 Chip	OK	42 degrees C / 107 degrees F
FPC 1 LU 3 TSen	OK	38 degrees C / 100 degrees F
FPC 1 LU 3 Chip	OK	47 degrees C / 116 degrees F
FPC 1 XM 0 TSen	OK	38 degrees C / 100 degrees F
FPC 1 XM 0 Chip	OK	44 degrees C / 111 degrees F
FPC 1 XF 0 TSen	OK	38 degrees C / 100 degrees F
FPC 1 XF 0 Chip	OK	54 degrees C / 129 degrees F
FPC 1 PLX Switch TSen	OK	38 degrees C / 100 degrees F
FPC 1 PLX Switch Chip	OK	41 degrees C / 105 degrees F
FPC 2 Intake	OK	28 degrees C / 82 degrees F
FPC 2 Exhaust A	OK	28 degrees C / 82 degrees F
FPC 2 Exhaust B	OK	28 degrees C / 82 degrees F
FPC 2 LU 0 TSen	OK	40 degrees C / 104 degrees F
FPC 2 LU 0 Chip	OK	40 degrees C / 104 degrees F
FPC 2 LU 1 TSen	OK	40 degrees C / 104 degrees F
FPC 2 LU 1 Chip	OK	41 degrees C / 105 degrees F
FPC 2 LU 2 TSen	OK	40 degrees C / 104 degrees F
FPC 2 LU 2 Chip	OK	34 degrees C / 93 degrees F
FPC 2 LU 3 TSen	OK	40 degrees C / 104 degrees F
FPC 2 LU 3 Chip	OK	38 degrees C / 100 degrees F
FPC 2 XM 0 TSen	OK	40 degrees C / 104 degrees F
FPC 2 XM 0 Chip	OK	47 degrees C / 116 degrees F
FPC 2 XM 1 TSen	OK	40 degrees C / 104 degrees F
FPC 2 XM 1 Chip	OK	42 degrees C / 107 degrees F
FPC 2 PLX Switch TSen	OK	40 degrees C / 104 degrees F
FPC 2 PLX Switch Chip	OK	39 degrees C / 102 degrees F
FPC 3 Intake	OK	27 degrees C / 80 degrees F
FPC 3 Exhaust A	OK	38 degrees C / 100 degrees F
FPC 3 Exhaust B	OK	31 degrees C / 87 degrees F
FPC 3 QX 0 TSen	OK	38 degrees C / 100 degrees F
FPC 3 QX 0 Chip	OK	42 degrees C / 107 degrees F
FPC 3 LU 0 TCAM TSen	OK	38 degrees C / 100 degrees F
FPC 3 LU 0 TCAM Chip	OK	43 degrees C / 109 degrees F
FPC 3 LU 0 TSen	OK	38 degrees C / 100 degrees F
FPC 3 LU 0 Chip	OK	42 degrees C / 107 degrees F
FPC 3 MQ 0 TSen	OK	38 degrees C / 100 degrees F
FPC 3 MQ 0 Chip	OK	39 degrees C / 102 degrees F
FPC 3 QX 1 TSen	OK	32 degrees C / 89 degrees F
FPC 3 QX 1 Chip	OK	36 degrees C / 96 degrees F
FPC 3 LU 1 TCAM TSen	OK	32 degrees C / 89 degrees F
FPC 3 LU 1 TCAM Chip	OK	35 degrees C / 95 degrees F
FPC 3 LU 1 TSen	OK	32 degrees C / 89 degrees F
FPC 3 LU 1 Chip	OK	37 degrees C / 98 degrees F
FPC 3 MQ 1 TSen	OK	32 degrees C / 89 degrees F

FPC 3 MQ 1 Chip	OK	36 degrees C / 96 degrees F
FPC 4 Intake	OK	29 degrees C / 84 degrees F
FPC 4 Exhaust A	OK	36 degrees C / 96 degrees F
FPC 4 Exhaust B	OK	40 degrees C / 104 degrees F
FPC 4 XL TSen	OK	39 degrees C / 102 degrees F
FPC 4 XL Chip	OK	42 degrees C / 107 degrees F
FPC 4 XL_XR0 TSen	OK	39 degrees C / 102 degrees F
FPC 4 XL_XR0 Chip	OK	45 degrees C / 113 degrees F
FPC 4 XL_XR1 TSen	OK	39 degrees C / 102 degrees F
FPC 4 XL_XR1 Chip	OK	46 degrees C / 114 degrees F
FPC 4 XQ TSen	OK	39 degrees C / 102 degrees F
FPC 4 XQ Chip	OK	42 degrees C / 107 degrees F
FPC 4 XQ_XR0 TSen	OK	39 degrees C / 102 degrees F
FPC 4 XQ_XR0 Chip	OK	54 degrees C / 129 degrees F
FPC 4 XQ_XR1 TSen	OK	39 degrees C / 102 degrees F
FPC 4 XQ_XR1 Chip	OK	53 degrees C / 127 degrees F
FPC 4 XM 0 TSen	OK	45 degrees C / 113 degrees F
FPC 4 XM 0 Chip	OK	59 degrees C / 138 degrees F
FPC 4 XM 1 TSen	OK	45 degrees C / 113 degrees F
FPC 4 XM 1 Chip	OK	41 degrees C / 105 degrees F
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

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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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user@host> show chassis environment
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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)

user@host> show chassis environment

Class	Item	Status	Measurement
Power	PEM 0	OK	
	PEM 1	Absent	
Temp	SCG 0	OK	28 degrees C / 82 degrees F
	SCG 1	OK	28 degrees C / 82 degrees F
	Routing Engine 0	OK	31 degrees C / 87 degrees F
	Routing Engine 1	OK	30 degrees C / 86 degrees F
	CB 0	OK	32 degrees C / 89 degrees F
	CB 1	OK	32 degrees C / 89 degrees F
	SIB 0	OK	33 degrees C / 91 degrees F
	SIB 1	OK	33 degrees C / 91 degrees F
	SIB 2	OK	34 degrees C / 93 degrees F
	FPC 0 Top	OK	38 degrees C / 100 degrees F
	FPC 0 Bottom	OK	32 degrees C / 89 degrees F
	FPC 1 Top	OK	38 degrees C / 100 degrees F
	FPC 1 Bottom	OK	33 degrees C / 91 degrees F
	FPC 2 Top	OK	36 degrees C / 96 degrees F
	FPC 2 Bottom	OK	31 degrees C / 87 degrees F
	FPM GBUS	OK	26 degrees C / 78 degrees F
	FPM Display	OK	29 degrees C / 84 degrees F
Fans	Top Left Front fan	OK	Spinning at normal speed
	Top Left Middle fan	OK	Spinning at normal speed
	Top Left Rear fan	OK	Spinning at normal speed
	Top Right Front fan	OK	Spinning at normal speed
	Top Right Middle fan	OK	Spinning at normal speed
	Top Right Rear fan	OK	Spinning at normal speed
	Bottom Left Front fan	OK	Spinning at normal speed
	Bottom Left Middle fan	OK	Spinning at normal speed
	Bottom Left Rear fan	OK	Spinning at normal speed
	Bottom Right Front fan	OK	Spinning at normal speed
	Bottom Right Middle fan	OK	Spinning at normal speed
	Bottom Right Rear fan	OK	Spinning at normal speed
	Rear Tray Top fan	OK	Spinning at normal speed
	Rear Tray Second fan	OK	Spinning at normal speed
	Rear Tray Middle fan	OK	Spinning at normal speed
	Rear Tray Fourth fan	OK	Spinning at normal speed
	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	
	PEM 2	Absent	
	PEM 3	Absent	
	PEM 4	Check	
	PEM 5	OK	61 degrees C / 141 degrees F
Fans	Fan Tray 0 Fan 0	OK	Spinning at normal speed
	Fan Tray 0 Fan 1	OK	Spinning at normal speed
	Fan Tray 0 Fan 2	OK	Spinning at normal speed
	Fan Tray 0 Fan 3	OK	Spinning at normal speed
	Fan Tray 1 Fan 0	OK	Spinning at normal speed
	Fan Tray 1 Fan 1	OK	Spinning at normal speed
	Fan Tray 1 Fan 2	OK	Spinning at normal speed
	Fan Tray 1 Fan 3	OK	Spinning at normal speed
	Fan Tray 2 Fan 0	OK	Spinning at normal speed
	Fan Tray 2 Fan 1	OK	Spinning at normal speed
	Fan Tray 2 Fan 2	OK	Spinning at normal speed
	Fan Tray 2 Fan 3	OK	Spinning at normal speed
	Fan Tray 3 Fan 0	OK	Spinning at normal speed
	Fan Tray 3 Fan 1	OK	Spinning at normal speed
	Fan Tray 3 Fan 2	OK	Spinning at normal speed
	Fan Tray 3 Fan 3	OK	Spinning at normal speed

### show chassis environment (QFX Series and OCX Series)

user@switch> show chassis environment

Class	Item	Status	Measurement
Temp	CB 0 Top Right Inlet Sensor	OK	29 degrees C / 84 degrees F
	CB 0 Top Left Inlet Sensor	OK	29 degrees C / 84 degrees F
	CB 0 Top Right Exhaust Sensor	OK	40 degrees C / 104 degrees F
	CB 0 Top Left Exhaust Sensor	OK	59 degrees C / 138 degrees F
	CB 0 CPU Core-0 Temp	OK	45 degrees C / 113 degrees F

```

CB 0 CPU Core-1 Temp      OK      44 degrees C / 111 degrees F
CB 0 CPU Core-2 Temp      OK      44 degrees C / 111 degrees F
CB 0 CPU Core-3 Temp      OK      44 degrees C / 111 degrees F
CB 0 CPU Core-4 Temp      OK      45 degrees C / 113 degrees F
CB 0 CPU Core-5 Temp      OK      44 degrees C / 111 degrees F
CB 0 CPU Core-6 Temp      OK      44 degrees C / 111 degrees F
CB 0 CPU Core-7 Temp      OK      43 degrees C / 109 degrees F
Power PEM 0               Check
  PEM 1                   OK      36 degrees C / 96 degrees F
Fans Fan Tray 0 Fan 0     OK      Spinning at normal speed
  Fan Tray 0 Fan 1       OK      Spinning at normal speed
  Fan Tray 1 Fan 0       OK      Spinning at normal speed
  Fan Tray 1 Fan 1       OK      Spinning at normal speed
  Fan Tray 2 Fan 0       Absent
  Fan Tray 2 Fan 1       Absent

```

### show chassis environment interconnect-device (QFabric System)

user@switch> show chassis environment interconnect-device IC-A0004

```

Class Item                Status      Measurement
CB 0
CB 0 L Intake             OK      30 degrees C / 86 degrees F
CB 0 R Intake             OK      31 degrees C / 87 degrees F
CB 0 L Exhaust            OK      32 degrees C / 89 degrees F
CB 0 R Exhaust            OK      33 degrees C / 91 degrees F
Routing Engine 0 CPU temp OK      51 degrees C / 123 degrees F
CB 1
CB 1 L Intake             OK      27 degrees C / 80 degrees F
CB 1 R Intake             OK      29 degrees C / 84 degrees F
CB 1 L Exhaust            OK      31 degrees C / 87 degrees F
CB 1 R Exhaust            OK      32 degrees C / 89 degrees F
Routing Engine 1 CPU temp OK      40 degrees C / 104 degrees F
FC 0 FPC 0
FPC 0 L Intake            OK      25 degrees C / 77 degrees F
FPC 0 R Intake            OK      28 degrees C / 82 degrees F
FPC 0 L Exhaust           OK      28 degrees C / 82 degrees F
FPC 0 R Exhaust           OK      29 degrees C / 84 degrees F
FC 7 FPC 7
FPC 7 L Intake            OK      25 degrees C / 77 degrees F
FPC 7 R Intake            OK      26 degrees C / 78 degrees F
FPC 7 L Exhaust           OK      28 degrees C / 82 degrees F
FPC 7 R Exhaust           OK      29 degrees C / 84 degrees F
RC 0 FPC 8

```

	FPC 8 L Intake	OK	25 degrees C / 77 degrees F
	FPC 8 R Intake	OK	26 degrees C / 78 degrees F
	FPC 8 L Exhaust	OK	32 degrees C / 89 degrees F
	FPC 8 R Exhaust	OK	30 degrees C / 86 degrees F
	RC 7 FPC 15		
	FPC 15 L Intake	OK	24 degrees C / 75 degrees F
	FPC 15 R Intake	OK	25 degrees C / 77 degrees F
	FPC 15 L Exhaust	OK	33 degrees C / 91 degrees F
	FPC 15 R Exhaust	OK	31 degrees C / 87 degrees F
Fans	TFT 0 Fan 0	OK	Spinning at normal speed
Fans	TFT 0 Fan 1	OK	Spinning at normal speed
Fans	TFT 0 Fan 2	OK	Spinning at normal speed
Fans	TFT 0 Fan 3	OK	Spinning at normal speed
Fans	TFT 0 Fan 4	OK	Spinning at normal speed
Fans	TFT 0 Fan 5	OK	Spinning at normal speed
Fans	BFT 1 Fan 0	OK	Spinning at normal speed
Fans	BFT 1 Fan 1	OK	Spinning at normal speed
Fans	BFT 1 Fan 2	OK	Spinning at normal speed
Fans	BFT 1 Fan 3	Check	
Fans	BFT 1 Fan 4	OK	Spinning at normal speed
Fans	BFT 1 Fan 5	OK	Spinning at normal speed
Fans	SFT 0 Fan 0 Rotor 0	OK	Spinning at normal speed
Fans	SFT 0 Fan 0 Rotor 1	OK	Spinning at normal speed
Fans	SFT 0 Fan 1 Rotor 0	OK	Spinning at normal speed
Fans	SFT 0 Fan 1 Rotor 1	OK	Spinning at normal speed
Fans	SFT 0 Fan 2 Rotor 0	OK	Spinning at normal speed
Fans	SFT 0 Fan 2 Rotor 1	OK	Spinning at normal speed
Fans	SFT 0 Fan 3 Rotor 0	OK	Spinning at normal speed
Fans	SFT 0 Fan 3 Rotor 1	OK	Spinning at normal speed
Fans	SFT 1 Fan 0 Rotor 0	OK	Spinning at normal speed
Fans	SFT 1 Fan 0 Rotor 1	OK	Spinning at normal speed
Fans	SFT 1 Fan 1 Rotor 0	OK	Spinning at normal speed
Fans	SFT 1 Fan 1 Rotor 1	OK	Spinning at normal speed
Fans	SFT 1 Fan 2 Rotor 0	OK	Spinning at normal speed
Fans	SFT 1 Fan 2 Rotor 1	OK	Spinning at normal speed
Fans	SFT 1 Fan 3 Rotor 0	OK	Spinning at normal speed
Fans	SFT 1 Fan 3 Rotor 1	OK	Spinning at normal speed
Fans	SFT 2 Fan 0 Rotor 0	OK	Spinning at normal speed
Fans	SFT 2 Fan 0 Rotor 1	OK	Spinning at normal speed
Fans	SFT 2 Fan 1 Rotor 0	OK	Spinning at normal speed
Fans	SFT 2 Fan 1 Rotor 1	OK	Spinning at normal speed
Fans	SFT 2 Fan 2 Rotor 0	OK	Spinning at normal speed
Fans	SFT 2 Fan 2 Rotor 1	OK	Spinning at normal speed
Fans	SFT 2 Fan 3 Rotor 0	OK	Spinning at normal speed

Fans	SFT 2	Fan 3	Rotor 1	OK	Spinning at normal speed
Fans	SFT 3	Fan 0	Rotor 0	OK	Spinning at normal speed
Fans	SFT 3	Fan 0	Rotor 1	OK	Spinning at normal speed
Fans	SFT 3	Fan 1	Rotor 0	OK	Spinning at normal speed
Fans	SFT 3	Fan 1	Rotor 1	OK	Spinning at normal speed
Fans	SFT 3	Fan 2	Rotor 0	OK	Spinning at normal speed
Fans	SFT 3	Fan 2	Rotor 1	OK	Spinning at normal speed
Fans	SFT 3	Fan 3	Rotor 0	OK	Spinning at normal speed
Fans	SFT 3	Fan 3	Rotor 1	OK	Spinning at normal speed
Fans	SFT 4	Fan 0	Rotor 0	OK	Spinning at normal speed
Fans	SFT 4	Fan 0	Rotor 1	OK	Spinning at normal speed
Fans	SFT 4	Fan 1	Rotor 0	OK	Spinning at normal speed
Fans	SFT 4	Fan 1	Rotor 1	OK	Spinning at normal speed
Fans	SFT 4	Fan 2	Rotor 0	OK	Spinning at normal speed
Fans	SFT 4	Fan 2	Rotor 1	OK	Spinning at normal speed
Fans	SFT 4	Fan 3	Rotor 0	OK	Spinning at normal speed
Fans	SFT 4	Fan 3	Rotor 1	OK	Spinning at normal speed
Fans	SFT 5	Fan 0	Rotor 0	OK	Spinning at normal speed
Fans	SFT 5	Fan 0	Rotor 1	OK	Spinning at normal speed
Fans	SFT 5	Fan 1	Rotor 0	OK	Spinning at normal speed
Fans	SFT 5	Fan 1	Rotor 1	OK	Spinning at normal speed
Fans	SFT 5	Fan 2	Rotor 0	OK	Spinning at normal speed
Fans	SFT 5	Fan 2	Rotor 1	OK	Spinning at normal speed
Fans	SFT 5	Fan 3	Rotor 0	OK	Spinning at normal speed
Fans	SFT 5	Fan 3	Rotor 1	OK	Spinning at normal speed
Fans	SFT 6	Fan 0	Rotor 0	OK	Spinning at normal speed
Fans	SFT 6	Fan 0	Rotor 1	OK	Spinning at normal speed
Fans	SFT 6	Fan 1	Rotor 0	OK	Spinning at normal speed
Fans	SFT 6	Fan 1	Rotor 1	OK	Spinning at normal speed
Fans	SFT 6	Fan 2	Rotor 0	OK	Spinning at normal speed
Fans	SFT 6	Fan 2	Rotor 1	OK	Spinning at normal speed
Fans	SFT 6	Fan 3	Rotor 0	OK	Spinning at normal speed
Fans	SFT 6	Fan 3	Rotor 1	OK	Spinning at normal speed
Fans	SFT 7	Fan 0	Rotor 0	OK	Spinning at normal speed
Fans	SFT 7	Fan 0	Rotor 1	OK	Spinning at normal speed
Fans	SFT 7	Fan 1	Rotor 0	OK	Spinning at normal speed
Fans	SFT 7	Fan 1	Rotor 1	OK	Spinning at normal speed
Fans	SFT 7	Fan 2	Rotor 0	OK	Spinning at normal speed
Fans	SFT 7	Fan 2	Rotor 1	OK	Spinning at normal speed
Fans	SFT 7	Fan 3	Rotor 0	OK	Spinning at normal speed
Fans	SFT 7	Fan 3	Rotor 1	OK	Spinning at normal speed
Power	PEM 0			OK	30 degrees C / 86 degrees F
Power	PEM 1			OK	30 degrees C / 86 degrees F
Power	PEM 2			OK	30 degrees C / 86 degrees F

Power PEM 3	Absent
Power PEM 4	Absent
Power PEM 5	Absent

### show chassis environment node-device (QFabric System)

user@switch> show chassis environment node-device node1

Class	Item	Status	Measurement
Power	node1 Power Supply 0	Absent	
	node1 Power Supply 1	Absent	
Fans	node1 Fan Tray 0	Testing	
	node1 Fan Tray 1	Testing	
	node1 Fan Tray 2	Testing	

### show chassis environment pem node-device (QFabric System)

user@switch> show chassis environment pem node-device node1

```
FPC 0 PEM 0 status:
  State           Check
  Airflow         Front to Back
  Temperature     OK
  AC Input:       OK
  DC Output       Voltage(V) Current(A) Power(W) Load(%)
                  12         10         120     18

FPC 0 PEM 1 status:
  State           Online
  Airflow         Back to Front
  Temperature     OK
  AC Input:       OK
  DC Output       Voltage(V) Current(A) Power(W) Load(%)
                  11         10         110     17
```

### show chassis environment (PTX5000 Packet Transport Router)

user@host> show chassis environment

Class	Item	Status	Measurement
Temp	PDU 0	OK	
	PDU 0 PSM 0	OK	36 degrees C / 96 degrees F
	PDU 0 PSM 1	OK	38 degrees C / 100 degrees F

PDU 0 PSM 2	OK	38 degrees C / 100 degrees F
PDU 0 PSM 3	OK	37 degrees C / 98 degrees F
PDU 1	Absent	
CCG 0	OK	44 degrees C / 111 degrees F
CCG 1	OK	44 degrees C / 111 degrees F
Routing Engine 0	OK	62 degrees C / 143 degrees F
Routing Engine 0 CPU	OK	75 degrees C / 167 degrees F
Routing Engine 1	OK	51 degrees C / 123 degrees F
Routing Engine 1 CPU	OK	64 degrees C / 147 degrees F
CB 0 Intake	OK	38 degrees C / 100 degrees F
CB 0 Exhaust A	OK	46 degrees C / 114 degrees F
CB 0 Exhaust B	OK	42 degrees C / 107 degrees F
CB 1 Intake	OK	35 degrees C / 95 degrees F
CB 1 Exhaust A	OK	39 degrees C / 102 degrees F
CB 1 Exhaust B	OK	36 degrees C / 96 degrees F
SIB 0 Exhaust	OK	47 degrees C / 116 degrees F
SIB 0 Junction	OK	45 degrees C / 113 degrees F
SIB 1 Exhaust	OK	44 degrees C / 111 degrees F
SIB 1 Junction	OK	43 degrees C / 109 degrees F
SIB 2 Exhaust	OK	47 degrees C / 116 degrees F
SIB 2 Junction	OK	42 degrees C / 107 degrees F
SIB 3 Exhaust	OK	43 degrees C / 109 degrees F
SIB 3 Junction	OK	43 degrees C / 109 degrees F
SIB 4 Exhaust	OK	47 degrees C / 116 degrees F
SIB 4 Junction	OK	42 degrees C / 107 degrees F
SIB 5 Exhaust	OK	42 degrees C / 107 degrees F
SIB 5 Junction	OK	40 degrees C / 104 degrees F
SIB 6 Exhaust	OK	46 degrees C / 114 degrees F
SIB 6 Junction	OK	42 degrees C / 107 degrees F
SIB 7 Exhaust	OK	43 degrees C / 109 degrees F
SIB 7 Junction	OK	39 degrees C / 102 degrees F
SIB 8 Exhaust	OK	44 degrees C / 111 degrees F
SIB 8 Junction	OK	41 degrees C / 105 degrees F
FPC 0 PMB	OK	35 degrees C / 95 degrees F
FPC 0 Intake	OK	33 degrees C / 91 degrees F
FPC 0 Exhaust A	OK	51 degrees C / 123 degrees F
FPC 0 Exhaust B	OK	43 degrees C / 109 degrees F
FPC 0 TL0	OK	48 degrees C / 118 degrees F
FPC 0 TQ0	OK	53 degrees C / 127 degrees F
FPC 0 TL1	OK	56 degrees C / 132 degrees F
FPC 0 TQ1	OK	58 degrees C / 136 degrees F
FPC 0 TL2	OK	55 degrees C / 131 degrees F
FPC 0 TQ2	OK	56 degrees C / 132 degrees F
FPC 0 TL3	OK	59 degrees C / 138 degrees F



FPC 0 TQ3	OK	59 degrees C / 138 degrees F
FPC 2 PMB	OK	35 degrees C / 95 degrees F
FPC 2 Intake	OK	34 degrees C / 93 degrees F
FPC 2 Exhaust A	OK	51 degrees C / 123 degrees F
FPC 2 Exhaust B	OK	52 degrees C / 125 degrees F
FPC 2 TL0	OK	53 degrees C / 127 degrees F
FPC 2 TQ0	OK	53 degrees C / 127 degrees F
FPC 2 TL1	OK	57 degrees C / 134 degrees F
FPC 2 TQ1	OK	58 degrees C / 136 degrees F
FPC 2 TL2	OK	54 degrees C / 129 degrees F
FPC 2 TQ2	OK	59 degrees C / 138 degrees F
FPC 2 TL3	OK	60 degrees C / 140 degrees F
FPC 2 TQ3	OK	64 degrees C / 147 degrees F
PIC 2/0 Ambient	OK	49 degrees C / 120 degrees F
FPC 3 PMB	OK	34 degrees C / 93 degrees F
FPC 3 Intake	OK	35 degrees C / 95 degrees F
FPC 3 Exhaust A	OK	54 degrees C / 129 degrees F
FPC 3 Exhaust B	OK	49 degrees C / 120 degrees F
FPC 3 TL0	OK	49 degrees C / 120 degrees F
FPC 3 TQ0	OK	55 degrees C / 131 degrees F
FPC 3 TL1	OK	56 degrees C / 132 degrees F
FPC 3 TQ1	OK	58 degrees C / 136 degrees F
FPC 3 TL2	OK	56 degrees C / 132 degrees F
FPC 3 TQ2	OK	59 degrees C / 138 degrees F
FPC 3 TL3	OK	62 degrees C / 143 degrees F
FPC 3 TQ3	OK	63 degrees C / 145 degrees F
PIC 3/1	Absent	
FPC 5 PMB	OK	35 degrees C / 95 degrees F
FPC 5 Intake	OK	34 degrees C / 93 degrees F
FPC 5 Exhaust A	OK	51 degrees C / 123 degrees F
FPC 5 Exhaust B	OK	53 degrees C / 127 degrees F
FPC 5 TL0	OK	54 degrees C / 129 degrees F
FPC 5 TQ0	OK	52 degrees C / 125 degrees F
FPC 5 TL1	OK	61 degrees C / 141 degrees F
FPC 5 TQ1	OK	60 degrees C / 140 degrees F
FPC 5 TL2	OK	55 degrees C / 131 degrees F
FPC 5 TQ2	OK	55 degrees C / 131 degrees F
FPC 5 TL3	OK	59 degrees C / 138 degrees F
FPC 5 TQ3	OK	58 degrees C / 136 degrees F
PIC 5/0 Ambient	OK	51 degrees C / 123 degrees F
PIC 5/1 Ambient	OK	34 degrees C / 93 degrees F
PIC 5/1 cfp-5/1/0	OK	34 degrees C / 93 degrees F
PIC 5/1 cfp-5/1/1	OK	36 degrees C / 96 degrees F
FPC 6 PMB	OK	36 degrees C / 96 degrees F

	FPC 6 Intake	OK	33 degrees C / 91 degrees F
	FPC 6 Exhaust A	OK	51 degrees C / 123 degrees F
	FPC 6 Exhaust B	OK	39 degrees C / 102 degrees F
	FPC 6 TL0	OK	44 degrees C / 111 degrees F
	FPC 6 TQ0	OK	54 degrees C / 129 degrees F
	FPC 6 TL1	OK	59 degrees C / 138 degrees F
	FPC 6 TQ1	OK	58 degrees C / 136 degrees F
	FPC 6 TL2	OK	60 degrees C / 140 degrees F
	FPC 6 TQ2	OK	57 degrees C / 134 degrees F
	FPC 6 TL3	OK	65 degrees C / 149 degrees F
	FPC 6 TQ3	OK	60 degrees C / 140 degrees F
	FPC 7 PMB	OK	35 degrees C / 95 degrees F
	FPC 7 Intake	OK	33 degrees C / 91 degrees F
	FPC 7 Exhaust A	OK	53 degrees C / 127 degrees F
	FPC 7 Exhaust B	OK	40 degrees C / 104 degrees F
	FPC 7 TL0	OK	46 degrees C / 114 degrees F
	FPC 7 TQ0	OK	58 degrees C / 136 degrees F
	FPC 7 TL1	OK	53 degrees C / 127 degrees F
	FPC 7 TQ1	OK	59 degrees C / 138 degrees F
	FPC 7 TL2	OK	56 degrees C / 132 degrees F
	FPC 7 TQ2	OK	61 degrees C / 141 degrees F
	FPC 7 TL3	OK	63 degrees C / 145 degrees F
	FPC 7 TQ3	OK	63 degrees C / 145 degrees F
	FPM I2CS	OK	37 degrees C / 98 degrees F
Fans	Fan Tray 0 Fan 1	OK	3042 RPM
	Fan Tray 0 Fan 2	OK	3042 RPM
	Fan Tray 0 Fan 3	OK	3000 RPM
	Fan Tray 0 Fan 4	OK	3042 RPM
	Fan Tray 0 Fan 5	OK	3000 RPM
	Fan Tray 0 Fan 6	OK	3042 RPM
	Fan Tray 0 Fan 7	OK	3085 RPM
	Fan Tray 0 Fan 8	OK	3042 RPM
	Fan Tray 0 Fan 9	OK	3042 RPM
	Fan Tray 0 Fan 10	OK	3085 RPM
	Fan Tray 0 Fan 11	OK	3085 RPM
	Fan Tray 0 Fan 12	OK	3128 RPM
	Fan Tray 0 Fan 13	OK	3128 RPM
	Fan Tray 0 Fan 14	OK	3042 RPM
	Fan Tray 1 Fan 1	OK	2299 RPM
	Fan Tray 1 Fan 2	OK	2399 RPM
	Fan Tray 1 Fan 3	OK	2299 RPM
	Fan Tray 1 Fan 4	OK	2266 RPM
	Fan Tray 1 Fan 5	OK	2266 RPM
	Fan Tray 1 Fan 6	OK	2366 RPM

	Fan Tray 2 Fan 1	OK	2199 RPM
	Fan Tray 2 Fan 2	OK	2133 RPM
	Fan Tray 2 Fan 3	OK	2366 RPM
	Fan Tray 2 Fan 4	OK	2233 RPM
	Fan Tray 2 Fan 5	OK	2399 RPM
	Fan Tray 2 Fan 6	OK	2233 RPM
Misc	SPMB 0 Intake	OK	50 degrees C / 122 degrees F
	SPMB 1 Intake	OK	40 degrees C / 104 degrees F

### show chassis environment (PTX5000 Packet Transport Router with FPC2-PTX-P1A)

user@host> show chassis environment

Class	Item	Status	Measurement
Temp	PDU 0	OK	
	PDU 0 PSM 0	OK	41 degrees C / 105 degrees F
	PDU 0 PSM 1	Absent	
	PDU 0 PSM 2	OK	43 degrees C / 109 degrees F
	PDU 0 PSM 3	Absent	
	PDU 0 PSM 4	OK	44 degrees C / 111 degrees F
	PDU 0 PSM 5	Absent	
	PDU 0 PSM 6	OK	45 degrees C / 113 degrees F
	PDU 0 PSM 7	Absent	
	PDU 1	OK	
	PDU 1 PSM 0	Absent	
	PDU 1 PSM 1	OK	45 degrees C / 113 degrees F
	PDU 1 PSM 2	Absent	
	PDU 1 PSM 3	OK	43 degrees C / 109 degrees F
	PDU 1 PSM 4	Absent	
	PDU 1 PSM 5	OK	46 degrees C / 114 degrees F
	PDU 1 PSM 6	Absent	
	PDU 1 PSM 7	OK	46 degrees C / 114 degrees F
	CCG 0	OK	27 degrees C / 80 degrees F
	CCG 1	OK	29 degrees C / 84 degrees F
	...		

### show chassis environment (PTX1000 Packet Transport Router)

user@host> show chassis environment

Class	Item	Status	Measurement
Power	FPC 0 Power Supply 0	Absent	
	FPC 0 Power Supply 1	Absent	

	FPC 0 Power Supply 2	OK	
	FPC 0 Power Supply 3	OK	
Temp	FPC 0 Intake Temp Sensor	OK	25 degrees C / 77 degrees F
	FPC 0 Exhaust Temp Sensor	OK	35 degrees C / 95 degrees F
	FPC 0 Mezz Temp Sensor 0	OK	25 degrees C / 77 degrees F
	FPC 0 Mezz Temp Sensor 1	OK	34 degrees C / 93 degrees F
	FPC 0 PE2 Temp Sensor	OK	34 degrees C / 93 degrees F
	FPC 0 PE1 Temp Sensor	OK	32 degrees C / 89 degrees F
	FPC 0 PF0 Temp Sensor	OK	40 degrees C / 104 degrees F
	FPC 0 PE0 Temp Sensor	OK	33 degrees C / 91 degrees F
	FPC 0 PE5 Temp Sensor	OK	34 degrees C / 93 degrees F
	FPC 0 PE4 Temp Sensor	OK	34 degrees C / 93 degrees F
	FPC 0 PF1 Temp Sensor	OK	41 degrees C / 105 degrees F
	FPC 0 PE3 Temp Sensor	OK	36 degrees C / 96 degrees F
	FPC 0 CPU Die Temp Sensor	OK	40 degrees C / 104 degrees F
	FPC 0 OCXO 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
	Routing Engine 0 CPU	OK	40 degrees C / 104 degrees F
	Routing Engine 1 CPU	OK	40 degrees C / 104 degrees F
Temp	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 Supply 0	OK	22 degrees C / 71 degrees F
Power Supply 1	OK	23 degrees C / 73 degrees F
Power Supply 2	OK	23 degrees C / 73 degrees F
Power Supply 3	OK	21 degrees C / 69 degrees F
Power Supply 4	OK	22 degrees C / 71 degrees F



	Power Supply 5	OK	25 degrees C / 77 degrees F
	Power Supply 6	OK	21 degrees C / 69 degrees F
	Power Supply 7	Absent	
	Power Supply 8	Absent	
	Power Supply 9	Absent	
Fans	Fan Tray 0 Fan 0	OK	Spinning at normal speed
	Fan Tray 0 Fan 1	OK	Spinning at normal speed
	Fan Tray 0 Fan 2	OK	Spinning at normal speed
	Fan Tray 0 Fan 3	OK	Spinning at normal speed
	Fan Tray 0 Fan 4	OK	Spinning at normal speed
	Fan Tray 0 Fan 5	OK	Spinning at normal speed
	Fan Tray 0 Fan 6	OK	Spinning at normal speed
	Fan Tray 0 Fan 7	OK	Spinning at normal speed
	Fan Tray 0 Fan 8	OK	Spinning at normal speed
	Fan Tray 0 Fan 9	OK	Spinning at normal speed
	Fan Tray 0 Fan 10	OK	Spinning at normal speed
	Fan Tray 0 Fan 11	OK	Spinning at normal speed
	Fan Tray 0 Fan 12	OK	Spinning at normal speed
	Fan Tray 0 Fan 13	OK	Spinning at normal speed
	Fan Tray 0 Fan 14	OK	Spinning at normal speed
	Fan Tray 0 Fan 15	OK	Spinning at normal speed
	Fan Tray 0 Fan 16	OK	Spinning at normal speed
	Fan Tray 0 Fan 17	OK	Spinning at normal speed
	Fan Tray 0 Fan 18	OK	Spinning at normal speed
	Fan Tray 0 Fan 19	OK	Spinning at normal speed
	Fan Tray 0 Fan 20	OK	Spinning at normal speed
	Fan Tray 1 Fan 0	OK	Spinning at normal speed
	Fan Tray 1 Fan 1	OK	Spinning at normal speed
	Fan Tray 1 Fan 2	OK	Spinning at normal speed
	Fan Tray 1 Fan 3	OK	Spinning at normal speed
	Fan Tray 1 Fan 4	OK	Spinning at normal speed
	Fan Tray 1 Fan 5	OK	Spinning at normal speed
	Fan Tray 1 Fan 6	OK	Spinning at normal speed
	Fan Tray 1 Fan 7	OK	Spinning at normal speed
	Fan Tray 1 Fan 8	OK	Spinning at normal speed
	Fan Tray 1 Fan 9	OK	Spinning at normal speed
	Fan Tray 1 Fan 10	OK	Spinning at normal speed
	Fan Tray 1 Fan 11	OK	Spinning at normal speed
	Fan Tray 1 Fan 12	OK	Spinning at normal speed
	Fan Tray 1 Fan 13	OK	Spinning at normal speed
	Fan Tray 1 Fan 14	OK	Spinning at normal speed
	Fan Tray 1 Fan 15	OK	Spinning at normal speed
	Fan Tray 1 Fan 16	OK	Spinning at normal speed
	Fan Tray 1 Fan 17	OK	Spinning at normal speed

Fan Tray 1 Fan 18	OK	Spinning at normal speed
Fan Tray 1 Fan 19	OK	Spinning at normal speed
Fan Tray 1 Fan 20	OK	Spinning at normal speed
SIB 0 Intake-A Temp Sensor	OK	20 degrees C / 68 degrees F
SIB 0 Intake-B Temp Sensor	OK	20 degrees C / 68 degrees F
SIB 0 Intake-C Temp Sensor	OK	16 degrees C / 60 degrees F
SIB 0 Exhaust-A Temp Sensor	OK	28 degrees C / 82 degrees F
SIB 0 Exhaust-B Temp Sensor	OK	28 degrees C / 82 degrees F
SIB 0 Exhaust-C Temp Sensor	OK	23 degrees C / 73 degrees F
SIB 0 PF0 Temp Sensor	OK	30 degrees C / 86 degrees F
SIB 0 PF1 Temp Sensor	OK	30 degrees C / 86 degrees F
SIB 0 PF2 Temp Sensor	OK	31 degrees C / 87 degrees F
SIB 0 PF3 Temp Sensor	OK	32 degrees C / 89 degrees F
SIB 0 PF4 Temp Sensor	OK	27 degrees C / 80 degrees F
SIB 0 PF5 Temp Sensor	OK	26 degrees C / 78 degrees F
SIB 1 Intake-A Temp Sensor	OK	22 degrees C / 71 degrees F
SIB 1 Intake-B Temp Sensor	OK	22 degrees C / 71 degrees F
SIB 1 Intake-C Temp Sensor	OK	16 degrees C / 60 degrees F
SIB 1 Exhaust-A Temp Sensor	OK	29 degrees C / 84 degrees F
SIB 1 Exhaust-B Temp Sensor	OK	31 degrees C / 87 degrees F
SIB 1 Exhaust-C Temp Sensor	OK	23 degrees C / 73 degrees F
SIB 1 PF0 Temp Sensor	OK	32 degrees C / 89 degrees F
SIB 1 PF1 Temp Sensor	OK	31 degrees C / 87 degrees F
SIB 1 PF2 Temp Sensor	OK	33 degrees C / 91 degrees F
SIB 1 PF3 Temp Sensor	OK	38 degrees C / 100 degrees F
SIB 1 PF4 Temp Sensor	OK	28 degrees C / 82 degrees F
SIB 1 PF5 Temp Sensor	OK	26 degrees C / 78 degrees F
SIB 2 Intake-A Temp Sensor	OK	24 degrees C / 75 degrees F
SIB 2 Intake-B Temp Sensor	OK	21 degrees C / 69 degrees F
SIB 2 Intake-C Temp Sensor	OK	16 degrees C / 60 degrees F
SIB 2 Exhaust-A Temp Sensor	OK	28 degrees C / 82 degrees F
SIB 2 Exhaust-B Temp Sensor	OK	32 degrees C / 89 degrees F
SIB 2 Exhaust-C Temp Sensor	OK	23 degrees C / 73 degrees F
SIB 2 PF0 Temp Sensor	OK	31 degrees C / 87 degrees F
SIB 2 PF1 Temp Sensor	OK	30 degrees C / 86 degrees F
SIB 2 PF2 Temp Sensor	OK	33 degrees C / 91 degrees F
SIB 2 PF3 Temp Sensor	OK	41 degrees C / 105 degrees F
SIB 2 PF4 Temp Sensor	OK	27 degrees C / 80 degrees F
SIB 2 PF5 Temp Sensor	OK	26 degrees C / 78 degrees F
SIB 3 Intake-A Temp Sensor	OK	22 degrees C / 71 degrees F
SIB 3 Intake-B Temp Sensor	OK	23 degrees C / 73 degrees F
SIB 3 Intake-C Temp Sensor	OK	16 degrees C / 60 degrees F
SIB 3 Exhaust-A Temp Sensor	OK	29 degrees C / 84 degrees F
SIB 3 Exhaust-B Temp Sensor	OK	31 degrees C / 87 degrees F

```

SIB 3 Exhaust-C Temp Sensor      OK      24 degrees C / 75 degrees F
SIB 3 PF0 Temp Sensor            OK      32 degrees C / 89 degrees F
SIB 3 PF1 Temp Sensor            OK      30 degrees C / 86 degrees F
SIB 3 PF2 Temp Sensor            OK      31 degrees C / 87 degrees F
SIB 3 PF3 Temp Sensor            OK      39 degrees C / 102 degrees F
SIB 3 PF4 Temp Sensor            OK      27 degrees C / 80 degrees F
SIB 3 PF5 Temp Sensor            OK      26 degrees C / 78 degrees F
SIB 4 Intake-A Temp Sensor       OK      22 degrees C / 71 degrees F
SIB 4 Intake-B Temp Sensor       OK      25 degrees C / 77 degrees F
SIB 4 Intake-C Temp Sensor       OK      16 degrees C / 60 degrees F
SIB 4 Exhaust-A Temp Sensor      OK      29 degrees C / 84 degrees F
SIB 4 Exhaust-B Temp Sensor      OK      32 degrees C / 89 degrees F
SIB 4 Exhaust-C Temp Sensor      OK      23 degrees C / 73 degrees F
SIB 4 PF0 Temp Sensor            OK      32 degrees C / 89 degrees F
SIB 4 PF1 Temp Sensor            OK      31 degrees C / 87 degrees F
SIB 4 PF2 Temp Sensor            OK      32 degrees C / 89 degrees F
SIB 4 PF3 Temp Sensor            OK      40 degrees C / 104 degrees F
SIB 4 PF4 Temp Sensor            OK      26 degrees C / 78 degrees F
SIB 4 PF5 Temp Sensor            OK      25 degrees C / 77 degrees F
SIB 5 Intake-A Temp Sensor       OK      21 degrees C / 69 degrees F
SIB 5 Intake-B Temp Sensor       OK      20 degrees C / 68 degrees F
SIB 5 Intake-C Temp Sensor       OK      16 degrees C / 60 degrees F
SIB 5 Exhaust-A Temp Sensor      OK      27 degrees C / 80 degrees F
SIB 5 Exhaust-B Temp Sensor      OK      27 degrees C / 80 degrees F
SIB 5 Exhaust-C Temp Sensor      OK      23 degrees C / 73 degrees F
SIB 5 PF0 Temp Sensor            OK      30 degrees C / 86 degrees F
SIB 5 PF1 Temp Sensor            OK      29 degrees C / 84 degrees F
SIB 5 PF2 Temp Sensor            OK      30 degrees C / 86 degrees F
SIB 5 PF3 Temp Sensor            OK      32 degrees C / 89 degrees F
SIB 5 PF4 Temp Sensor            OK      28 degrees C / 82 degrees F
SIB 5 PF5 Temp Sensor            OK      27 degrees C / 80 degrees F

```

### show chassis environment (ACX2000 Universal Metro Router)

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

Class	Item	Status	Measurement
	PCB Left	OK	44 degrees C / 111 degrees F
	SFP+ Xcvr	OK	50 degrees C / 122 degrees F
	FEB	OK	70 degrees C / 158 degrees F
	PCB Up	OK	63 degrees C / 145 degrees F
	PCB Mid	OK	66 degrees C / 150 degrees F
	Telecom Mod	OK	65 degrees C / 149 degrees F

Routing Engine	OK	54 degrees C / 129 degrees F
Heater off		

### show chassis environment (ACX4000 Universal Metro Router)

On the ACX4000 router, the MIC output of the **show chassis environment** command varies depending on the number of temperature channels present in the installed MIC.

user@host> **show chassis environment**

Class	Item	Status	Measurement
Temp	PEM 0	OK	33 degrees C / 91 degrees F
	PEM 1	Absent	
	PCB Bottom	OK	30 degrees C / 86 degrees F
	PCB Middle	OK	34 degrees C / 93 degrees F
	BCM56445	OK	33 degrees C / 91 degrees F
	SFP+ Xcvr	OK	32 degrees C / 89 degrees F
	Fan tray inlet	OK	39 degrees C / 102 degrees F
	Exhaust	OK	30 degrees C / 86 degrees F
	Routing Engine	OK	32 degrees C / 89 degrees F
	Heater off		
Pic	PIC 0/0 Channel 0	OK	28 degrees C / 82 degrees F
	PIC 0/0 Channel 1	OK	29 degrees C / 84 degrees F
	PIC 0/0 Channel 2	OK	0 degrees C / 32 degrees F
	PIC 0/0 Channel 3	OK	0 degrees C / 32 degrees F
	PIC 0/0 Channel 4	OK	0 degrees C / 32 degrees F
	PIC 0/0 Channel 5	OK	0 degrees C / 32 degrees F
	PIC 0/0 Channel 6	OK	0 degrees C / 32 degrees F
	PIC 0/0 Channel 7	OK	0 degrees C / 32 degrees F
	PIC 0/0 Channel 8	OK	0 degrees C / 32 degrees F
	PIC 0/0 Channel 9	OK	0 degrees C / 32 degrees F
	PIC 1/0 Channel 0	OK	33 degrees C / 91 degrees F
	PIC 1/0 Channel 1	OK	31 degrees C / 87 degrees F
	PIC 1/0 Channel 2	OK	30 degrees C / 86 degrees F
	PIC 1/0 Channel 3	OK	0 degrees C / 32 degrees F
	PIC 1/0 Channel 4	OK	0 degrees C / 32 degrees F
	PIC 1/0 Channel 5	OK	0 degrees C / 32 degrees F
	PIC 1/0 Channel 6	OK	0 degrees C / 32 degrees F
	PIC 1/0 Channel 7	OK	0 degrees C / 32 degrees F
	PIC 1/0 Channel 8	OK	0 degrees C / 32 degrees F
	PIC 1/1 Channel 0	OK	31 degrees C / 87 degrees F
	PIC 1/1 Channel 1	OK	29 degrees C / 84 degrees F
	PIC 1/1 Channel 2	OK	28 degrees C / 82 degrees F

	PIC 1/1 Channel 3	OK	0 degrees C / 32 degrees F
	PIC 1/1 Channel 4	OK	0 degrees C / 32 degrees F
	PIC 1/1 Channel 5	OK	0 degrees C / 32 degrees F
	PIC 1/1 Channel 6	OK	0 degrees C / 32 degrees F
	PIC 1/1 Channel 7	OK	0 degrees C / 32 degrees F
	PIC 1/1 Channel 8	OK	0 degrees C / 32 degrees F
Fans	Fan 1	OK	Spinning at normal speed
	Fan 2	OK	Spinning at normal speed

### show chassis environment (ACX5048 Router)

user@host> show chassis environment

Class	Item	Status	Measurement
Power	FPC 0 Power Supply 0	Absent	
	FPC 0 Power Supply 1	OK	
Temp	FPC 0 Sensor TopMiddle E	OK	23 degrees C / 73 degrees F
	FPC 0 Sensor TopRight C	OK	18 degrees C / 64 degrees F
	FPC 0 Sensor TopLeft C	OK	21 degrees C / 69 degrees F
	FPC 0 Sensor TopRight E	OK	20 degrees C / 68 degrees F
	FPC 0 Sensor CPURight C	OK	23 degrees C / 73 degrees F
	FPC 0 Sensor CPULeft E	OK	22 degrees C / 71 degrees F
	FPC 0 Sensor CPU Die Temp	OK	39 degrees C / 102 degrees F
Fans	FPC 0 Fan Tray 0	OK	Spinning at normal speed
	FPC 0 Fan Tray 1	OK	Spinning at normal speed
	FPC 0 Fan Tray 2	OK	Spinning at normal speed
	FPC 0 Fan Tray 3	OK	Spinning at normal speed
	FPC 0 Fan Tray 4	OK	Spinning at normal speed

### show chassis environment (ACX5096 Router)

user@host> show chassis environment

Class	Item	Status	Measurement
Power	FPC 0 Power Supply 0	OK	
	FPC 0 Power Supply 1	OK	
Temp	FPC 0 Sensor TopMiddle E	OK	32 degrees C / 89 degrees F
	FPC 0 Sensor TopRight I	OK	29 degrees C / 84 degrees F
	FPC 0 Sensor TopLeft I	OK	23 degrees C / 73 degrees F
	FPC 0 Sensor TopRight E	OK	28 degrees C / 82 degrees F
	FPC 0 Sensor CPURight I	OK	30 degrees C / 86 degrees F

	FPC 0 Sensor CPULeft I	OK	29 degrees C / 84 degrees F
	FPC 0 Sensor Die Temp	OK	46 degrees C / 114 degrees F
	FPC 0 Mezz Temp	OK	23 degrees C / 73 degrees F
Fans	FPC 0 Fan Tray 0	OK	Spinning at normal speed
	FPC 0 Fan Tray 1	OK	Spinning at normal speed
	FPC 0 Fan Tray 2	OK	Spinning at normal speed

### show chassis environment (ACX500 Router)

user@host> show chassis environment

Class	Item	Status	Measurement
	Power Mod	OK	47 degrees C / 116 degrees F
	BCM54610	OK	46 degrees C / 114 degrees F
	DPLL31404	OK	45 degrees C / 113 degrees F
	CPLD	OK	42 degrees C / 107 degrees F
	1588-FPGA	OK	43 degrees C / 109 degrees F
	NPU	OK	62 degrees C / 143 degrees F
	MAC sensor 1	OK	40 degrees C / 104 degrees F
	MAC sensor 2	OK	38 degrees C / 100 degrees F
	SFP PHY	OK	38 degrees C / 100 degrees F
	Combo/RJ45 PHY	OK	37 degrees C / 98 degrees F
	SFP sensor 1	OK	35 degrees C / 95 degrees F
	SFP sensor 2	OK	33 degrees C / 91 degrees F
	SFP sensor 3	OK	32 degrees C / 89 degrees F
	Routing Engine	OK	54 degrees C / 129 degrees F
	Heater off		

## show chassis environment fpc

### List of Syntax

[Syntax on page 332](#)

[Syntax \(TX Matrix and TX Matrix Plus Routers\) on page 332](#)

[Syntax \(MX Series Routers\) on page 332](#)

[Syntax \(MX2010, MX10003, MX204, MX2008, and MX10008, OCX Series, PTX3000, PTX10008 devices and Junos OS Evolved platforms\) on page 332](#)

[Syntax \(MX2020 Universal Routing Platforms\) on page 332](#)

[Syntax \(QFX Series\) on page 333](#)

### 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
```

### Release Information

Command introduced before Junos OS Release 7.4.

Command introduced in Junos OS Release 9.0 for EX Series switches.

Command introduced in Junos OS Release 11.1 for QFX Series.

Command introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers.

Command introduced in Junos OS Release 12.1 for T4000 Core Routers.

Command introduced in Junos OS Release 12.3 for MX 2010 and MX2020 Universal Routing Platforms.

Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

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

Command introduced in Junos OS Release 17.2 for MX2008 Universal Routing Platforms and PTX10008 Routers.

Command introduced in Junos OS Release 17.3 for MX10003 Universal Routing Platforms.

Command introduced in Junos OS Release 17.4 for MX204 Universal Routing Platforms.

Command introduced in Junos OS Release 18.1R1 for EX9251 switches.

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

### 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 *name***—(QFabric systems only) (Optional) Display chassis environmental information for the Interconnect device.

**lcc *number***—(TX Matrix router and TX Matrix Plus router only) (Optional) Line-card chassis number.



Replace *number* with the following values depending on the LCC configuration:

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**local**—(MX Series routers only) (Optional) Display environmental information for the FPCs in the local Virtual Chassis member.

**member *member-id***—(MX Series routers only) (Optional) Display environmental information for the FPCs in the specified member of the Virtual Chassis configuration. Replace *member-id* with a value of 0 or 1.

**satellite [*fpc-slot slot-id* | *device-alias alias-name*]**—(Junos Fusion only)(Optional) Display environmental information for the FPCs in the specified satellite device in a Junos Fusion, or for all satellite devices in the Junos Fusion if no satellite devices are specified.

***slot* or *fpc-slot***—(Optional) Display environmental information about an individual FPC:

- (TX Matrix and TX Matrix Plus routers only) On a TX Matrix router, if you specify the number of the T640 router by using only the **lcc *number*** option (the recommended method), replace ***slot*** with a value from 0 through 7. Similarly, on a TX Matrix Plus router, if you specify the number of the router by using only the **lcc *number*** option (the recommended method), replace ***slot*** with a value from 0 through 7. Otherwise, replace ***slot*** with a value from 0 through 31. For example, the following commands have the same result:

```
user@host> show chassis environment fpc 1 lcc 1
user@host> show chassis environment fpc 9
```

- M120 router—Replace ***slot*** with a value from 0 through 5.
- MX240 router—Replace ***slot*** with a value from 0 through 2.
- MX480 router—Replace ***slot*** with a value from 0 through 5.
- MX960 router—Replace ***slot*** with a value from 0 through 11.
- MX2010 router—Replace ***slot*** with a value from 0 through 9.
- MX2020 router—Replace ***slot*** with a value from 0 through 19.
- MX2008 router—Replace ***slot*** with a value from 0 through 9.
- Other routers—Replace ***slot*** with a value from 0 through 7.

- EX Series switches:
  - EX3200 switches and EX4200 standalone switches—Replace **slot** with 0.
  - EX4200 switches in a Virtual Chassis configuration—Replace **slot** with a value from 0 through 9 (switch's member ID).
  - EX6210 switches—Replace **slot** with a value from 0 through 3 (line card only), 4 or 5 (line card or Switch Fabric and Rotuing Engine (SRE) module), or 6 through 9 (line card only).
  - EX8208 switches—Replace **slot** with a value from 0 through 7 (line card).
  - EX8216 switches—Replace **slot** with a value from 0 through 15 (line card).
- QFX3500 switches —Replace **fpc-slot** with 0 through 15.
- PTX5000 Packet Transport Router—Replace **fpc-slot** with 0 through 7.
- PTX3000 Packet Transport Router—Replace **fpc-slot** with 0 through 15.

### Required Privilege Level

view

### RELATED DOCUMENTATION

*request chassis fpc*

*show chassis fpc*

*show chassis fpc-feb-connectivity*

*Resynchronizing FPC Sequence Numbers with Active FPCs when an FPC Comes Online*

*MX960 Flexible PIC Concentrator Description*

### List of Sample Output

[show chassis environment fpc \(M120 Router\) on page 337](#)

[show chassis environment fpc \(M160 Router\) on page 339](#)

[show chassis environment fpc \(M320 Router\) on page 339](#)

[show chassis environment fpc \(MX2020 Router\) on page 341](#)

[show chassis environment fpc \(MX2010 Router\) on page 344](#)

[show chassis environment fpc \(MX2008 Router\) on page 348](#)

[show chassis environment fpc \(MX240 Router\) on page 353](#)

[show chassis environment fpc \(MX480 Router\) on page 355](#)

[show chassis environment fpc \(MX960 Router MPC10E-15C-MRATE\) on page 355](#)

[show chassis environment fpc \(MX960 Router\) on page 360](#)

[show chassis environment fpc \(MX480 Router with 100-Gigabit Ethernet CFP\) on page 361](#)

[show chassis environment fpc \(MX240, MX480, MX960 with Application Services Modular Line Card\) on page 363](#)

[show chassis environment fpc \(MX10003 Router\) on page 363](#)  
[show chassis environment fpc \(MX204 Router\) on page 368](#)  
[show chassis environment fpc \(MX10008 Router\) on page 368](#)  
[show chassis environment fpc \(T320, T640, and T1600 Routers\) on page 378](#)  
[show chassis environment fpc \(T4000 Router\) on page 379](#)  
[show chassis environment fpc lcc \(TX Matrix Router\) on page 386](#)  
[show chassis environment fpc lcc \(TX Matrix Plus Router\) on page 387](#)  
[show chassis environment fpc \(QFX Series and OCX Series\) on page 388](#)  
[show chassis environment fpc interconnect-device \(QFabric Systems\) on page 388](#)  
[show chassis environment fpc 5 \(PTX3000 Packet Transport Router\) on page 389](#)  
[show chassis environment fpc 0 \(PTX5000 Packet Transport Router\) on page 389](#)  
[show chassis environment fpc 07 \(PTX5000 Packet Transport Router with FPC2-PTX-P1A\) on page 390](#)  
[show chassis environment fpc \(PTX10008 router\) on page 392](#)  
[show chassis environment fpc \(PTX10016 router\) on page 397](#)  
[show chassis environment FPC 1 \(MX Routers with Media Services Blade \[MSB\]\) on page 401](#)  
[show chassis environment FPC \(Junos OS Evolved\) on page 402](#)

## Output Fields

Table 10 on page 336 lists the output fields for the **show chassis environment fpc** command. Output fields are listed in the approximate order in which they appear.

Table 10: show chassis environment fpc Output Fields

Field Name	Field Description
<b>State</b>	<p>Status of the FPC:</p> <ul style="list-style-type: none"> <li>• <b>Unknown</b>—FPC is not detected by the router.</li> <li>• <b>Empty</b>—No FPC is present.</li> <li>• <b>Present</b>—FPC is detected by the chassis daemon but is either not supported by the current version of the Junos OS, or the FPC is coming up but not yet online.</li> <li>• <b>Ready</b>—FPC is in intermediate or transition state.</li> <li>• <b>Announce online</b>—Intermediate state during which the FPC is coming up but not yet online, and the chassis manager acknowledges the chassisd FPC online initiative.</li> <li>• <b>Online</b>—FPC is online and running.</li> <li>• <b>Offline</b>—FPC is powered down.</li> <li>• <b>Diagnostics</b>—FPC is set to operate in diagnostics mode.</li> </ul>
<b>Temperature</b>	(M40e and M160 routers and QFX Series only) Temperature of the air flowing past the FPC.
<b>PMB Temperature</b>	<p>(PTX Series only) Temperature of the air flowing past the PMB (bottom of the FPC).</p> <p>The PTX5000 Packet Transport Router with FPC2-PTX-P1A include multiple temperatures for PMB (<b>TEMPO</b> and <b>TEMP1</b>).</p>

Table 10: show chassis environment fpc Output Fields (*continued*)

Field Name	Field Description
<b>PMB CPU Temperature</b>	(PTX5000 Packet Transport Router with FPC2-PTX-P1A only) Temperature of the air flowing past the PMB CPU.
<b>Temperature Intake</b>	(M320 routers, MX2010 routers, MX2020 routers, MX2008 routers, and PTX Series only) Temperature of the air flowing into the chassis.
<b>Temperature Top</b>	(T Series routers only) Temperature of the air flowing past the top of the FPC.
<b>Temperature Exhaust</b>	<p>(M120 and M320 routers, MX2010 routers, MX2020 routers, MX2008 routers, and PTX Series only) Temperature of the air flowing out of the chassis.</p> <p>The PTX Series Packet Transport Routers, and the MX2010, MX2020, and MX2008 routers include exhaust temperatures for multiple zones (<b>Exhaust A</b> and <b>Exhaust B</b>).</p>
<b>Temperature Bottom</b>	(T Series routers only) Temperature of the air flowing past the bottom of the FPC.
<b>TL <i>n</i> Temperature</b>	(PTX Series only) Temperature of the air flowing past the specified TL area of the packet forwarding engine (PFE) on the FPC.
<b>TQ <i>n</i> Temperature</b>	(PTX Series only) Temperature of the air flowing past the specified TQ area of the packet forwarding engine (PFE) on the FPC.
<b>Temperature MMBO</b>	(T640 router only) Temperature of the air flowing past the type 3 FPC.
<b>Temperature MMB1</b>	(M320 and T Series routers only) Temperature of the air flowing past the type 1, type 2, and type 3 FPC.
<b>Power</b>	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.
<b>CMB Revision or BUS revision</b>	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
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## FPC 3 status:

State	Online
Temperature Intake	41 degrees C / 105 degrees F
Temperature Exhaust A	48 degrees C / 118 degrees F

```

Temperature Exhaust B      58 degrees C / 136 degrees F
Temperature LU 0 TSen      56 degrees C / 132 degrees F
Temperature LU 0 Chip      59 degrees C / 138 degrees F
Temperature LU 1 TSen      56 degrees C / 132 degrees F
Temperature LU 1 Chip      61 degrees C / 141 degrees F
Temperature LU 2 TSen      56 degrees C / 132 degrees F
Temperature LU 2 Chip      51 degrees C / 123 degrees F
Temperature LU 3 TSen      56 degrees C / 132 degrees F
Temperature LU 3 Chip      53 degrees C / 127 degrees F
Temperature MQ 0 TSen      50 degrees C / 122 degrees F
Temperature MQ 0 Chip      51 degrees C / 123 degrees F
Temperature MQ 1 TSen      50 degrees C / 122 degrees F
Temperature MQ 1 Chip      55 degrees C / 131 degrees F
Temperature MQ 2 TSen      50 degrees C / 122 degrees F
Temperature MQ 2 Chip      47 degrees C / 116 degrees F
Temperature MQ 3 TSen      50 degrees C / 122 degrees F
Temperature MQ 3 Chip      50 degrees C / 122 degrees F
Power
  AS-BIAS3V3-z12105        3305 mV
  AS-VDD1V8-z12006         1810 mV
  AS-VDD2V5-z12006         2508 mV
  AS-AVDD1V0-z12004         999 mV
  AS-PCIE_1V0-z12004        1001 mV
  AS-VDD3V3-z12004         3294 mV
  AS-VDD_1V5A-z12004        1500 mV
  AS-VDD_1V5B-z12004        1498 mV
  AS-LU0_1V0-z12004         998 mV
  AS-LU1_1V0-z12004         998 mV
  AS-MQ0_1V0-z12004         999 mV
  AS-MQ1_1V0-z12004         998 mV
  AS-LU2_1V0-z12004        1000 mV
  AS-LU3_1V0-z12004        1001 mV
  AS-MQ2_1V0-z12004         996 mV
  AS-MQ3_1V0-z12004         998 mV
  AS-PMB_1V1-z12006        1098 mV
I2C Slave Revision        68
FPC 4 status:
...
```

**show chassis environment fpc (MX2010 Router)**

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

## FPC 0 status:

State	Online
Temperature Intake	36 degrees C / 96 degrees F
Temperature Exhaust A	42 degrees C / 107 degrees F
Temperature Exhaust B	51 degrees C / 123 degrees F
Temperature LU 0 TSen	49 degrees C / 120 degrees F
Temperature LU 0 Chip	50 degrees C / 122 degrees F
Temperature LU 1 TSen	49 degrees C / 120 degrees F
Temperature LU 1 Chip	54 degrees C / 129 degrees F
Temperature LU 2 TSen	49 degrees C / 120 degrees F
Temperature LU 2 Chip	45 degrees C / 113 degrees F
Temperature LU 3 TSen	49 degrees C / 120 degrees F
Temperature LU 3 Chip	46 degrees C / 114 degrees F
Temperature MQ 0 TSen	40 degrees C / 104 degrees F
Temperature MQ 0 Chip	41 degrees C / 105 degrees F
Temperature MQ 1 TSen	40 degrees C / 104 degrees F
Temperature MQ 1 Chip	44 degrees C / 111 degrees F
Temperature MQ 2 TSen	40 degrees C / 104 degrees F
Temperature MQ 2 Chip	38 degrees C / 100 degrees F
Temperature MQ 3 TSen	40 degrees C / 104 degrees F
Temperature MQ 3 Chip	41 degrees C / 105 degrees F

## Power

AS-BIAS3V3-z12105	3300 mV
AS-VDD1V8-z12006	1805 mV
AS-VDD2V5-z12006	2505 mV
AS-AVDD1V0-z12004	998 mV
AS-PCIE_1V0-z12004	999 mV
AS-VDD3V3-z12004	3303 mV
AS-VDD_1V5A-z12004	1497 mV
AS-VDD_1V5B-z12004	1497 mV
AS-LU0_1V0-z12004	998 mV
AS-LU1_1V0-z12004	1003 mV
AS-MQ0_1V0-z12004	998 mV
AS-MQ1_1V0-z12004	998 mV
AS-LU2_1V0-z12004	997 mV
AS-LU3_1V0-z12004	1001 mV
AS-MQ2_1V0-z12004	996 mV
AS-MQ3_1V0-z12004	994 mV
AS-PMB_1V1-z12006	1097 mV

I2C Slave Revision	68
--------------------	----

## FPC 1 status:

State	Online
Temperature Intake	34 degrees C / 93 degrees F
Temperature Exhaust A	46 degrees C / 114 degrees F

```

Temperature Exhaust B      54 degrees C / 129 degrees F
Temperature LU 0 TSen      45 degrees C / 113 degrees F
Temperature LU 0 Chip      55 degrees C / 131 degrees F
Temperature LU 1 TSen      45 degrees C / 113 degrees F
Temperature LU 1 Chip      44 degrees C / 111 degrees F
Temperature LU 2 TSen      45 degrees C / 113 degrees F
Temperature LU 2 Chip      50 degrees C / 122 degrees F
Temperature LU 3 TSen      45 degrees C / 113 degrees F
Temperature LU 3 Chip      58 degrees C / 136 degrees F
Temperature XM 0 TSen      45 degrees C / 113 degrees F
Temperature XM 0 Chip      51 degrees C / 123 degrees F
Temperature XF 0 TSen      45 degrees C / 113 degrees F
Temperature XF 0 Chip      63 degrees C / 145 degrees F
Temperature PLX Switch 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 Sensor	56 degrees C / 132 degrees F
FPC 0 Exhaust-B Temp Sensor	44 degrees C / 111 degrees F
FPC 0 EA0 Chip	58 degrees C / 136 degrees F
FPC 0 EA0-XR0 Chip	61 degrees C / 141 degrees F
FPC 0 EA0-XR1 Chip	62 degrees C / 143 degrees F
FPC 0 EA1 Chip	67 degrees C / 152 degrees F
FPC 0 EA1-XR0 Chip	72 degrees C / 161 degrees F
FPC 0 EA1-XR1 Chip	72 degrees C / 161 degrees F
FPC 0 PEX Chip	77 degrees C / 170 degrees F
FPC 0 EA2 Chip	48 degrees C / 118 degrees F
FPC 0 EA2-XR0 Chip	54 degrees C / 129 degrees F
FPC 0 EA2-XR1 Chip	56 degrees C / 132 degrees F
FPC 0 PF Chip	68 degrees C / 154 degrees F
FPC 0 EA0_HMC0 Logic die	72 degrees C / 161 degrees F
FPC 0 EA0_HMC0 DRAM botm	69 degrees C / 156 degrees F
FPC 0 EA0_HMC1 Logic die	71 degrees C / 159 degrees F
FPC 0 EA0_HMC1 DRAM botm	68 degrees C / 154 degrees F
FPC 0 EA0_HMC2 Logic die	75 degrees C / 167 degrees F
FPC 0 EA0_HMC2 DRAM botm	72 degrees C / 161 degrees F
FPC 0 EA1_HMC0 Logic die	81 degrees C / 177 degrees F
FPC 0 EA1_HMC0 DRAM botm	78 degrees C / 172 degrees F
FPC 0 EA1_HMC1 Logic die	80 degrees C / 176 degrees F
FPC 0 EA1_HMC1 DRAM botm	77 degrees C / 170 degrees F
FPC 0 EA1_HMC2 Logic die	82 degrees C / 179 degrees F
FPC 0 EA1_HMC2 DRAM botm	79 degrees C / 174 degrees F
FPC 0 EA2_HMC0 Logic die	60 degrees C / 140 degrees F
FPC 0 EA2_HMC0 DRAM botm	57 degrees C / 134 degrees F
FPC 0 EA2_HMC1 Logic die	61 degrees C / 141 degrees F
FPC 0 EA2_HMC1 DRAM botm	58 degrees C / 136 degrees F
FPC 0 EA2_HMC2 Logic die	63 degrees C / 145 degrees F
FPC 0 EA2_HMC2 DRAM botm	60 degrees C / 140 degrees F

## Power

LTC3887-PF-VDD0V9-RAIL	898 mV
LTC3887-PF-VDD0V9-DEV0-	898 mV
LTC3887-PF-VDD0V9-DEV0-	900 mV
LTC3887-PF-VDD0V9-DEV1-	899 mV
LTC3887-PF-VDD0V9-DEV1-	901 mV
LTC3887-PF-AVDD1V0-RAIL	998 mV
LTC3887-PF-AVDD1V0-CH0	998 mV
LTC3887-PF-AVDD1V0-CH1	999 mV

LTC3887-ETHSW-VDD1V0	1000 mV
LTC3887-VDD2V5	2499 mV
LTC3887-PCIE-VDD0V9	899 mV
LTC3887-V1P0	999 mV
LTC3887-PHY-VDD1V0-A	999 mV
LTC3887-3V3	3300 mV
LTC3887-VDD1V8	1799 mV
UCD9090_0-CH_1-EA0_PLL_	1005 mV
UCD9090_0-CH_2-EA0_1V4	1049 mV
UCD9090_0-CH_3-EA0_2V5	2499 mV
UCD9090_0-CH_4-EA0_1V5	1499 mV
UCD9090_0-CH_5-EA1_PLL_	999 mV
UCD9090_0-CH_6-EA1_1V4	1037 mV
UCD9090_0-CH_7-EA1_2V5	2499 mV
UCD9090_0-CH_8-EA1_1V5	1510 mV
UCD9090_0-CH_9-PVCC	797 mV
UCD9090_0-CH_10-PVNN	991 mV
UCD9090_1-CH_1-EA2_PLL_	1008 mV
UCD9090_1-CH_2-EA2_1V4	1009 mV
UCD9090_1-CH_3-EA2_2V5	2499 mV
UCD9090_1-CH_4-EA2_1V5	1513 mV
UCD9090_1-CH_5-1V0_PFPPL	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_PFPPL	1000 mV
UCD9090_1-CH_6-V1P1	1037 mV
UCD9090_1-CH_7-V1P5	1530 mV
UCD9090_1-CH_8-V1P35	1360 mV
UCD9090_1-CH_9-VDD1V5	1513 mV
UCD9090_1-CH_10-VDD1V2	1217 mV
LTC3887-EA0-VDD0V9-RAIL	949 mV
LTC3887-EA0-VDD0V9-DEV0	949 mV
LTC3887-EA0-VDD0V9-DEV0	951 mV
LTC3887-EA0-VDD0V9-DEV1	949 mV
LTC3887-EA0-VDD0V9-DEV1	952 mV
LTC3887-EA0-VDD0V9R2-RA	947 mV
LTC3887-EA0-VDD0V9R2-CH	947 mV

```

LTC3887-EA0-VDD0V9R2-CH      949 mV
LTC3887-EA0-VDD1V0-RAIL      1000 mV
LTC3887-EA0-VDD1V0-CH0       1000 mV
LTC3887-EA0-VDD1V0-CH1       1001 mV
LTC3887-EA0-XR-VDD0V9        899 mV
LTC3887-EA0-XR-VDD1V2        1200 mV
LTC3887-EA0-HM1-VDD0V9       899 mV
LTC3887-EA0-HM-VDD1V2        1199 mV
LTC3887-EA0-HM-VDDM1V2       1199 mV
LTC3887-EA1-VDD0V9-RAIL      948 mV
LTC3887-EA1-VDD0V9-DEV0      950 mV
LTC3887-EA1-VDD0V9-DEV0      950 mV
LTC3887-EA1-VDD0V9-DEV1      951 mV
LTC3887-EA1-VDD0V9-DEV1      951 mV
LTC3887-EA1-VDD0V9R2-RA      947 mV
LTC3887-EA1-VDD0V9R2-CH      947 mV
LTC3887-EA1-VDD0V9R2-CH      949 mV
LTC3887-EA1-VDD1V0-RAIL      1000 mV
LTC3887-EA1-VDD1V0-CH0       1000 mV
LTC3887-EA1-VDD1V0-CH1       1002 mV
I2C Slave Revision           99

```

### show chassis environment fpc (MX204 Router)

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

```

FPC 0 status:
State                               Online
FPC 0 EA0_HMC0 Logic die           77 degrees C / 170 degrees F
FPC 0 EA0_HMC0 DRAM botm           74 degrees C / 165 degrees F
FPC 0 EA0_HMC1 Logic die           80 degrees C / 176 degrees F
FPC 0 EA0_HMC1 DRAM botm           77 degrees C / 170 degrees F
FPC 0 EA0 Chip                     93 degrees C / 199 degrees F
FPC 0 EA0-XR0 Chip                  63 degrees C / 145 degrees F
FPC 0 EA0-XR1 Chip                  64 degrees C / 147 degrees F
Power
I2C Slave Revision                 0

```

### show chassis environment fpc (MX10008 Router)

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

## FPC 0 status:

State	Online
FPC 0 Intake-A Temp Sensor	32 degrees C / 89 degrees F
FPC 0 Exhaust-A Temp Sensor	44 degrees C / 111 degrees F
FPC 0 Exhaust-B Temp Sensor	50 degrees C / 122 degrees F
FPC 0 EA0 Temp Sensor	67 degrees C / 152 degrees F
FPC 0 EA0_XR0 Temp Sensor	69 degrees C / 156 degrees F
FPC 0 EA0_XR1 Temp Sensor	73 degrees C / 163 degrees F
FPC 0 EA1 Temp Sensor	61 degrees C / 141 degrees F
FPC 0 EA1_XR0 Temp Sensor	65 degrees C / 149 degrees F
FPC 0 EA1_XR1 Temp Sensor	63 degrees C / 145 degrees F
FPC 0 EA2 Temp Sensor	69 degrees C / 156 degrees F
FPC 0 EA2_XR0 Temp Sensor	73 degrees C / 163 degrees F
FPC 0 EA2_XR1 Temp Sensor	72 degrees C / 161 degrees F
FPC 0 EA3 Temp Sensor	64 degrees C / 147 degrees F
FPC 0 EA3_XR0 Temp Sensor	66 degrees C / 150 degrees F
FPC 0 EA3_XR1 Temp Sensor	66 degrees C / 150 degrees F
FPC 0 EA4 Temp Sensor	70 degrees C / 158 degrees F
FPC 0 EA4_XR0 Temp Sensor	72 degrees C / 161 degrees F
FPC 0 EA4_XR1 Temp Sensor	72 degrees C / 161 degrees F
FPC 0 EA5 Temp Sensor	58 degrees C / 136 degrees F
FPC 0 EA5_XR0 Temp Sensor	61 degrees C / 141 degrees F
FPC 0 EA5_XR1 Temp Sensor	64 degrees C / 147 degrees F
FPC 0 EA0_HMC0 Logic die	75 degrees C / 167 degrees F
FPC 0 EA0_HMC0 DRAM botm	72 degrees C / 161 degrees F
FPC 0 EA0_HMC1 Logic die	76 degrees C / 168 degrees F
FPC 0 EA0_HMC1 DRAM botm	73 degrees C / 163 degrees F
FPC 0 EA0_HMC2 Logic die	77 degrees C / 170 degrees F
FPC 0 EA0_HMC2 DRAM botm	74 degrees C / 165 degrees F
FPC 0 EA1_HMC0 Logic die	72 degrees C / 161 degrees F
FPC 0 EA1_HMC0 DRAM botm	69 degrees C / 156 degrees F
FPC 0 EA1_HMC1 Logic die	73 degrees C / 163 degrees F
FPC 0 EA1_HMC1 DRAM botm	70 degrees C / 158 degrees F
FPC 0 EA1_HMC2 Logic die	72 degrees C / 161 degrees F
FPC 0 EA1_HMC2 DRAM botm	69 degrees C / 156 degrees F
FPC 0 EA2_HMC0 Logic die	80 degrees C / 176 degrees F
FPC 0 EA2_HMC0 DRAM botm	77 degrees C / 170 degrees F
FPC 0 EA2_HMC1 Logic die	81 degrees C / 177 degrees F
FPC 0 EA2_HMC1 DRAM botm	78 degrees C / 172 degrees F
FPC 0 EA2_HMC2 Logic die	80 degrees C / 176 degrees F
FPC 0 EA2_HMC2 DRAM botm	77 degrees C / 170 degrees F
FPC 0 EA3_HMC0 Logic die	77 degrees C / 170 degrees F
FPC 0 EA3_HMC0 DRAM botm	74 degrees C / 165 degrees F
FPC 0 EA3_HMC1 Logic die	78 degrees C / 172 degrees F

FPC 0 EA3_HMC1 DRAM botm	75 degrees C / 167 degrees F
FPC 0 EA3_HMC2 Logic die	77 degrees C / 170 degrees F
FPC 0 EA3_HMC2 DRAM botm	74 degrees C / 165 degrees F
FPC 0 EA4_HMC0 Logic die	80 degrees C / 176 degrees F
FPC 0 EA4_HMC0 DRAM botm	77 degrees C / 170 degrees F
FPC 0 EA4_HMC1 Logic die	81 degrees C / 177 degrees F
FPC 0 EA4_HMC1 DRAM botm	78 degrees C / 172 degrees F
FPC 0 EA4_HMC2 Logic die	80 degrees C / 176 degrees F
FPC 0 EA4_HMC2 DRAM botm	77 degrees C / 170 degrees F
FPC 0 EA5_HMC0 Logic die	69 degrees C / 156 degrees F
FPC 0 EA5_HMC0 DRAM botm	66 degrees C / 150 degrees F
FPC 0 EA5_HMC1 Logic die	68 degrees C / 154 degrees F
FPC 0 EA5_HMC1 DRAM botm	65 degrees C / 149 degrees F
FPC 0 EA5_HMC2 Logic die	68 degrees C / 154 degrees F
FPC 0 EA5_HMC2 DRAM botm	65 degrees C / 149 degrees F

## Power

12V SS 1	12259 mV	9841 mA	120642 mW
12V SS 2	12259 mV	21054 mA	258104 mW
12V SS 3	12285 mV	9841 mA	120902 mW
12V SS 4	12232 mV	20968 mA	256496 mW
12V SS 5	12179 mV	14993 mA	182614 mW
VDD 1.0V_A	1000 mV	95375 mA	95375 mW
VDD 1.0V_B	0 mV	0 mA	0 mW
VDD 3.3V	3298 mV	12500 mA	41235 mW
VDD 0.9V	894 mV	3569 mA	3192 mW
ETH SW 1V	980 mV	4500 mA	4410 mW
VDD 1.8V	1809 mV	895 mA	1619 mW
PVCC	951 mV	0 mA	0 mW
PVNN	1009 mV	0 mA	0 mW
V1P0	1006 mV	0 mA	0 mW
V1P1	1070 mV	0 mA	0 mW
V1P3	1351 mV	0 mA	0 mW
VDDQ	1500 mV	0 mA	0 mW
V1P8	1816 mV	0 mA	0 mW
VDD3V3	3296 mV	0 mA	0 mW
V5V0_BIAS	5025 mV	0 mA	0 mW
VDD12V0	12174 mV	0 mA	0 mW
EA0 Core 0.9V	900 mV	40625 mA	36578 mW
EA0 AVDD 1.0V	1000 mV	32500 mA	32500 mW
EA0 HMC Core 0.9V	894 mV	10081 mA	9017 mW
EA0 1.2V	1189 mV	15081 mA	17945 mW
EA01_HMC_VDDM 1.2V	1193 mV	-151 mA	-180 mW
EA0_XR 0.906V	905 mV	13802 mA	12496 mW
EA1 Core 0.9V	900 mV	41000 mA	36916 mW

EA1 AVDD 1.0V	1000 mV	28000 mA	28000 mW
EA1 HMC Core 0.9V	897 mV	9848 mA	8835 mW
EA1 1.2V	1197 mV	15313 mA	18332 mW
EA0_PLL_1V0	1003 mV	0 mA	0 mW
EA0_1V04	1032 mV	0 mA	0 mW
EA0_2V5	2445 mV	0 mA	0 mW
EA0_1V5	1512 mV	0 mA	0 mW
EA1_PLL_1V0	1000 mV	0 mA	0 mW
EA1_1V04	1051 mV	0 mA	0 mW
EA1_2V5	2516 mV	0 mA	0 mW
EA1_1V5	1503 mV	0 mA	0 mW
EA1_XR 0.906V	908 mV	14151 mA	12850 mW
EA2 Core 0.9V	899 mV	40625 mA	36538 mW
EA2 AVDD 1.0V	1000 mV	27250 mA	27276 mW
EA2 HMC Core 0.9V	897 mV	9616 mA	8627 mW
EA2 1.2V	1193 mV	15779 mA	18832 mW
EA23_HMC_VDDM 1.2V	1197 mV	81 mA	97 mW
EA2_XR 0.906V	908 mV	14848 mA	13484 mW
EA3 Core 0.9V	899 mV	40625 mA	36538 mW
EA3 AVDD 1.0V	1000 mV	28000 mA	28000 mW
EA3 HMC Core 0.9V	897 mV	10546 mA	9461 mW
EA3 1.2V	1197 mV	15895 mA	19028 mW
EA2_PLL_1V0	1025 mV	0 mA	0 mW
EA2_1V04	1048 mV	0 mA	0 mW
EA2_2V5	2516 mV	0 mA	0 mW
EA2_1V5	1500 mV	0 mA	0 mW
EA3_PLL_1V0	1009 mV	0 mA	0 mW
EA3_1V04	1032 mV	0 mA	0 mW
EA3_2V5	2551 mV	0 mA	0 mW
EA3_1V5	1496 mV	0 mA	0 mW
EA3_XR 0.906V	908 mV	15895 mA	14434 mW
EA4 Core 0.9V	900 mV	41000 mA	36916 mW
EA4 AVDD 1.0V	999 mV	31250 mA	31219 mW
EA4 HMC Core 0.9V	894 mV	9965 mA	8913 mW
EA4 1.2V	1197 mV	15779 mA	18889 mW
EA45_HMC_VDDM 1.2V	1197 mV	546 mA	654 mW
EA4_XR 0.906V	908 mV	15197 mA	13801 mW
EA5 Core 0.9V	900 mV	39750 mA	35790 mW
EA5 AVDD 1.0V	1000 mV	28000 mA	28000 mW
EA5 HMC Core 0.9V	897 mV	9965 mA	8940 mW
EA5 1.2V	1197 mV	15546 mA	18610 mW
EA4_PLL_1V0	1003 mV	0 mA	0 mW
EA4_1V04	1041 mV	0 mA	0 mW
EA4_2V5	2541 mV	0 mA	0 mW

EA4_1V5	1506 mV	0 mA	0 mW
EA5_PLL_1V0	1022 mV	0 mA	0 mW
EA5_1V04	1048 mV	0 mA	0 mW
EA5_2V5	2532 mV	0 mA	0 mW
EA5_1V5	1509 mV	0 mA	0 mW
VDD2V5	2503 mV	0 mA	0 mW
VDD1V5	1509 mV	0 mA	0 mW
VDD1V2	1206 mV	0 mA	0 mW
EA5_XR 0.906V	902 mV	14500 mA	13088 mW

FPC 2 status:

State	Online
FPC 2 Intake-A Temp Sensor	33 degrees C / 91 degrees F
FPC 2 Exhaust-A Temp Sensor	52 degrees C / 125 degrees F
FPC 2 Exhaust-B Temp Sensor	50 degrees C / 122 degrees F
FPC 2 EA0 Temp Sensor	72 degrees C / 161 degrees F
FPC 2 EA0_XR0 Temp Sensor	76 degrees C / 168 degrees F
FPC 2 EA0_XR1 Temp Sensor	79 degrees C / 174 degrees F
FPC 2 EA1 Temp Sensor	64 degrees C / 147 degrees F
FPC 2 EA1_XR0 Temp Sensor	68 degrees C / 154 degrees F
FPC 2 EA1_XR1 Temp Sensor	66 degrees C / 150 degrees F
FPC 2 EA2 Temp Sensor	75 degrees C / 167 degrees F
FPC 2 EA2_XR0 Temp Sensor	81 degrees C / 177 degrees F
FPC 2 EA2_XR1 Temp Sensor	81 degrees C / 177 degrees F
FPC 2 EA3 Temp Sensor	67 degrees C / 152 degrees F
FPC 2 EA3_XR0 Temp Sensor	69 degrees C / 156 degrees F
FPC 2 EA3_XR1 Temp Sensor	69 degrees C / 156 degrees F
FPC 2 EA4 Temp Sensor	76 degrees C / 168 degrees F
FPC 2 EA4_XR0 Temp Sensor	77 degrees C / 170 degrees F
FPC 2 EA4_XR1 Temp Sensor	76 degrees C / 168 degrees F
FPC 2 EA5 Temp Sensor	60 degrees C / 140 degrees F
FPC 2 EA5_XR0 Temp Sensor	65 degrees C / 149 degrees F
FPC 2 EA5_XR1 Temp Sensor	65 degrees C / 149 degrees F
FPC 2 EA0_HMC0 Logic die	84 degrees C / 183 degrees F
FPC 2 EA0_HMC0 DRAM botm	81 degrees C / 177 degrees F
FPC 2 EA0_HMC1 Logic die	86 degrees C / 186 degrees F
FPC 2 EA0_HMC1 DRAM botm	83 degrees C / 181 degrees F
FPC 2 EA0_HMC2 Logic die	83 degrees C / 181 degrees F
FPC 2 EA0_HMC2 DRAM botm	80 degrees C / 176 degrees F
FPC 2 EA1_HMC0 Logic die	76 degrees C / 168 degrees F
FPC 2 EA1_HMC0 DRAM botm	73 degrees C / 163 degrees F
FPC 2 EA1_HMC1 Logic die	77 degrees C / 170 degrees F
FPC 2 EA1_HMC1 DRAM botm	74 degrees C / 165 degrees F
FPC 2 EA1_HMC2 Logic die	76 degrees C / 168 degrees F
FPC 2 EA1_HMC2 DRAM botm	73 degrees C / 163 degrees F

FPC 2 EA2_HMC0 Logic die	87 degrees C / 188 degrees F
FPC 2 EA2_HMC0 DRAM botm	84 degrees C / 183 degrees F
FPC 2 EA2_HMC1 Logic die	89 degrees C / 192 degrees F
FPC 2 EA2_HMC1 DRAM botm	86 degrees C / 186 degrees F
FPC 2 EA2_HMC2 Logic die	88 degrees C / 190 degrees F
FPC 2 EA2_HMC2 DRAM botm	85 degrees C / 185 degrees F
FPC 2 EA3_HMC0 Logic die	80 degrees C / 176 degrees F
FPC 2 EA3_HMC0 DRAM botm	77 degrees C / 170 degrees F
FPC 2 EA3_HMC1 Logic die	81 degrees C / 177 degrees F
FPC 2 EA3_HMC1 DRAM botm	78 degrees C / 172 degrees F
FPC 2 EA3_HMC2 Logic die	81 degrees C / 177 degrees F
FPC 2 EA3_HMC2 DRAM botm	78 degrees C / 172 degrees F
FPC 2 EA4_HMC0 Logic die	88 degrees C / 190 degrees F
FPC 2 EA4_HMC0 DRAM botm	85 degrees C / 185 degrees F
FPC 2 EA4_HMC1 Logic die	90 degrees C / 194 degrees F
FPC 2 EA4_HMC1 DRAM botm	87 degrees C / 188 degrees F
FPC 2 EA4_HMC2 Logic die	81 degrees C / 177 degrees F
FPC 2 EA4_HMC2 DRAM botm	78 degrees C / 172 degrees F
FPC 2 EA5_HMC0 Logic die	73 degrees C / 163 degrees F
FPC 2 EA5_HMC0 DRAM botm	70 degrees C / 158 degrees F
FPC 2 EA5_HMC1 Logic die	69 degrees C / 156 degrees F
FPC 2 EA5_HMC1 DRAM botm	66 degrees C / 150 degrees F
FPC 2 EA5_HMC2 Logic die	73 degrees C / 163 degrees F
FPC 2 EA5_HMC2 DRAM botm	70 degrees C / 158 degrees F

## Power

12V SS 1	12285 mV	9408 mA	115582 mW
12V SS 2	12338 mV	20881 mA	257637 mW
12V SS 3	12351 mV	10317 mA	127430 mW
12V SS 4	12285 mV	21054 mA	258660 mW
12V SS 5	12153 mV	13954 mA	169591 mW
VDD 1.0V_A	1000 mV	91000 mA	91000 mW
VDD 1.0V_B	0 mV	0 mA	0 mW
VDD 3.3V	3298 mV	9125 mA	30101 mW
VDD 0.9V	897 mV	3337 mA	2993 mW
ETH SW 1V	0 mV	0 mA	0 mW
VDD 1.8V	1809 mV	1127 mA	2040 mW
PVCC	835 mV	0 mA	0 mW
PVNN	1000 mV	0 mA	0 mW
V1P0	1003 mV	0 mA	0 mW
V1P1	1070 mV	0 mA	0 mW
V1P3	1348 mV	0 mA	0 mW
VDDQ	1493 mV	0 mA	0 mW
V1P8	1806 mV	0 mA	0 mW
VDD3V3	3303 mV	0 mA	0 mW



V5V0_BIAS	5000 mV	0 mA	0 mW
VDD12V0	12116 mV	0 mA	0 mW
EA0 Core 0.9V	900 mV	38875 mA	35002 mW
EA0 AVDD 1.0V	999 mV	31875 mA	31843 mW
EA0 HMC Core 0.9V	894 mV	9034 mA	8081 mW
EA0 1.2V	1197 mV	15430 mA	18471 mW
EA01_HMC_VDDM 1.2V	1200 mV	-267 mA	-321 mW
EA0_XR 0.906V	908 mV	15430 mA	14012 mW
EA1 Core 0.9V	900 mV	38875 mA	35002 mW
EA1 AVDD 1.0V	1000 mV	28250 mA	28250 mW
EA1 HMC Core 0.9V	899 mV	8802 mA	7920 mW
EA1 1.2V	1197 mV	15081 mA	18054 mW
EA0_PLL_1V0	1003 mV	0 mA	0 mW
EA0_1V04	1048 mV	0 mA	0 mW
EA0_2V5	2425 mV	0 mA	0 mW
EA0_1V5	1483 mV	0 mA	0 mW
EA1_PLL_1V0	1019 mV	0 mA	0 mW
EA1_1V04	1019 mV	0 mA	0 mW
EA1_2V5	2490 mV	0 mA	0 mW
EA1_1V5	1480 mV	0 mA	0 mW
EA1_XR 0.906V	908 mV	14965 mA	13590 mW
EA2 Core 0.9V	900 mV	44000 mA	39617 mW
EA2 AVDD 1.0V	1000 mV	28625 mA	28625 mW
EA2 HMC Core 0.9V	891 mV	10546 mA	9404 mW
EA2 1.2V	1200 mV	15313 mA	18387 mW
EA23_HMC_VDDM 1.2V	1193 mV	-267 mA	-319 mW
EA2_XR 0.906V	908 mV	15197 mA	13801 mW
EA3 Core 0.9V	900 mV	39750 mA	35790 mW
EA3 AVDD 1.0V	1000 mV	27750 mA	27750 mW
EA3 HMC Core 0.9V	897 mV	9267 mA	8314 mW
EA3 1.2V	1197 mV	15430 mA	18471 mW
EA2_PLL_1V0	1009 mV	0 mA	0 mW
EA2_1V04	1041 mV	0 mA	0 mW
EA2_2V5	2496 mV	0 mA	0 mW
EA2_1V5	1493 mV	0 mA	0 mW
EA3_PLL_1V0	1003 mV	0 mA	0 mW
EA3_1V04	1041 mV	0 mA	0 mW
EA3_2V5	2490 mV	0 mA	0 mW
EA3_1V5	1500 mV	0 mA	0 mW
EA3_XR 0.906V	908 mV	15081 mA	13695 mW
EA4 Core 0.9V	899 mV	45750 mA	41148 mW
EA4 AVDD 1.0V	1000 mV	32250 mA	32250 mW
EA4 HMC Core 0.9V	897 mV	10779 mA	9670 mW
EA4 1.2V	1193 mV	16011 mA	19110 mW

EA45_HMC_VDDM 1.2V	1200 mV	-267 mA	-321 mW
EA4_XR 0.906V	905 mV	15779 mA	14286 mW
EA5 Core 0.9V	900 mV	38375 mA	34552 mW
EA5 AVDD 1.0V	1000 mV	27750 mA	27777 mW
EA5 HMC Core 0.9V	899 mV	8453 mA	7606 mW
EA5 1.2V	1200 mV	14732 mA	17689 mW
EA4_PLL_1V0	1012 mV	0 mA	0 mW
EA4_1V04	1029 mV	0 mA	0 mW
EA4_2V5	2496 mV	0 mA	0 mW
EA4_1V5	1490 mV	0 mA	0 mW
EA5_PLL_1V0	1003 mV	0 mA	0 mW
EA5_1V04	1032 mV	0 mA	0 mW
EA5_2V5	2503 mV	0 mA	0 mW
EA5_1V5	1480 mV	0 mA	0 mW
VDD2V5	2461 mV	0 mA	0 mW
VDD1V5	1490 mV	0 mA	0 mW
VDD1V2	1212 mV	0 mA	0 mW
EA5_XR 0.906V	910 mV	13686 mA	12466 mW

FPC 3 status:

State	Online
FPC 3 Intake-A Temp Sensor	30 degrees C / 86 degrees F
FPC 3 Exhaust-A Temp Sensor	48 degrees C / 118 degrees F
FPC 3 Exhaust-B Temp Sensor	45 degrees C / 113 degrees F
FPC 3 EA0 Temp Sensor	60 degrees C / 140 degrees F
FPC 3 EA0_XR0 Temp Sensor	65 degrees C / 149 degrees F
FPC 3 EA0_XR1 Temp Sensor	67 degrees C / 152 degrees F
FPC 3 EA1 Temp Sensor	54 degrees C / 129 degrees F
FPC 3 EA1_XR0 Temp Sensor	60 degrees C / 140 degrees F
FPC 3 EA1_XR1 Temp Sensor	58 degrees C / 136 degrees F
FPC 3 EA2 Temp Sensor	62 degrees C / 143 degrees F
FPC 3 EA2_XR0 Temp Sensor	67 degrees C / 152 degrees F
FPC 3 EA2_XR1 Temp Sensor	67 degrees C / 152 degrees F
FPC 3 EA3 Temp Sensor	55 degrees C / 131 degrees F
FPC 3 EA3_XR0 Temp Sensor	57 degrees C / 134 degrees F
FPC 3 EA3_XR1 Temp Sensor	57 degrees C / 134 degrees F
FPC 3 EA4 Temp Sensor	69 degrees C / 156 degrees F
FPC 3 EA4_XR0 Temp Sensor	71 degrees C / 159 degrees F
FPC 3 EA4_XR1 Temp Sensor	70 degrees C / 158 degrees F
FPC 3 EA5 Temp Sensor	55 degrees C / 131 degrees F
FPC 3 EA5_XR0 Temp Sensor	58 degrees C / 136 degrees F
FPC 3 EA5_XR1 Temp Sensor	59 degrees C / 138 degrees F
FPC 3 EA0_HMC0 Logic die	69 degrees C / 156 degrees F
FPC 3 EA0_HMC0 DRAM botm	66 degrees C / 150 degrees F
FPC 3 EA0_HMC1 Logic die	70 degrees C / 158 degrees F

FPC 3 EA0_HMC1 DRAM botm	67 degrees C / 152 degrees F
FPC 3 EA0_HMC2 Logic die	70 degrees C / 158 degrees F
FPC 3 EA0_HMC2 DRAM botm	67 degrees C / 152 degrees F
FPC 3 EA1_HMC0 Logic die	68 degrees C / 154 degrees F
FPC 3 EA1_HMC0 DRAM botm	65 degrees C / 149 degrees F
FPC 3 EA1_HMC1 Logic die	65 degrees C / 149 degrees F
FPC 3 EA1_HMC1 DRAM botm	62 degrees C / 143 degrees F
FPC 3 EA1_HMC2 Logic die	64 degrees C / 147 degrees F
FPC 3 EA1_HMC2 DRAM botm	61 degrees C / 141 degrees F
FPC 3 EA2_HMC0 Logic die	74 degrees C / 165 degrees F
FPC 3 EA2_HMC0 DRAM botm	71 degrees C / 159 degrees F
FPC 3 EA2_HMC1 Logic die	77 degrees C / 170 degrees F
FPC 3 EA2_HMC1 DRAM botm	74 degrees C / 165 degrees F
FPC 3 EA2_HMC2 Logic die	74 degrees C / 165 degrees F
FPC 3 EA2_HMC2 DRAM botm	71 degrees C / 159 degrees F
FPC 3 EA3_HMC0 Logic die	70 degrees C / 158 degrees F
FPC 3 EA3_HMC0 DRAM botm	67 degrees C / 152 degrees F
FPC 3 EA3_HMC1 Logic die	68 degrees C / 154 degrees F
FPC 3 EA3_HMC1 DRAM botm	65 degrees C / 149 degrees F
FPC 3 EA3_HMC2 Logic die	68 degrees C / 154 degrees F
FPC 3 EA3_HMC2 DRAM botm	65 degrees C / 149 degrees F
FPC 3 EA4_HMC0 Logic die	82 degrees C / 179 degrees F
FPC 3 EA4_HMC0 DRAM botm	79 degrees C / 174 degrees F
FPC 3 EA4_HMC1 Logic die	80 degrees C / 176 degrees F
FPC 3 EA4_HMC1 DRAM botm	77 degrees C / 170 degrees F
FPC 3 EA4_HMC2 Logic die	81 degrees C / 177 degrees F
FPC 3 EA4_HMC2 DRAM botm	78 degrees C / 172 degrees F
FPC 3 EA5_HMC0 Logic die	69 degrees C / 156 degrees F
FPC 3 EA5_HMC0 DRAM botm	66 degrees C / 150 degrees F
FPC 3 EA5_HMC1 Logic die	70 degrees C / 158 degrees F
FPC 3 EA5_HMC1 DRAM botm	67 degrees C / 152 degrees F
FPC 3 EA5_HMC2 Logic die	69 degrees C / 156 degrees F
FPC 3 EA5_HMC2 DRAM botm	66 degrees C / 150 degrees F

## Power

12V SS 1	12259 mV	9538 mA	116927 mW
12V SS 2	12259 mV	20491 mA	251202 mW
12V SS 3	12298 mV	9711 mA	119433 mW
12V SS 4	12219 mV	20491 mA	250391 mW
12V SS 5	12206 mV	10447 mA	127520 mW
VDD 1.0V_A	1000 mV	42250 mA	42291 mW
VDD 1.0V_B	996 mV	8918 mA	8890 mW
VDD 3.3V	3301 mV	10375 mA	34255 mW
VDD 0.9V	897 mV	3569 mA	3202 mW
ETH SW 1V	983 mV	4267 mA	4195 mW

VDD 1.8V	1812 mV	1825 mA	3309 mW
PVCC	974 mV	0 mA	0 mW
PVNN	1003 mV	0 mA	0 mW
V1P0	1003 mV	0 mA	0 mW
V1P1	1070 mV	0 mA	0 mW
V1P3	1351 mV	0 mA	0 mW
VDDQ	1496 mV	0 mA	0 mW
V1P8	1809 mV	0 mA	0 mW
VDD3V3	3309 mV	0 mA	0 mW
V5V0_BIAS	4987 mV	0 mA	0 mW
VDD12V0	12212 mV	0 mA	0 mW
EA0 Core 0.9V	900 mV	38125 mA	34327 mW
EA0 AVDD 1.0V	999 mV	31125 mA	31094 mW
EA0 HMC Core 0.9V	897 mV	9500 mA	8522 mW
EA0 1.2V	1193 mV	15430 mA	18416 mW
EA01_HMC_VDDM 1.2V	1193 mV	313 mA	374 mW
EA0_XR 0.906V	913 mV	14965 mA	13671 mW
EA1 Core 0.9V	900 mV	39750 mA	35790 mW
EA1 AVDD 1.0V	1000 mV	26000 mA	26000 mW
EA1 HMC Core 0.9V	897 mV	8918 mA	8001 mW
EA1 1.2V	1200 mV	15779 mA	18946 mW
EA0_PLL_1V0	1003 mV	0 mA	0 mW
EA0_1V04	1019 mV	0 mA	0 mW
EA0_2V5	2448 mV	0 mA	0 mW
EA0_1V5	1470 mV	0 mA	0 mW
EA1_PLL_1V0	1016 mV	0 mA	0 mW
EA1_1V04	1035 mV	0 mA	0 mW
EA1_2V5	2506 mV	0 mA	0 mW
EA1_1V5	1483 mV	0 mA	0 mW
EA1_XR 0.906V	908 mV	13918 mA	12639 mW
EA2 Core 0.9V	900 mV	38625 mA	34777 mW
EA2 AVDD 1.0V	1000 mV	26375 mA	26400 mW
EA2 HMC Core 0.9V	897 mV	9383 mA	8418 mW
EA2 1.2V	1200 mV	15779 mA	18946 mW
EA23_HMC_VDDM 1.2V	1193 mV	81 mA	97 mW
EA2_XR 0.906V	908 mV	13918 mA	12639 mW
EA3 Core 0.9V	899 mV	40250 mA	36201 mW
EA3 AVDD 1.0V	1000 mV	26750 mA	26776 mW
EA3 HMC Core 0.9V	894 mV	9267 mA	8289 mW
EA3 1.2V	1197 mV	16127 mA	19306 mW
EA2_PLL_1V0	993 mV	0 mA	0 mW
EA2_1V04	1045 mV	0 mA	0 mW
EA2_2V5	2474 mV	0 mA	0 mW
EA2_1V5	1490 mV	0 mA	0 mW

EA3_PLL_1V0	980 mV	0 mA	0 mW
EA3_1V04	1032 mV	0 mA	0 mW
EA3_2V5	2506 mV	0 mA	0 mW
EA3_1V5	1474 mV	0 mA	0 mW
EA3_XR 0.906V	910 mV	14732 mA	13419 mW
EA4 Core 0.9V	900 mV	42500 mA	38266 mW
EA4 AVDD 1.0V	1000 mV	32250 mA	32281 mW
EA4 HMC Core 0.9V	899 mV	10081 mA	9071 mW
EA4 1.2V	1193 mV	16360 mA	19526 mW
EA45_HMC_VDDM 1.2V	1193 mV	662 mA	791 mW
EA4_XR 0.906V	908 mV	15430 mA	14012 mW
EA5 Core 0.9V	899 mV	37000 mA	33278 mW
EA5 AVDD 1.0V	1000 mV	26125 mA	26150 mW
EA5 HMC Core 0.9V	897 mV	9267 mA	8314 mW
EA5 1.2V	1197 mV	15662 mA	18750 mW
EA4_PLL_1V0	1000 mV	0 mA	0 mW
EA4_1V04	1029 mV	0 mA	0 mW
EA4_2V5	2487 mV	0 mA	0 mW
EA4_1V5	1496 mV	0 mA	0 mW
EA5_PLL_1V0	1009 mV	0 mA	0 mW
EA5_1V04	1032 mV	0 mA	0 mW
EA5_2V5	2503 mV	0 mA	0 mW
EA5_1V5	1496 mV	0 mA	0 mW
VDD2V5	2483 mV	0 mA	0 mW
VDD1V5	1470 mV	0 mA	0 mW
VDD1V2	1203 mV	0 mA	0 mW
EA5_XR 0.906V	908 mV	14500 mA	13167 mW

### show chassis environment fpc (T320, T640, and T1600 Routers)

user@host> show chassis environment fpc

```

FPC 0 status:
  State                Online
  Temperature Top       42 degrees C / 107 degrees F
  Temperature Bottom    36 degrees C / 96 degrees F
  Temperature MMB1      39 degrees C / 102 degrees F
  Power:
    1.8 V               1959 mV
    2.5 V               2495 mV
    3.3 V               3344 mV
    5.0 V               5047 mV
    1.8 V bias          1787 mV
    3.3 V bias          3291 mV

```

```

    5.0 V bias          4998 mV
    8.0 V bias          7343 mV
    BUS Revision        40
FPC 1 status:
  State                Online
  Temperature Top       42 degrees C / 107 degrees F
  Temperature Bottom    39 degrees C / 102 degrees F
  Temperature MMB1      40 degrees C / 104 degrees F
  Power:
    1.8 V              1956 mV
    2.5 V              2498 mV
    3.3 V              3340 mV
    5.0 V              5023 mV
    1.8 V bias         1782 mV
    3.3 V bias         3277 mV
    5.0 V bias         4989 mV
    8.0 V bias         7289 mV
    BUS Revision        40
FPC 2 status:
  State                Online
  Temperature Top       43 degrees C / 109 degrees F
  Temperature Bottom    39 degrees C / 102 degrees F
  Temperature MMB1      41 degrees C / 105 degrees F
  Power:
    1.8 V              1963 mV
    2.5 V              2503 mV
    3.3 V              3340 mV
    5.0 V              5042 mV
    1.8 V bias         1797 mV
    3.3 V bias         3311 mV
    5.0 V bias         5013 mV
    8.0 V bias         7221 mV
    BUS Revision        40

```

### show chassis environment fpc (T4000 Router)

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

```

FPC 0 status:
  State                Online
  Fan Intake           34 degrees C / 93 degrees F
  Fan Exhaust          48 degrees C / 118 degrees F
  PMB                  47 degrees C / 116 degrees F
  LMB0                 50 degrees C / 122 degrees F

```

LMB1	41 degrees C / 105 degrees F
LMB2	35 degrees C / 95 degrees F
PFE1 LU2	46 degrees C / 114 degrees F
PFE1 LU0	41 degrees C / 105 degrees F
PFE0 LU0	57 degrees C / 134 degrees F
XF1	47 degrees C / 116 degrees F
XF0	52 degrees C / 125 degrees F
XM1	41 degrees C / 105 degrees F
XM0	50 degrees C / 122 degrees F
PFE0 LU1	56 degrees C / 132 degrees F
PFE0 LU2	45 degrees C / 113 degrees F
PFE1 LU1	37 degrees C / 98 degrees F
Power 1	
1.0 V	991 mV
1.2 V bias	1195 mV
1.8 V	1788 mV
2.5 V	2483 mV
3.3 V	3289 mV
3.3 V bias	3299 mV
12.0 V A	10608 mV
12.0 V B	10637 mV
Power 2	
0.9 V	881 mV
0.9 V PFE0	916 mV
0.9 V PFE1	903 mV
1.0 V PFE0	1012 mV
1.0 V PFE1	1002 mV
1.1 V	1095 mV
1.5 V_0	1494 mV
1.5 V_1	1479 mV
Power 3	
1.0 V PFE0	1000 mV
1.0 V PFE1	1002 mV
1.0 V PFE0 *	995 mV
1.0 V PFE1 *	995 mV
1.8 V PFE 0	1788 mV
1.8 V PFE 1	1789 mV
2.5 V	2482 mV
12.0 V	11614 mV
Power 4	
1.0 V PFE0 LU0	1003 mV
1.0 V PFE1 LU0	1003 mV
1.0 V PFE1 LU2	1004 mV
1.0 V PFE0 LU0 *	995 mV

```

1.0 V PFE1 LU0 *          998 mV
1.0 V PFE1 LU2 *          996 mV
12.0 V                    11643 mV
12.0 V C                  11711 mV
Power (Base/PMB/MMB)
LMB0 VDD2V5              2488 mV
LMB0 VDD1V8              1788 mV
LMB0 VDD1V5              1496 mV
LMB0 PFE0 LU0 AVDD1V0    1002 mV
LMB0 PFE0 LU0 VDD1V0     1000 mV
LMB0 VDD12V0             10752 mV
LMB1 VDD2V5              2472 mV
LMB1 VDD1V8              1792 mV
LMB1 VDD1V5              1480 mV
LMB1 PFE0 LU2 AVDD1V0    994 mV
LMB1 PFE0 LU2 VDD1V0     1002 mV
LMB1 VDD12V0             10800 mV
LMB2 VDD2V5              2472 mV
LMB2 VDD1V8              1792 mV
LMB2 VDD1V5              1486 mV
LMB2 PFE1 LU1 AVDD1V0    996 mV
LMB2 PFE1 LU1 VDD1V0     998 mV
LMB2 VDD12V0             10704 mV
PMB 1.05v                1049 mV
PMB 1.5v                  1500 mV
PMB 2.5v                  2500 mV
PMB 3.3v                  3299 mV
Bus Revision              113
FPC 3 status:
State                     Online
Fan Intake                37 degrees C / 98 degrees F
Fan Exhaust               51 degrees C / 123 degrees F
PMB                       43 degrees C / 109 degrees F
LMB0                      57 degrees C / 134 degrees F
LMB1                      54 degrees C / 129 degrees F
LMB2                      38 degrees C / 100 degrees F
PFE1 LU2                 63 degrees C / 145 degrees F
PFE1 LU0                 45 degrees C / 113 degrees F
PFE0 LU0                 69 degrees C / 156 degrees F
XF1                      62 degrees C / 143 degrees F
XF0                      63 degrees C / 145 degrees F
XM1                      43 degrees C / 109 degrees F
XM0                      67 degrees C / 152 degrees F
PFE0 LU1                 63 degrees C / 145 degrees F

```



PFE0 LU2	66 degrees C / 150 degrees F
PFE1 LU1	41 degrees C / 105 degrees F
Power 1	
1.0 V	1002 mV
1.2 V bias	1201 mV
1.8 V	1785 mV
2.5 V	2485 mV
3.3 V	3288 mV
3.3 V bias	3285 mV
12.0 V A	10412 mV
12.0 V B	10515 mV
Power 2	
0.9 V	882 mV
0.9 V PFE0	920 mV
0.9 V PFE1	905 mV
1.0 V PFE0	1015 mV
1.0 V PFE1	1001 mV
1.1 V	1094 mV
1.5 V_0	1495 mV
1.5 V_1	1478 mV
Power 3	
0.92 V PFE1	998 mV
1.0 V PFE0	997 mV
1.0 V PFE0 *	992 mV
1.0 V PFE1 *	991 mV
1.8 V PFE 0	1780 mV
1.8 V PFE 1	1797 mV
2.5 V	2492 mV
12.0 V	11604 mV
Power 4	
1.0 V PFE0 LU0	1003 mV
1.0 V PFE1 LU0	1004 mV
1.0 V PFE1 LU2	1003 mV
1.0 V PFE0 LU0 *	1000 mV
1.0 V PFE1 LU0 *	1001 mV
1.0 V PFE1 LU2 *	1003 mV
12.0 V	11653 mV
12.0 V C	11672 mV
Power (Base/PMB/MMB)	
LMB0 VDD2V5	2512 mV
LMB0 VDD1V8	1790 mV
LMB0 VDD1V5	1500 mV
LMB0 PFE0 LU0 AVDD1V0	1004 mV
LMB0 PFE0 LU0 VDD1V0	1002 mV

```

LMB0 VDD12V0      10608 mV
LMB1 VDD2V5       2472 mV
LMB1 VDD1V8       1788 mV
LMB1 VDD1V5       1480 mV
LMB1 PFE0 LU2 AVDD1V0 1000 mV
LMB1 PFE0 LU2 VDD1V0 1004 mV
LMB1 VDD12V0      10672 mV
LMB2 VDD2V5       2488 mV
LMB2 VDD1V8       1798 mV
LMB2 VDD1V5       1494 mV
LMB2 PFE1 LU1 AVDD1V0 1000 mV
LMB2 PFE1 LU1 VDD1V0 1004 mV
LMB2 VDD12V0      10528 mV
PMB 1.05v         1050 mV
PMB 1.5v          1500 mV
PMB 2.5v          2499 mV
PMB 3.3v          3299 mV
Bus Revision      113
FPC 5 status:
State             Online
Temperature Top    39 degrees C / 102 degrees F
Temperature Bottom 38 degrees C / 100 degrees F
Power
  1.8 V           1804 mV
  1.8 V bias      1802 mV
  3.3 V           3294 mV
  3.3 V bias      3277 mV
  5.0 V bias      5008 mV
  5.0 V TOP       5067 mV
  8.0 V bias      6642 mV
Power (Base/PMB/MMB)
  1.2 V           1202 mV
  1.5 V           1504 mV
  5.0 V BOT       5079 mV
  12.0 V TOP Base 11848 mV
  12.0 V BOT Base 11780 mV
  1.1 V PMB       1111 mV
  1.2 V PMB       1189 mV
  1.5 V PMB       1494 mV
  1.8 V PMB       1819 mV
  2.5 V PMB       2503 mV
  3.3 V PMB       3294 mV
  5.0 V PMB       5035 mV
  12.0 V PMB      11788 mV

```

0.75 MMB TOP	766 mV
1.5 V MMB TOP	1484 mV
1.8 V MMB TOP	1772 mV
2.5 V MMB TOP	2485 mV
1.2 V MMB TOP	1137 mV
5.0 V MMB TOP	4946 mV
12.0 V MMB TOP	11772 mV
3.3 V MMB TOP	3289 mV
0.75 MMB BOT	759 mV
1.5 V MMB BOT	1482 mV
1.8 V MMB BOT	1792 mV
2.5 V MMB BOT	2490 mV
1.2 V MMB BOT	1145 mV
5.0 V MMB BOT	4922 mV
12.0 V MMB BOT	11625 mV
3.3 V MMB BOT	3282 mV
APS 00	2495 mV
APS 01	3308 mV
APS 02	3301 mV
5.0 V PIC 0	4967 mV
APS 10	2512 mV
APS 11	3316 mV
APS 12	3304 mV
5.0 V PIC 1	5081 mV
Bus Revision	49
FPC 6 status:	
State	Online
Fan Intake	34 degrees C / 93 degrees F
Fan Exhaust	49 degrees C / 120 degrees F
PMB	40 degrees C / 104 degrees F
LMB0	60 degrees C / 140 degrees F
LMB1	58 degrees C / 136 degrees F
LMB2	40 degrees C / 104 degrees F
PFE1 LU2	69 degrees C / 156 degrees F
PFE1 LU0	45 degrees C / 113 degrees F
PFE0 LU0	71 degrees C / 159 degrees F
XF1	58 degrees C / 136 degrees F
XF0	65 degrees C / 149 degrees F
XM1	40 degrees C / 104 degrees F
XM0	66 degrees C / 150 degrees F
PFE0 LU1	69 degrees C / 156 degrees F
PFE0 LU2	68 degrees C / 154 degrees F
PFE1 LU1	42 degrees C / 107 degrees F
Power 1	

1.0 V	998 mV
1.2 V bias	1191 mV
1.8 V	1781 mV
2.5 V	2487 mV
3.3 V	3302 mV
3.3 V bias	3300 mV
12.0 V A	10388 mV
12.0 V B	10388 mV
Power 2	
0.9 V	902 mV
0.9 V PFE0	921 mV
0.9 V PFE1	907 mV
1.0 V PFE0	996 mV
1.0 V PFE1	974 mV
1.1 V	1095 mV
1.5 V_0	1495 mV
1.5 V_1	1478 mV
Power 3	
1.0 V PFE0	997 mV
1.0 V PFE1	998 mV
1.0 V PFE0 *	993 mV
1.0 V PFE1 *	991 mV
1.8 V PFE 0	1796 mV
1.8 V PFE 1	1789 mV
2.5 V	2465 mV
12.0 V	11609 mV
Power 4	
1.0 V PFE0 LU0	1003 mV
1.0 V PFE1 LU0	1006 mV
1.0 V PFE1 LU2	1002 mV
1.0 V PFE0 LU0 *	1000 mV
1.0 V PFE1 LU0 *	998 mV
1.0 V PFE1 LU2 *	998 mV
12.0 V	11638 mV
12.0 V C	11702 mV
Power (Base/PMB/MMB)	
LMB0 VDD2V5	2484 mV
LMB0 VDD1V8	1780 mV
LMB0 VDD1V5	1496 mV
LMB0 PFE0 LU0 AVDD1V0	998 mV
LMB0 PFE0 LU0 VDD1V0	1004 mV
LMB0 VDD12V0	10528 mV
LMB1 VDD2V5	2472 mV
LMB1 VDD1V8	1776 mV

```

LMB1 VDD1V5          1474 mV
LMB1 PFE0 LU2 AVDD1V0  994 mV
LMB1 PFE0 LU2 VDD1V0   1004 mV
LMB1 VDD12V0         10544 mV
LMB2 VDD2V5          2476 mV
LMB2 VDD1V8          1790 mV
LMB2 VDD1V5          1492 mV
LMB2 PFE1 LU1 AVDD1V0  996 mV
LMB2 PFE1 LU1 VDD1V0   1010 mV
LMB2 VDD12V0         10528 mV
PMB 1.05v            1050 mV
PMB 1.5v             1499 mV
PMB 2.5v             2500 mV
PMB 3.3v             3300 mV
Bus Revision          80

```

### show chassis environment fpc lcc (TX Matrix Router)

```
user@host> show chassis environment fpc lcc 0
```

```
lcc0-re0:
```

```
-----
FPC 1 status:
```

```

State                Online
Temperature Top       30 degrees C / 86 degrees F
Temperature Bottom    25 degrees C / 77 degrees F
Temperature MMB0      Absent
Temperature MMB1      27 degrees C / 80 degrees F
Power:
  1.8 V               1813 mV
  2.5 V               2504 mV
  3.3 V               3338 mV
  5.0 V               5037 mV
  1.8 V bias          1797 mV
  3.3 V bias          3301 mV
  5.0 V bias          5013 mV
  8.0 V bias          7345 mV
BUS Revision          40

```

```
FPC 2 status:
```

```

State                Online
Temperature Top       37 degrees C / 98 degrees F
Temperature Bottom    26 degrees C / 78 degrees F
Temperature MMB0      32 degrees C / 89 degrees F
Temperature MMB1      27 degrees C / 80 degrees F

```

```

Power:
  1.8 V          1791 mV
  2.5 V          2517 mV
  3.3 V          3308 mV
  5.0 V          5052 mV
  1.8 V bias     1797 mV
  3.3 V bias     3289 mV
  5.0 V bias     4991 mV
  8.0 V bias     7477 mV
BUS Revision     40

```

### show chassis environment fpc lcc (TX Matrix Plus Router)

```
user@host> show chassis environment fpc lcc 0
```

```

lcc0-re0:
-----
FPC 1 status:
  State          Online
  Temperature Top 46 degrees C / 114 degrees F
  Temperature Bottom 47 degrees C / 116 degrees F
  Power
    1.8 V          1788 mV
    1.8 V bias     1787 mV
    3.3 V          3321 mV
    3.3 V bias     3306 mV
    5.0 V bias     5018 mV
    5.0 V TOP      5037 mV
    8.0 V bias     7223 mV
  Power (Base/PMB/MMB)
    1.2 V          1205 mV
    1.5 V          1503 mV
    5.0 V BOT      5084 mV
    12.0 V TOP Base 11775 mV
    12.0 V BOT Base 11794 mV
    1.1 V PMB      1108 mV
    1.2 V PMB      1196 mV
    1.5 V PMB      1499 mV
    1.8 V PMB      1811 mV
    2.5 V PMB      2515 mV
    3.3 V PMB      3318 mV
    5.0 V PMB      5030 mV
    12.0 V PMB     11832 mV
    0.75 MMB TOP    752 mV

```

1.5 V MMB TOP	1489 mV
1.8 V MMB TOP	1782 mV
2.5 V MMB TOP	2498 mV
1.2 V MMB TOP	1155 mV
5.0 V MMB TOP	4902 mV
12.0 V MMB TOP	11721 mV
3.3 V MMB TOP	3316 mV
0.75 MMB BOT	754 mV
1.5 V MMB BOT	1482 mV
1.8 V MMB BOT	1758 mV
2.5 V MMB BOT	2488 mV
1.2 V MMB BOT	1157 mV
5.0 V MMB BOT	4962 mV
12.0 V MMB BOT	11691 mV
3.3 V MMB BOT	3308 mV
APS 00	1484 mV
APS 01	2503 mV
APS 02	3313 mV
5.0 V PIC 0	5025 mV
APS 10	1501 mV
APS 11	2466 mV
APS 12	3311 mV
5.0 V PIC 1	5081 mV
Bus Revision	49

### show chassis environment fpc (QFX Series and OCX Series)

user@switch> show chassis environment fpc 0

```
FPC 0 status:
  State           Online
  Temperature      42 degrees C / 107 degrees F
```

### show chassis environment fpc interconnect-device (QFabric Systems)

user@switch> show chassis environment fpc interconnect-device interconnect1 0

```
FC 0 FPC 0 status:
  State           Online
  Left Intake Temperature  24 degrees C / 75 degrees F
  Right Intake Temperature 24 degrees C / 75 degrees F
  Left Exhaust Temperature 27 degrees C / 80 degrees F
  Right Exhaust Temperature 27 degrees C / 80 degrees F
```

```

Power
  BIAS 3V3          3330 mV
  VDD 3V3          3300 mV
  VDD 2V5          2502 mV
  VDD 1V5          1496 mV
  VDD 1V2          1194 mV
  VDD 1V0          1000 mV
  SW0 VDD 1V0      1020 mV
  SW0 CVDD 1V025   1032 mV
  SW1 VDD 1V0      1022 mV
  SW1 CVDD 1V025   1030 mV
  VDD 12V0 DIV3_33 3414 mV

```

### show chassis environment fpc 5(PTX3000 Packet Transport Router)

```
user@host> show chassis environment fpc 5
```

```

FPC 5 status:
  State          Online
  Intake Temperature 31 degrees C / 87 degrees F
  Exhaust Temperature 41 degrees C / 105 degrees F
  Power
    FPC 12.0v          12221 mV
    FPC VCC 0.5-1.3v   1640 mV
    FPC VNN 0.5-1.3v   1640 mV
    FPC 1.0v           1640 mV
    FPC 1.1v           1640 mV
    FPC 1.35v          1640 mV
    FPC VDDQ 1.5v      1640 mV
    FPC 1.8v           1640 mV
    FPC 3.3v           3280 mV
    FPC 5.0v bias      5143 mV
    FPC 5.0v usb       5143 mV
    FPC VCC 12.0v      12289 mV
    FPC Vref 3.3v      3280 mV
    MAIN 12.0v-i       2265 mA

```

### show chassis environment fpc 0 (PTX5000 Packet Transport Router)

```
user@host> show chassis environment fpc 0
```

```

FPC 0 status:
  State          Online

```



PMB Temperature	35 degrees C / 95 degrees F
Intake Temperature	33 degrees C / 91 degrees F
Exhaust A Temperature	51 degrees C / 123 degrees F
Exhaust B Temperature	43 degrees C / 109 degrees F
TL0 Temperature	48 degrees C / 118 degrees F
TQ0 Temperature	53 degrees C / 127 degrees F
TL1 Temperature	56 degrees C / 132 degrees F
TQ1 Temperature	58 degrees C / 136 degrees F
TL2 Temperature	55 degrees C / 131 degrees F
TQ2 Temperature	57 degrees C / 134 degrees F
TL3 Temperature	59 degrees C / 138 degrees F
TQ3 Temperature	59 degrees C / 138 degrees F
Power	
PMB 1.05v	1049 mV
PMB 1.5v	1500 mV
PMB 2.5v	2500 mV
PMB 3.3v	3299 mV
PFE0 1.5v	1500 mV
PFE0 1.0v	999 mV
TQ0 0.9v	900 mV
TL0 0.9v	900 mV
PFE1 1.5v	1499 mV
PFE1 1.0v	999 mV
TQ1 0.9v	899 mV
TL1 0.9v	900 mV
PFE2 1.5v	1500 mV
PFE2 1.0v	1000 mV
TQ2 0.9v	900 mV
TL2 0.9v	900 mV
PFE3 1.5v	1499 mV
PFE3 1.0v	1000 mV
TQ3 0.9v	900 mV
TL3 0.9v	900 mV
Bias 3.3v	3327 mV
FPC 3.3v	3300 mV
FPC 2.5v	2500 mV
SAM 0.9v	900 mV
A 12.0v	2014 mV
B 12.0v	2030 mV

**show chassis environment fpc 07 (PTX5000 Packet Transport Router with FPC2-PTX-P1A)**

user@host> **show chassis environment fpc 07**

## FPC 7 status:

State	Online
PMB 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 LCPUR 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
LCPUR Platform 1.1V	1100 mV	4617 mA	5078 mW
LCPUR 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 Sensor	37 degrees C / 98 degrees F
FPC 1 Exhaust-B Temp Sensor	36 degrees C / 96 degrees F
FPC 1 Exhaust-C Temp Sensor	36 degrees C / 96 degrees F
FPC 1 PE0 Temp Sensor	45 degrees C / 113 degrees F
FPC 1 PE1 Temp Sensor	46 degrees C / 114 degrees F
FPC 1 PE2 Temp Sensor	53 degrees C / 127 degrees F
FPC 1 LCPU Temp Sensor	35 degrees C / 95 degrees F

## Power

PE0 Core 0.9V	897 mV	28992 mA	26027 mW
PE0 HMC0 Core 0.9V	899 mV	10156 mA	9156 mW
PE1 Core 0.9V	871 mV	28800 mA	25164 mW
PE1 HMC0 Core 0.9V	899 mV	10125 mA	9109 mW
PE2 Core 0.9V	898 mV	29914 mA	26906 mW



PE2 HMC0 Core 0.9V	899 mV	10343 mA	9296 mW
PE0 Serdes 1.0V	1019 mV	27515 mA	28093 mW
PE1 Serdes 1.0V	1020 mV	27968 mA	28546 mW
PE2 Serdes 1.0V	1019 mV	27796 mA	28359 mW
LCPU Platform 1.1V	1100 mV	3347 mA	3289 mW
LCPU Core 1.0V	1000 mV	7960 mA	7960 mW
PHY VDD B 1.0V	1000 mV	16437 mA	16437 mW
PHY VDD A 1.0V	999 mV	15656 mA	15656 mW
BCM Core 1.0V	1000 mV	7289 mA	7335 mW
BCM PEX 1.0V	999 mV	3453 mA	3453 mW
HMC Core 1.2V	1199 mV	1218 mA	1453 mW
HMC Serdes 1.2V	1199 mV	32093 mA	38562 mW
VDD 1.5V	1500 mV	2859 mA	4289 mW
VDD 2.5V	2449 mV	3875 mA	9500 mW
VDD 3.3V	3299 mV	2806 mA	9257 mW
12V	12351 mV	28569 mA	354877 mW

## FPC 3 status:

State	Online
FPC 3 Intake-A Temp Sensor	35 degrees C / 95 degrees F
FPC 3 Intake-B Temp Sensor	31 degrees C / 87 degrees F
FPC 3 Exhaust-A Temp Sensor	36 degrees C / 96 degrees F
FPC 3 Exhaust-B Temp 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 LCPU Temp Sensor	35 degrees C / 95 degrees F

## Power

PE0 Core 0.9V	897 mV	28832 mA	25871 mW
PE0 HMC0 Core 0.9V	899 mV	10359 mA	9328 mW
PE1 Core 0.9V	873 mV	28230 mA	24671 mW
PE1 HMC0 Core 0.9V	899 mV	10468 mA	9421 mW
PE2 Core 0.9V	898 mV	29539 mA	26539 mW
PE2 HMC0 Core 0.9V	899 mV	10656 mA	9593 mW
PE0 Serdes 1.0V	1020 mV	27484 mA	28031 mW
PE1 Serdes 1.0V	1019 mV	27515 mA	28078 mW
PE2 Serdes 1.0V	1020 mV	27625 mA	28187 mW
LCPU Platform 1.1V	1099 mV	3050 mA	3355 mW
LCPU Core 1.0V	999 mV	7820 mA	7804 mW
PHY VDD B 1.0V	999 mV	15406 mA	15406 mW
PHY VDD A 1.0V	1000 mV	14953 mA	14953 mW
BCM Core 1.0V	1000 mV	7648 mA	7648 mW
BCM PEX 1.0V	1000 mV	3531 mA	3531 mW
HMC Core 1.2V	1200 mV	1234 mA	1476 mW

HMC Serdes 1.2V	1199 mV	34671 mA	41593 mW
VDD 1.5V	1499 mV	3484 mA	5226 mW
VDD 2.5V	2449 mV	3218 mA	7890 mW
VDD 3.3V	3299 mV	2468 mA	8148 mW
12V	12311 mV	28785 mA	355950 mW

## FPC 6 status:

State	Online
FPC 6 Intake-A Temp Sensor	34 degrees C / 93 degrees F
FPC 6 Intake-B Temp Sensor	31 degrees C / 87 degrees F
FPC 6 Exhaust-A Temp 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 LCPUR 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
LCPUR Platform 1.1V	1099 mV	3230 mA	4742 mW
LCPUR 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 Sensor37 degrees C / 98 degrees F
FPC 8 PE0 Temp Sensor      42 degrees C / 107 degrees F
FPC 8 PE1 Temp Sensor      44 degrees C / 111 degrees F
FPC 8 PE2 Temp Sensor      47 degrees C / 116 degrees F
FPC 8 LCPU Temp Sensor     33 degrees C / 91 degrees F

```

#### Power

PE0 Core 0.9V	897 mV	29382 mA	26437 mW
PE0 HMC0 Core 0.9V	899 mV	10265 mA	9250 mW
PE1 Core 0.9V	872 mV	28867 mA	25175 mW
PE1 HMC0 Core 0.9V	899 mV	10171 mA	9109 mW
PE2 Core 0.9V	899 mV	30210 mA	27214 mW
PE2 HMC0 Core 0.9V	900 mV	10187 mA	9171 mW
PE0 Serdes 1.0V	1020 mV	27843 mA	28421 mW
PE1 Serdes 1.0V	1020 mV	28265 mA	28828 mW
PE2 Serdes 1.0V	1019 mV	28406 mA	29000 mW
LCPU Platform 1.1V	1099 mV	3000 mA	3300 mW
LCPU Core 1.0V	1000 mV	7937 mA	7937 mW
PHY VDD B 1.0V	1000 mV	15843 mA	15843 mW
PHY VDD A 1.0V	1000 mV	15250 mA	15250 mW
BCM Core 1.0V	999 mV	6914 mA	6898 mW
BCM PEX 1.0V	999 mV	3445 mA	3445 mW
HMC Core 1.2V	1199 mV	1162 mA	1390 mW
HMC Serdes 1.2V	1199 mV	33437 mA	40125 mW
VDD 1.5V	1499 mV	2851 mA	4273 mW
VDD 2.5V	2450 mV	3867 mA	9484 mW
VDD 3.3V	3300 mV	3258 mA	10753 mW
12V	12338 mV	28656 mA	356171 mW

#### FPC 9 status:

```

State                               Online
FPC 9 Intake-A Temp Sensor 44 degrees C / 111 degrees F
FPC 9 Intake-B Temp Sensor 28 degrees C / 82 degrees F
FPC 9 Exhaust-A Temp Sensor51 degrees C / 123 degrees F
FPC 9 Exhaust-B Temp Sensor52 degrees C / 125 degrees F
FPC 9 Exhaust-C Temp Sensor48 degrees C / 118 degrees F
FPC 9 PE0 Temp Sensor      52 degrees C / 125 degrees F
FPC 9 PE1 Temp Sensor      65 degrees C / 149 degrees F
FPC 9 PE2 Temp Sensor      50 degrees C / 122 degrees F
FPC 9 PE3 Temp Sensor      65 degrees C / 149 degrees F
FPC 9 PE4 Temp Sensor      50 degrees C / 122 degrees F
FPC 9 PE5 Temp Sensor      67 degrees C / 152 degrees F
FPC 9 LCPU Temp Sensor     45 degrees C / 113 degrees F

```

#### Power

PE0 Core 0.9V	875 mV	28316 mA	24808 mW
PE1 Core 0.9V	875 mV	28546 mA	24996 mW

PE0 Serdes 1.0V	1019 mV	38906 mA	39687 mW
PE1 Serdes 1.0V	1020 mV	33078 mA	33781 mW
PE0 HMC Core 0.9V	899 mV	7718 mA	6945 mW
PE0,1 HMC Memory 1.2V	1199 mV	579 mA	695 mW
PE1 HMC Core 0.9V	899 mV	7289 mA	6570 mW
PE0,1 HMC Serdes 1.2V	1199 mV	20187 mA	24250 mW
PE2 Core 0.9V	924 mV	29062 mA	26894 mW
PE3 Core 0.9V	900 mV	28914 mA	26039 mW
PE2 Serdes 1.0V	1020 mV	36375 mA	37093 mW
PE3 Serdes 1.0V	1019 mV	32640 mA	33296 mW
PE2 HMC Core 0.9V	900 mV	7695 mA	6921 mW
PE2,3 HMC Memory 1.2V	1199 mV	562 mA	674 mW
PE3 HMC Core 0.9V	899 mV	7554 mA	6796 mW
PE2,3 HMC Serdes 1.2V	1199 mV	20156 mA	24218 mW
VDD 3.3V	3300 mV	8964 mA	29609 mW
VDD 1.5V	1499 mV	3968 mA	5945 mW
VDD 2.5V	2449 mV	4414 mA	10890 mW
PE4 Core 0.9V	900 mV	28527 mA	25679 mW
PE5 Core 0.9V	899 mV	28902 mA	26035 mW
PE4 Serdes 1.0V	1019 mV	41281 mA	42125 mW
PE5 Serdes 1.0V	1019 mV	25781 mA	26328 mW
PE4 HMC Core 0.9V	900 mV	7382 mA	6648 mW
PE4,5 HMC Memory 1.2V	1199 mV	626 mA	750 mW
PE5 HMC Core 0.9V	899 mV	7562 mA	6796 mW
PE4,5 HMC Serdes 1.2V	1199 mV	20312 mA	24375 mW
LCPU platform 1.1V	1099 mV	3687 mA	4054 mW
LCPU core 1.0V	1000 mV	9000 mA	9000 mW
BCM core 1.0V	999 mV	7843 mA	7835 mW
BCM & PEX Serdes 1.0V	999 mV	4062 mA	4062 mW
12V	12417 mV	51659 mA	643215 mW

### show chassis environment FPC 1 (MX Routers with Media Services Blade [MSB])

user@switch> show chassis environment fpc 1

```
FPC 1 status:
State           Online
Temperature Intake      36 degrees C / 96 degrees F
Temperature Exhaust A   39 degrees C / 102 degrees F
Temperature LU TSen      52 degrees C / 125 degrees F
Temperature LU Chip      54 degrees C / 129 degrees F
Temperature XM TSen      52 degrees C / 125 degrees F
Temperature XM Chip      60 degrees C / 140 degrees F
Temperature PCIe TSen    52 degrees C / 125 degrees F
```

```

Temperature PCIe Chip      69 degrees C / 156 degrees F
Power
  MPC-BIAS3V3-z12106      3302 mV
  MPC-VDD3V3-z16100       3325 mV
  MPC-AVDD1V0-z16100      1007 mV
  MPC-PCIE_1V0-z16100     904 mV
  MPC-LU0_1V0-z12004      996 mV
  MPC-VDD_1V5-z12004      1498 mV
  MPC-12VA-BMR453         11733 mV
  MPC-12VB-BMR453         11728 mV
  MPC-XM_0V9-vt273m       900 mV
I2C Slave Revision        81

```

### show chassis environment FPC (Junos OS Evolved)

user@switch> show chassis environment fpc

```

FPC 0 status:
  State      Online
  Intake Temperature    32 degrees C / 89 degrees F
  Exhaust-A Temperature 43 degrees C / 109 degrees F
  Exhaust-B Temperature 32 degrees C / 89 degrees F
  PE0 Temperature      34 degrees C / 93 degrees F
  PE1 Temperature      38 degrees C / 100 degrees F
  PE2 Temperature      38 degrees C / 100 degrees F
  PE3 Temperature      36 degrees C / 96 degrees F
  PE4 Temperature      35 degrees C / 95 degrees F
  PE5 Temperature      35 degrees C / 95 degrees F
  Power 1
    RT_1  1.0v      1018 mV
    RT_2  1.0v      1018 mV
  Power 2
    FPC 1 1.0v      999 mV
    FPC 2 1.0v      998 mV
  Power 3
    FPC  2.5v      2499 mV
    FPC  3.3v      3299 mV
  Power 4
    FPC  0.9v      899 mV
    FPC  1.5v      1499 mV
  Power 5
    PE0 1 1.0v      1039 mV
    PE0 2 1.0v      1039 mV

```

Power 6		
PE0 1 0.9v		900 mV
PE0 2 0.9v		900 mV
Power 7		
PE0 3 0.9v		902 mV
PE0 4 0.9v		902 mV
Power 8		
PE0 H 0.9v		899 mV
PE0 H 1.2v		1199 mV
Power 9		
PE1 1 1.0v		1040 mV
PE1 2 1.0v		1039 mV
Power 10		
PE1 1 0.9v		901 mV
PE1 2 0.9v		901 mV
Power 11		
PE1 3 0.9v		900 mV
PE1 4 0.9v		900 mV
Power 12		
PE1 H 0.9v		899 mV
PE1 H 1.2v		1199 mV
Power 13		
PE2 1 1.0v		1039 mV
PE2 2 1.0v		1039 mV
Power 14		
PE2 1 0.9v		900 mV
PE2 2 0.9v		900 mV
Power 15		
PE2 3 0.9v		900 mV
PE2 4 0.9v		900 mV
Power 16		
PE2 H 0.9v		899 mV
PE2 H 1.2v		1199 mV
Power 17		
PE3 1 1.0v		1039 mV
PE3 2 1.0v		1039 mV
Power 18		
PE3 1 0.9v		899 mV
PE3 2 0.9v		900 mV
Power 19		
PE3 3 0.9v		899 mV
PE3 4 0.9v		900 mV
Power 20		
PE3 H 0.9v		899 mV

```

    PE3 H 1.2v                1199 mV
Power 21
    PE4 1 1.0v                1039 mV
    PE4 2 1.0v                1039 mV
Power 22
    PE4 1 0.9v                900 mV
    PE4 2 0.9v                900 mV
Power 23
    PE4 3 0.9v                901 mV
    PE4 4 0.9v                901 mV
Power 24
    PE4 H 0.9v                899 mV
    PE4 H 1.2v                1199 mV
Power 25
    PE5 1 1.0v                1040 mV
    PE5 2 1.0v                1039 mV
Power 26
    PE5 1 0.9v                901 mV
    PE5 2 0.9v                901 mV
Power 27
    PE5 3 0.9v                901 mV
    PE5 4 0.9v                901 mV
Power 28
    PE5 H 0.9v                899 mV
    PE5 H 1.2v                1199 mV
Power 29
    PIC0 12.0v                12342 mV
Power 30
    PIC1 12.0v                12342 mV
Power 31
    A    12.0v                12375 mV
    B    12.0v                1008 mV
Bus Revision                  115
FPC 1 status:
State                         Online
Intake Temperature           33 degrees C / 91 degrees F
Exhaust-A Temperature        44 degrees C / 111 degrees F
Exhaust-B Temperature        33 degrees C / 91 degrees F
PE0 Temperature              34 degrees C / 93 degrees F
PE1 Temperature              38 degrees C / 100 degrees F
PE2 Temperature              37 degrees C / 98 degrees F
PE3 Temperature              36 degrees C / 96 degrees F
PE4 Temperature              34 degrees C / 93 degrees F
PE5 Temperature              36 degrees C / 96 degrees F

```

Power 1		
RT_1	1.0v	1018 mV
RT_2	1.0v	1018 mV
Power 2		
FPC 1	1.0v	999 mV
FPC 2	1.0v	999 mV
Power 3		
FPC	2.5v	2499 mV
FPC	3.3v	3300 mV
Power 4		
FPC	0.9v	899 mV
FPC	1.5v	1500 mV
Power 5		
PE0 1	1.0v	1039 mV
PE0 2	1.0v	1039 mV
Power 6		
PE0 1	0.9v	925 mV
PE0 2	0.9v	925 mV
Power 7		
PE0 3	0.9v	925 mV
PE0 4	0.9v	926 mV
Power 8		
PE0 H	0.9v	899 mV
PE0 H	1.2v	1199 mV
Power 9		
PE1 1	1.0v	1040 mV
PE1 2	1.0v	1039 mV
Power 10		
PE1 1	0.9v	900 mV
PE1 2	0.9v	901 mV
Power 11		
PE1 3	0.9v	899 mV
PE1 4	0.9v	900 mV
Power 12		
PE1 H	0.9v	899 mV
PE1 H	1.2v	1199 mV
Power 13		
PE2 1	1.0v	1040 mV
PE2 2	1.0v	1039 mV
Power 14		
PE2 1	0.9v	926 mV
PE2 2	0.9v	926 mV
Power 15		
PE2 3	0.9v	927 mV



PE2 4 0.9v	927 mV
Power 16	
PE2 H 0.9v	899 mV
PE2 H 1.2v	1199 mV
Power 17	
PE3 1 1.0v	1039 mV
PE3 2 1.0v	1039 mV
Power 18	
PE3 1 0.9v	926 mV
PE3 2 0.9v	927 mV
Power 19	
PE3 3 0.9v	925 mV
PE3 4 0.9v	926 mV
Power 20	
PE3 H 0.9v	899 mV
PE3 H 1.2v	1199 mV
Power 21	
PE4 1 1.0v	1039 mV
PE4 2 1.0v	1040 mV
Power 22	
PE4 1 0.9v	925 mV
PE4 2 0.9v	925 mV
Power 23	
PE4 3 0.9v	925 mV
PE4 4 0.9v	926 mV
Power 24	
PE4 H 0.9v	900 mV
PE4 H 1.2v	1199 mV
Power 25	
PE5 1 1.0v	1039 mV
PE5 2 1.0v	1039 mV
Power 26	
PE5 1 0.9v	898 mV
PE5 2 0.9v	899 mV
Power 27	
PE5 3 0.9v	900 mV
PE5 4 0.9v	900 mV
Power 28	
PE5 H 0.9v	899 mV
PE5 H 1.2v	1199 mV
Power 29	
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

## show chassis environment pem

### List of Syntax

[Syntax on page 412](#)

[Syntax \(ACX4000 Router\) on page 412](#)

[Syntax \(TX Matrix Routers\) on page 412](#)

[Syntax \(TX Matrix Plus Routers\) on page 412](#)

[Syntax \(MX Series Router\) on page 412](#)

[Syntax \(PTX Series Router\) on page 413](#)

[Syntax \(MX104 Universal Routing Platforms\) on page 413](#)

[Syntax \(MX10003 , MX204, MX10008, OCX Series, EX9251, and EX9253 devices\) on page 413](#)

[Syntax \(QFX Series\) on page 413](#)

### 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)>
```

### Release Information

Command introduced before Junos OS Release 7.4.

Command introduced in Junos OS Release 11.3 for the QFX Series.

Command introduced in Junos OS Release 12.3R2 for EX Series.

Command introduced in Junos OS Release 13.2 for MX104 Universal Routing Platforms.

Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

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

Command introduced in Junos OS Release 17.2 for PTX10008 Routers.

Command introduced in Junos OS Release 17.3 for MX10003 Universal Routing Platforms and MX150 Router Appliance.

Command introduced in Junos OS Release 17.4 for MX204 Universal Routing Platforms.

Command introduced in Junos OS Release 18.1R1 for EX9251 Switches.

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

### 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 *name***—(QFabric systems only) (Optional) Display chassis environmental information about the PEMs in the Interconnect device.

**lcc *number***—(TX Matrix router and TX Matrix Plus router only) (Optional) Line-card chassis number.

Replace *number* with the following values depending on the LCC configuration:

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**local**—(MX Series routers only) (Optional) Display environmental information about the PEM in the local Virtual Chassis member.

**member *member-id***—(MX Series routers only) (Optional) Display environmental information about the PEM in the specified member of the Virtual Chassis configuration. Replace *member-id* with a value of 0 or 1.

**node-device *name***—(QFabric systems only) (Optional) Display chassis environmental information about the PEMs in the Node device.

**satellite [*fpc-slot slot-id* | *device-alias alias-name*]**—(Junos Fusion only)(Optional) Display environmental information about the PEM in the specified satellite device in a Junos Fusion, or for all satellite devices in the Junos Fusion if no satellite devices are specified.

**scc**—(TX Matrix routers only) (Optional) Display environmental information about the PEM in the TX Matrix router (or switch-card chassis).

**sfc**—(TX Matrix Plus routers only) (Optional) Display environmental information about the PEM in the TX Matrix Plus router (or switch-fabric chassis).

**slot** —(Optional) Display environmental information about an individual PEM. Replace *slot* with 0 or 1.

### Required Privilege Level

view

## RELATED DOCUMENTATION

[show chassis hardware](#) | 479

### List of Sample Output

[show chassis environment pem \(M40e Router\) on page 417](#)

[show chassis environment pem \(M120 Router\) on page 417](#)

[show chassis environment pem \(M160 Router\) on page 417](#)

[show chassis environment pem \(M320 Router\) on page 418](#)

[show chassis environment pem \(MX150\) on page 418](#)

[show chassis environment pem \(MX104 Router\) on page 419](#)

[show chassis environment pem \(MX240 Router\) on page 419](#)

[show chassis environment pem \(MX480 Router\) on page 419](#)

[show chassis environment pem \(MX960 Router\) on page 420](#)

[show chassis environment pem \(MX10003 Router\) on page 420](#)

[show chassis environment pem \(MX204 Router\) on page 421](#)

[show chassis environment pem \(MX10008 Router\) on page 421](#)

[show chassis environment pem \(PTX10016 Router\) on page 422](#)

[show chassis environment pem \(T320 Router\) on page 423](#)

[show chassis environment pem \(T640 Router\) on page 424](#)

[show chassis environment pem \(T4000 Router\) on page 424](#)

[show chassis environment pem \(T640/T1600/T4000 Routers With Six-Input DC Power Supply\) on page 425](#)

[show chassis environment pem lcc \(TX Matrix Routing Matrix\) on page 425](#)

[show chassis environment pem scc \(TX Matrix Routing Matrix\) on page 426](#)

[show chassis environment pem sfc \(TX Matrix Plus Routing Matrix\) on page 426](#)

[show chassis environment pem lcc \(TX Matrix Plus Routing Matrix\) on page 427](#)

[show chassis environment pem node-device \(QFabric System\) on page 428](#)

[show chassis environment pem \(QFX Series and OCX Series\) on page 428](#)

[show chassis environment pem \(QFX 10016\) on page 428](#)

[show chassis environment pem interconnect-device \(QFabric System\) on page 429](#)

[show chassis environment pem \(EX9251 Switches\) on page 429](#)

[show chassis environment pem \(EX9253 Switches\) on page 429](#)

[show chassis environment pem \(PTX1000 Packet Transport Routers\) on page 430](#)

### Output Fields

[Table 11 on page 416](#) lists the output fields for the **show chassis environment pem** command. Output fields are listed in the approximate order in which they appear.

**Table 11: show chassis environment pem Output Fields**

Field Name	Field Description
PEMslotstatus	Number of the PEM slot.
State	Status of the PEM.
Temperature	Temperature of the air flowing past the PEM.
AC Input	Status of the AC input for the specified component
AC Output	Status of the AC output for the specified component.
DC input	Status of the DC input for the specified component.
DC output	Status of the DC output for the specified component.
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
    48.0 V input  51853 mV
    48.0 V fan supply 48877 mV
    8.0 V bias    8449 mV
    5.0 V bias    4998 mV
PEM 3 status:
  State          Online
  Temperature     OK
  DC input       OK
  Load           Less than 40 percent
    48.0 V input  51717 mV
    48.0 V fan supply 49076 mV
    8.0 V bias    8442 mV
    5.0 V bias    4998 mV

```

### show chassis environment pem (MX150)

user@host> show chassis environment pem

```

FPC 0 PEM 0 status:
  State          Online
  Airflow        Front to Back
  Temperature     OK

```

**show chassis environment pem (MX104 Router)**

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

```

PEM 0 status:
  State           Online
  Temperature      OK
  DC Output:       OK
  Voltage:
    12.0 V output  12281 mV
    3.3 V output   3353 mV
PEM 1 status:
  State           Empty

```

**show chassis environment pem (MX240 Router)**

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

```

PEM 0 status:
  State           Online
  Temperature      OK
  DC Output:       OK
PEM 1 status:
  State           Online
  Temperature      OK
  DC Output:       OK

```

**show chassis environment pem (MX480 Router)**

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

```

PEM 0 status:
  State           Online
  Temperature      OK
  DC Input:        OK
  DC Output:       OK
  Voltage:
PEM 1 status:
  State           Online
  Temperature      OK
  DC Input:        OK
  DC Output:       OK
  Voltage:

```

**show chassis environment pem (MX960 Router)**

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

```

PEM 2 status:
  State                Present
PEM 3 status:
  State                Online
  Temperature          OK
  DC Output:           OK

```

**show chassis environment pem (MX10003 Router)**

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

```

PEM 0 status:
  State                Online
  Airflow              Front to Back
  Temperature          OK    34 degrees C / 93 degrees F
  Temperature          OK    26 degrees C / 78 degrees F
  Temperature          OK    24 degrees C / 75 degrees F
  Firmware version     0x22
  Cooling Fan          8752 RPM
  DC Output            Voltage(V) Current(A) Power(W) Load(%)
                      12.00      26          312      10
PEM 1 status:
  State                Online
  Airflow              Front to Back
  Temperature          OK    35 degrees C / 95 degrees F
  Temperature          OK    26 degrees C / 78 degrees F
  Temperature          OK    25 degrees C / 77 degrees F
  Firmware version     0x22
  Cooling Fan          8480 RPM
  DC Output            Voltage(V) Current(A) Power(W) Load(%)
                      12.00      27          324      11
PEM 2 status:
  State                Online
  Airflow              Front to Back
  Temperature          OK    37 degrees C / 98 degrees F
  Temperature          OK    29 degrees C / 84 degrees F
  Temperature          OK    25 degrees C / 77 degrees F
  Firmware version     0x22
  Cooling Fan          8656 RPM
  DC Output            Voltage(V) Current(A) Power(W) Load(%)

```

```

12.00      25      300      10

PEM 3 status:
  State      Online
  Airflow    Front to Back
  Temperature OK   35 degrees C / 95 degrees F
  Temperature OK   26 degrees C / 78 degrees F
  Temperature OK   25 degrees C / 77 degrees F
  Firmware version 0x22
  Cooling Fan 8448 RPM
  DC Output   Voltage(V) Current(A) Power(W) Load(%)
              12.00      26      312      10

PEM 4 status:
  State      Empty
PEM 5 status:
  State      Empty
```

**show chassis environment pem (MX204 Router)**

user@host> **show chassis environment pem**

```

PEM 0 status:
  State      Empty
PEM 1 status:
  State      Online
  Airflow    Front to Back
  Temperature OK   48 degrees C / 118 degrees F
  Temperature OK   51 degrees C / 123 degrees F
  Fan Sensor 5400 RPM
  DC Output   Voltage(V) Current(A) Power(W) Load(%)
              11.94      16      191      29
```

**show chassis environment pem (MX10008 Router)**

user@host> **show chassis environment pem**

```

PEM 0 status:
  State      Online
  Airflow    Front to Back
  Temperature OK   29 degrees C / 84 degrees F
  Firmware version 0x36
  Fan 0      5880 RPM
  DC Output   Voltage(V) Current(A) Power(W) Load(%)
```



```

12.00      104      1248      46
PEM 1 status:
  State      Online
  Airflow    Front to Back
  Temperature      OK    27 degrees C / 80 degrees F
  Firmware version      0x36
  Fan 0      5940 RPM
  DC Output   Voltage(V) Current(A)  Power(W)  Load(%)
              12.00      104      1248      46
PEM 2 status:
  State      Online
  Airflow    Front to Back
  Temperature      OK    30 degrees C / 86 degrees F
  Firmware version      0x36
  Fan 0      5940 RPM
  DC Output   Voltage(V) Current(A)  Power(W)  Load(%)
              12.00      105      1260      46
PEM 3 status:
  State      Present
PEM 4 status:
  State      Present
PEM 5 status:
  State      Present

```

### show chassis environment pem (PTX10016 Router)

user@host> show chassis environment pem

```

PEM 0 status:
  State      Online
  Airflow    Front to Back
  Temperature      OK    21 degrees C / 69 degrees F
  Firmware version      0x36
  Fan 0      5760 RPM
  DC Output   Voltage(V) Current(A)  Power(W)  Load(%)
              12.00      51      612      22
PEM 1 status:
  State      Online
  Airflow    Front to Back
  Temperature      OK    23 degrees C / 73 degrees F
  Firmware version      0x36
  Fan 0      5760 RPM
  DC Output   Voltage(V) Current(A)  Power(W)  Load(%)
              12.00      52      624      23

```

```

PEM 2 status:
  State           Online
  Airflow         Front to Back
  Temperature     OK    23 degrees C / 73 degrees F
  Firmware version 0x36
  Fan 0           5760 RPM
  DC Output       Voltage(V) Current(A) Power(W) Load(%)
                  12.00      51          612      22

PEM 3 status:
  State           Online
  Airflow         Front to Back
  Temperature     OK    21 degrees C / 69 degrees F
  Firmware version 0x36
  Fan 0           5760 RPM
  DC Output       Voltage(V) Current(A) Power(W) Load(%)
                  12.00      51          612      22

PEM 4 status:
  State           Online
  Airflow         Front to Back
  Temperature     OK    22 degrees C / 71 degrees F
  Firmware version 0x36
  Fan 0           5760 RPM
  DC Output       Voltage(V) Current(A) Power(W) Load(%)
                  12.00      52          624      23

PEM 5 status:
  State           Online
  Airflow         Front to Back
  Temperature     OK    24 degrees C / 75 degrees F
  Firmware version 0x36
  Fan 0           5700 RPM
  DC Output       Voltage(V) Current(A) Power(W) Load(%)
                  12.00      51          612      22

PEM 6 status:
  State           Online
  Airflow         Front to Back
  Temperature     OK    21 degrees C / 69 degrees F
  Firmware version 0x36
  Fan 0           5700 RPM
  DC Output       Voltage(V) Current(A) Power(W) Load(%)
                  12.00      50          600      22

```

**show chassis environment pem (T320 Router)**

user@host> **show chassis environment pem**

```

PEM 0 status:
  State                Online
  Temperature           OK
  DC input:            OK

```

### show chassis environment pem (T640 Router)

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

```

PEM 0 status:
  State                Online
  Temperature           22 degrees C / 71 degrees F
  AC input: OK
  DC output:
    Voltage    Current    Power    Load
    FPC 0      56875      606      34      4
    FPC 1      57016      525      29      3
    FPC 2        0         0         0      0
    FPC 3        0         0         0      0
    FPC 4        0         0         0      0
    FPC 5        0         0         0      0
    FPC 6      57158     1581      90     12
    FPC 7        0         0         0      0
    SCG/CB/SIB 56750     1125      63      5

```

### show chassis environment pem (T4000 Router)

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

```

PEM 0 status:
  State                Online
  Temperature           33 degrees C / 91 degrees F
  DC Input:            OK
    Voltage(V)  Current(A)  Power(W)  Load(%)
    INPUT 0     54.625     9.812     535     22
    INPUT 1     54.625    10.250     559     23
    INPUT 2     55.125     0.125        6      0
    INPUT 3     54.500    10.062     548     22
    INPUT 4     54.750     9.375     513     21
    INPUT 5     54.750    10.187     557     23
  DC Output      Voltage(V)  Current(A)  Power(W)  Load(%)
    FPC 0        55.750    10.125     564     37
    FPC 1        51.625     0.000        0      0
    FPC 2        52.000     0.000        0      0

```

FPC 3	55.062	10.437	574	38
FPC 4	52.125	0.000	0	0
FPC 5	55.000	9.375	515	34
FPC 6	55.187	9.687	534	35
FPC 7	51.437	0.000	0	0
SCG/CB/SIB	55.375	15.750	872	35
FAN	54.562	14.750	804	42

### show chassis environment pem (T640/T1600/T4000 Routers With Six-Input DC Power Supply)

user@host> show chassis environment pem

```

PEM 1 status:
  State                Online
  Temperature          36 degrees C / 96 degrees F
  DC Input:            OK
                        Voltage(V)  Current(A)  Power(W)  Load(%)
  INPUT 0               0.000       0.000      0         0
  INPUT 1               54.875       3.812     209       27
  INPUT 2               55.375       3.937     218       29
  INPUT 3               54.625       3.750     204       27
  INPUT 4               55.125       3.375     186       24
  INPUT 5               55.125       3.375     186       24
  DC Output             Voltage(V)  Current(A)  Power(W)  Load(%)
  FPC 0                 52.312       0.000      0         0
  FPC 1                 52.687       0.000      0         0
  FPC 2                 52.812       0.000      0         0
  FPC 3                 55.812       7.062     394       52
  FPC 4                 52.625       0.000      0         0
  FPC 5                 52.625       0.000      0         0
  FPC 6                 52.750       0.000      0         0
  FPC 7                 52.750       0.000      0         0
  SCG/CB/SIB            55.937     11.937     667       55
  FAN                   55.812       4.937     275       36

```

### show chassis environment pem lcc (TX Matrix Routing Matrix)

user@host> show chassis environment pem 0 lcc 0

```
lcc0-re0:
```

```
-----
PEM 0 status:
```

```
  State                Present
```

```

Temperature                27 degrees C / 80 degrees F
DC input:                   Check
DC output:                   Voltage    Current    Power    Load
    FPC 0                    0          0          0        0
    FPC 1                    0          0          0        0
    FPC 2                    0          0          0        0
    FPC 3                    0          0          0        0
    FPC 4                    0          0          0        0
    FPC 5                    0          0          0        0
    FPC 6                    0          0          0        0
    FPC 7                    0          0          0        0
    SCG/CB/SIB               0          0          0        0

```

### show chassis environment pem scc (TX Matrix Routing Matrix)

user@host> show chassis environment pem scc

```

scc-re0:
-----
PEM 1 status:
  State                Online
  Temperature          24 degrees C / 75 degrees F
  DC input:            OK
  DC output:            Voltage    Current    Power    Load
    SIB 0               0          0          0        0
    SIB 1               0          0          0        0
    SIB 2               0          0          0        0
    SIB 3               56550      0          0        0
    SIB 4               55958      6912       386       51

```

### show chassis environment pem sfc (TX Matrix Plus Routing Matrix)

user@host> show chassis environment pem sfc 0

```

sfc0-re0:
-----
PEM 0 status:
  State                Online
  Temperature          35 degrees C / 95 degrees F
  DC Input:            OK
  DC Output            Voltage    Current    Power    Load
    Channel 0           53820     14140      761      59
    Channel 1           53550     12720      681      53

```

Channel 2	53840	12930	696	54
Channel 3	53690	14990	804	63
Channel 4	53620	15070	808	63
Channel 5	53900	14820	798	62
Channel 6	54120	5020	271	21

### show chassis environment pem lcc (TX Matrix Plus Routing Matrix)

user@host> show chassis environment lcc 0

lcc0-rel:

-----  
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**.

## show chassis environment routing-engine

### List of Syntax

[Syntax on page 432](#)

[Syntax \(TX Matrix Routers\) on page 432](#)

[Syntax \(TX Matrix Plus Routers\) on page 432](#)

[Syntax \(MX104, MX2010, MX2020, MX10003, MX204, and MX2008 Universal Routing Platforms\) on page 432](#)

[Syntax \(MX Series and PTX Series Devices\) on page 432](#)

[Syntax \(QFX Series and OCX Series\) on page 433](#)

[Syntax \(EX9251 and EX9253 Switches; ACX500, ACX5048 and ACX5096 Routers\) on page 433](#)

### 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
```

### Release Information

Command introduced before Junos OS Release 7.4.

Command introduced in Junos OS Release 9.0 for EX Series switches.

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

Command introduced in Junos OS Release 11.1 for the QFX Series.

Command introduced in Junos OS Release 12.1 for the PTX Series Packet Transport Routers and T4000 Core Routers.

Command introduced in Junos OS Release 12.3 for MX2010 and MX2020 Universal Routing Platforms.

Command introduced in Junos OS Release 13.2 for MX104 Universal Routing Platforms.

Command introduced in Junos OS Release 15.1X54-D20 for ACX5048 and ACX5096 Routers.

Command introduced in Junos OS Release 17.2 for MX2008 and PTX10008 Routers.

Command introduced in Junos OS Release 17.3 for MX150 Router Appliance and MX10003 Universal Routing Platforms.

Command introduced in Junos OS Release 17.4 for MX204 Universal Routing Platforms.

Command introduced in Junos OS Release 18.1R1 for EX9251 Switches.

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

### 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 *name***—(QFabric systems only) (Optional) Display environmental information about the Routing Engines for the Interconnect device.

**lcc *number***—(TX Matrix router and TX Matrix Plus router only) (Optional) Line-card chassis number.

Replace *number* with the following values depending on the LCC configuration:

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**local**—(MX Series routers only) (Optional) Display environmental information about the Routing Engines in the local Virtual Chassis member.

**member *member-id***—(MX Series routers only) (Optional) Display environmental information about the Routing Engines in the specified member in the Virtual Chassis configuration. Replace *member-id* with the value of 0 or 1.

**satellite [*fpc-slot slot-id* | *device-alias alias-name*]**—(Junos Fusion only)(Optional) Display environmental information for the specified satellite device in a Junos Fusion, or for all satellite devices in the Junos Fusion if no satellite devices are specified.

**scc**—(TX Matrix router only) (Optional) Display environmental information about the Routing Engine in the TX Matrix router (switch-card chassis).

**sfc**—(TX Matrix Plus router only) (Optional) Display environmental information about the Routing Engine in the TX Matrix Plus router (or switch-fabric chassis).

**slot**—(Optional) Display environmental information about an individual Routing Engine. On M10i, M20, M40e, M120, M160, M320, MX Series, MX104 routers, MX2010 routers, MX2020 routers, MX2008 routers, and T Series routers, replace *slot* with 0 or 1. On M5, M7i, M10, and M40 routers, replace *slot* with 0. On EX3200 and EX4200 standalone switches, replace *slot* with 0. On EX4200 switches in a Virtual Chassis configuration and on EX8208 and EX8216 switches, replace *slot* with 0 or 1. On the QFX3500 switch, there is only one Routing Engine, so you do not need to specify the slot number. On PTX Series Packet Transport Routers, replace *slot* with 0 or 1.

### Required Privilege Level

view

### RELATED DOCUMENTATION

[request chassis routing-engine master](#)

[show chassis routing-engine](#) | 501

## List of Sample Output

[show chassis environment routing-engine \(Nonredundant\) on page 436](#)  
[show chassis environment routing-engine \(Redundant\) on page 436](#)  
[show chassis environment routing-engine \(MX150\) on page 436](#)  
[show chassis environment routing-engine \(MX104 Router\) on page 436](#)  
[show chassis environment routing-engine \(MX2010 Router\) on page 437](#)  
[show chassis environment routing-engine \(MX2020 Router\) on page 437](#)  
[show chassis environment routing-engine \(MX2008 Router\) on page 437](#)  
[show chassis environment routing-engine \(TX Matrix Plus Router\) on page 438](#)  
[show chassis environment routing-engine \(T4000 Core Router\) on page 438](#)  
[show chassis environment routing-engine \(QFX Series and OCX Series\) on page 438](#)  
[show chassis environment routing-engine interconnect-device \(QFabric System\) on page 439](#)  
[show chassis environment routing-engine \(PTX5000 Packet Transport Router\) on page 439](#)  
[show chassis environment routing-engine \(PTX10008 Router\) on page 439](#)  
[show chassis environment routing-engine \(PTX10016 Router\) on page 440](#)  
[show chassis environment routing-engine \(ACX5048 and ACX5096 Routers\) on page 440](#)  
[show chassis environment routing-engine \(ACX500 Routers\) on page 440](#)  
[show chassis environment routing-engine \(PTX5000 \(RE-PTX-X8-64G\), MX240 \(RE-S-X6-64G\), MX480 \(RE-S-X6-64G\), MX960 \(RE-S-X6-64G\), MX2010 \(RE-MX2K-X8-64G\), MX2020 \(RE-MX2K-X8-64G\) on page 440](#)  
[show chassis environment routing-engine \(MX204 Routers\) on page 441](#)  
[show chassis environment routing-engine \(MX10008 Routers\) on page 441](#)  
[show chassis environment routing-engine \(EX9251 Switches\) on page 441](#)  
[show chassis environment routing-engine \(EX9253 Switches\) on page 441](#)

## Output Fields

Table 12 on page 435 lists the output fields for the **show chassis environment routing-engine** command. Output fields are listed in the approximate order in which they appear.

Table 12: show chassis environment routing-engine Output Fields

Field Name	Field Description
Routing engine slot status	Number of the Routing Engine slot: 0 or 1.
State	Status of the Routing Engine: <ul style="list-style-type: none"> <li>• Online Master—Routing Engine is online, operating as Master.</li> <li>• Online Standby—Routing Engine is online, operating as Standby.</li> <li>• Offline—Routing Engine is offline.</li> </ul>
Temperature	Temperature of the air flowing past the Routing Engine.

Table 12: show chassis environment routing-engine Output Fields (*continued*)

Field Name	Field Description
CPU Temperature	(PTX Series and T4000 Core Routers only) Temperature of the air flowing past the Routing Engine CPU.

## Sample Output

### show chassis environment routing-engine (Nonredundant)

```
user@host> show chassis environment routing-engine
```

```
Routing Engine 0 status:
  State                Online Master
  Temperature           27 degrees C / 80 degrees
```

### show chassis environment routing-engine (Redundant)

```
user@host> show chassis environment routing-engine
```

```
Route Engine 0 status:
  State:                Online Master
  Temperature:          26 degrees C / 78 degrees F
Route Engine 1 status:
  State:                Online Standby
  Temperature:          26 degrees C / 78 degrees F
```

### show chassis environment routing-engine (MX150)

```
user@ host >show chassis environment routing-engine
```

```
Routing Engine 0 status:
  State                Online Master
  CPU Temperature      42 degrees C / 107 degrees F
```

### show chassis environment routing-engine (MX104 Router)

```
user@ host >show chassis environment routing-engine
```

```

Routing Engine 0 status:
  State                Online Master
  Temperature           34 degrees C / 93 degrees F
  CPU Temperature       43 degrees C / 109 degrees F
Routing Engine 1 status:
  State                Online Standby
  Temperature           33 degrees C / 91 degrees F
  CPU Temperature       39 degrees C / 102 degrees F

```

### show chassis environment routing-engine (MX2010 Router)

```
user@host> show chassis environment routing-engine
```

```

Routing Engine 0 status:
  State                Online Master
  Temperature           37 degrees C / 98 degrees F
  CPU Temperature       37 degrees C / 98 degrees F
Routing Engine 1 status:
  State                Online Standby
  Temperature           35 degrees C / 95 degrees F
  CPU Temperature       34 degrees C / 93 degrees F

```

### show chassis environment routing-engine (MX2020 Router)

```
user@host> show chassis environment routing-engine
```

```

Routing Engine 0 status:
  State                Online Master
  Temperature           35 degrees C / 95 degrees F
  CPU Temperature       34 degrees C / 93 degrees F
Routing Engine 1 status:
  State                Online Standby
  Temperature           44 degrees C / 111 degrees F
  CPU Temperature       43 degrees C / 109 degrees F

```

### show chassis environment routing-engine (MX2008 Router)

```
user@host> show chassis environment routing-engine
```

```

Routing Engine 0 status:
  State                Online Master
  CPU Temperature       75 degrees C / 167 degrees F

```



```

Routing Engine 1 status:
  State                Online Standby
  CPU Temperature      47 degrees C / 116 degrees F

```

### show chassis environment routing-engine (TX Matrix Plus Router)

```
user@host> show chassis environment routing-engine
```

```

sfc0-re0:
-----
Routing Engine 0 status:
  State                Online Master
  Temperature          26 degrees C / 78 degrees F
Routing Engine 1 status:
  State                Online Standby
  Temperature          28 degrees C / 82 degrees F

lcc0-re0:
-----
Routing Engine 0 status:
  State                Online Master
  Temperature          30 degrees C / 86 degrees F
Routing Engine 1 status:
  State                Online Standby
  Temperature          29 degrees C / 84 degrees F

```

### show chassis environment routing-engine (T4000 Core Router)

```
user@host> show chassis environment routing-engine
```

```

Routing Engine 0 status:
  State                Online Master
  Temperature          33 degrees C / 91 degrees F
  CPU Temperature      50 degrees C / 122 degrees F
Routing Engine 1 status:
  State                Online Standby
  Temperature          33 degrees C / 91 degrees F
  CPU Temperature      46 degrees C / 114 degrees F

```

### show chassis environment routing-engine (QFX Series and OCX Series)

```
user@switch> show chassis environment routing-engine
```

```

Routing Engine 0 status:
  State                Online Master
  Temperature           42 degrees C / 107 degrees F

```

### show chassis environment routing-engine interconnect-device (QFabric System)

```
user@switch> show chassis environment routing-engine interconnect-device interconnect1
```

```

routing-engine interconnect-device interconnect1
Routing Engine 0 status:
  State                Online Standby
  Temperature           52 degrees C / 125 degrees F
Routing Engine 1 status:
  State                Online Master
  Temperature           57 degrees C / 134 degrees F

```

### show chassis environment routing-engine (PTX5000 Packet Transport Router)

```
user@switch> show chassis environment routing-engine
```

```

Routing Engine 0 status:
  State                Online Master
  Temperature           55 degrees C / 131 degrees F
  CPU Temperature       66 degrees C / 150 degrees F
Routing Engine 1 status:
  State                Online Standby
  Temperature           52 degrees C / 125 degrees F
  CPU Temperature       64 degrees C / 147 degrees F

```

### show chassis environment routing-engine (PTX10008 Router)

```
user@switch> show chassis environment routing-engine
```

```

Routing Engine 0 status:
  State                Online Master
  CPU Temperature       40 degrees C / 104 degrees F
Routing Engine 1 status:
  State                Online Standby
  CPU Temperature       40 degrees C / 104 degrees F

```

**show chassis environment routing-engine (PTX10016 Router)**

```
user@switch> show chassis environment routing-engine
```

```
Routing Engine 0 status:
  State                Online Master
  CPU Temperature      33 degrees C / 91 degrees F
Routing Engine 1 status:
  State                Online Standby
  CPU Temperature      38 degrees C / 100 degrees F
```

**show chassis environment routing-engine (ACX5048 and ACX5096 Routers)**

```
user@host> show chassis environment routing-engine
```

```
Routing Engine 0 status:
  State                Online Master
  Temperature          33 degrees C / 91 degrees F
```

**show chassis environment routing-engine (ACX500 Routers)**

```
user@host> show chassis environment routing-engine
```

```
Routing Engine 0 status:
  State                Online Master
  Temperature          54 degrees C / 129 degrees F
```

## Sample Output

**show chassis environment routing-engine (PTX5000 (RE-PTX-X8-64G), MX240 (RE-S-X6-64G), MX480 (RE-S-X6-64G), MX960 (RE-S-X6-64G), MX2010 (RE-MX2K-X8-64G), MX2020 (RE-MX2K-X8-64G))**

```
user@switch> show chassis environment routing-engine
```

```
Routing Engine 0 status:
  State                Online Master
  Temperature          37 degrees C / 98 degrees F
  CPU Temperature      52 degrees C / 125 degrees F
Routing Engine 1 status:
  State                Online Standby
  Temperature          37 degrees C / 98 degrees F
```

CPU Temperature	51 degrees C / 123 degrees F
-----------------	------------------------------

### show chassis environment routing-engine (MX204 Routers)

user@host> show chassis environment routing-engine

Routing Engine 0 status:	
State	Online Master

### show chassis environment routing-engine (MX10008 Routers)

Routing Engine 0 status:	
State	Online Master
CPU Temperature	41 degrees C / 105 degrees F
Routing Engine 1 status:	
State	Online Standby
CPU Temperature	40 degrees C / 104 degrees F

### show chassis environment routing-engine (EX9251 Switches)

user@switch> show chassis environment routing-engine

Routing Engine 0 status:	
State	Online Master

### show chassis environment routing-engine (EX9253 Switches)

user@switch> show chassis environment routing-engine

Routing Engine 0 status:	
State	Online Master
Routing Engine 1 status:	
State	Present

## show chassis firmware

### List of Syntax

[Syntax on page 442](#)

[Syntax \(TX Matrix Routers\) on page 442](#)

[Syntax \(TX Matrix Plus Routers\) on page 442](#)

[Syntax \(MX Series Routers\) on page 442](#)

[Syntax \(MX104, MX204, MX2010, MX2020, MX10003, and MX2008 Universal Routing Platforms\) on page 442](#)

[Syntax \(QFX Series\) on page 442](#)

[Syntax \(ACX5048 and ACX5096 Routers\) on page 443](#)

[Syntax \(EX Series Switches\) on page 443](#)

### 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]>
```

### Release Information

Command introduced before Junos OS Release 7.4.

Command introduced in Junos OS Release 9.4 for EX Series switches.

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.

Command introduced in Junos OS Release 11.1 for QFX Series.

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

Command introduced in Junos OS Release 12.3 for MX2010 and MX2020 Universal Routing Platforms, and ACX4000 Universal Metro Routers.

Command introduced in Junos OS Release 13.2 for MX104 Universal Routing Platforms.

Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

Command introduced in Junos OS Release 15.1X54-D20 for ACX5048 and ACX5096 Routers.

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

Command introduced in Junos OS Release 17.2 for MX2008 and PTX10008 Routers.

Command introduced in Junos OS Release 17.3 for MX10003 Universal Routing Platforms and MX150 Router Appliance.

Command introduced in Junos OS Release 17.4 for MX204 Universal Routing Platforms.

Command introduced in Junos OS Release 18.1R1 for EX9251 switches.

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

### Description

On routers and switches, display the version levels of the firmware running on the System Control Board (SCB), Switching and Forwarding Module (SFM), System and Switch Board (SSB), Forwarding Engine Board

(FEB), Flexible PIC Concentrators (FPCs), and Routing Engines. On a TX Matrix Plus router, display the version levels of the firmware running on the FPCs and the Switch Processor Mezzanine Board (SPMBs).

On EX2200, EX3200, EX4200, QFX Series, and OCX Series switches, display the version levels of the firmware running on the switch. On an EX8208 switch, display the version levels of the firmware running on the Switch Fabric and Routing Engine (SRE) modules and on the line cards (shown as FPCs). On an EX8216 switch, display the version levels of the firmware running on the Routing Engine (RE) modules and on the line cards (shown as FPCs).

### Options

**none**—Display the version levels of the firmware running. For an EX4200 switch that is a member of a Virtual Chassis, display version levels for all members. For a TX Matrix router, display version levels for the firmware on the TX Matrix router and on all the T640 routers connected to the TX Matrix router. For a TX Matrix Plus router, display version levels for the firmware on the TX Matrix Plus router and on all the routers connected to the TX Matrix Plus router.

**all-members**—(MX Series routers only) (Optional) Display the version levels of the firmware running for all members of the Virtual Chassis configuration.

**interconnect-device *name***—(QFabric systems) (Optional) Display the version levels of the firmware running on the Interconnect device.

**lcc *number***—(TX Matrix and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display version levels for the firmware on a specified T640 router (line-card chassis) that is connected to the TX Matrix router. On a TX Matrix Plus router, display the version levels for the firmware on a specified router (line-card chassis) that is connected to the TX Matrix Plus router.

Replace *number* with the following values depending on the LCC configuration:

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**local**—(MX Series routers only) (Optional) Display the version levels of the firmware running for the local Virtual Chassis member.

**member *member-id***—(MX Series routers only) (Optional) Display the version levels of the firmware running for the specified member of the Virtual Chassis configuration. Replace *member-id* with a value of 0 or 1.

**node-device**—(QFabric systems only) (Optional) Display the version levels of the firmware running on the Node device.

**satellite** [*slot-id slot-id* | *device-alias alias-name*]  
—(Junos Fusion only) (Optional) Display version levels of the firmware running for the specified satellite device or devices in a Junos Fusion, or for all satellite devices if no satellite devices are specified.

**scc**—(TX Matrix router only) (Optional) Display version levels for the firmware on the TX Matrix router (switch-card chassis).

**sfc number**—(TX Matrix Plus router only) (Optional) Display version levels for the firmware on the TX Matrix Plus router (or switch-fabric chassis). Replace *number* with 0.

**detail**—(EX3200, EX3300, EX4200, and EX4500 standalone and Virtual Chassis member switches only) (Optional) Display version levels of the firmware running on the switch for its programmable hardware components.

### Required Privilege Level

view

### List of Sample Output

[show chassis firmware \(M10 Router\) on page 447](#)  
[show chassis firmware \(M20 Router\) on page 447](#)  
[show chassis firmware \(M40 Router\) on page 447](#)  
[show chassis firmware \(M160 Router\) on page 448](#)  
[show chassis firmware \(MX150\) on page 448](#)  
[show chassis firmware \(MX104 Router\) on page 448](#)  
[show chassis firmware \(MX240 Router\) on page 449](#)  
[show chassis firmware \(MX480 Router\) on page 449](#)  
[show chassis firmware \(MX960 Router\) on page 449](#)  
[show chassis firmware \(MX2020 Router\) on page 449](#)  
[show chassis firmware \(MX204 Router\) on page 450](#)  
[show chassis firmware \(MX10008 Router\) on page 451](#)  
[show chassis firmware \(MX240, MX480, MX960 Router with Application Services Modular Line Card\) on page 452](#)  
[show chassis firmware \(EX4200 Switch\) on page 452](#)  
[show chassis firmware \(EX8200 Switch\) on page 452](#)  
[show chassis firmware \(EX9200 Switch\) on page 453](#)  
[show chassis firmware \(EX9251 Switch\) on page 453](#)  
[show chassis firmware \(EX9253 Switch\) on page 453](#)  
[show chassis firmware lcc \(TX Matrix Router\) on page 454](#)  
[show chassis firmware scc \(TX Matrix Router\) on page 454](#)  
[show chassis firmware \(TX Matrix Plus Router\) on page 454](#)  
[show chassis firmware lcc \(TX Matrix Plus Router\) on page 456](#)  
[show chassis firmware sfc \(TX Matrix Plus Router\) on page 457](#)  
[show chassis firmware \(QFX Series and OCX Series\) on page 457](#)  
[show chassis firmware \(PTX1000 Packet Transport Routers\) on page 458](#)



[show chassis firmware \(PTX10008 Routers\) on page 458](#)

[show chassis firmware interconnect-device \(QFabric System\) on page 459](#)

[show chassis firmware \(ACX2000 Universal Metro Router\) on page 459](#)

[show chassis firmware detail \(EX3300 Switch\) on page 459](#)

[show chassis firmware \(MX Routers with Media Services Blade \[MSB\]\) on page 459](#)

[show chassis firmware \(ACX5048 Router\) on page 460](#)

[show chassis firmware \(ACX5096 Router\) on page 460](#)

[show chassis firmware \(ACX500 Router\) on page 461](#)

## Output Fields

Table 13 on page 446 lists the output fields for the show chassis firmware command. Output fields are listed in the approximate order in which they appear.

Table 13: show chassis firmware Output Fields

Field Name	Field Description
<b>Part</b>	(MX Series, MX2010, MX2020, and MX2008 routers) Chassis part name.
<b>Type</b>	(MX Series, MX2010, MX2020, and MX2008 routers) Type of firmware: On routers: ROM or O/S. On switches: uboot or loader.
<b>Version</b>	(MX Series, MX2010, MX2020, and MX2008 routers) Version of firmware running on the chassis part.
<b>FPC</b>	( <i>detail</i> option only) Number of FPC. 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.
<b>AFEB</b>	(MX104 routers) Version of the compact Forwarding Engine Board.
<b>Boot</b>	( <i>detail</i> option only) Version of the SYSPLD.
<b>PoE</b>	( <i>detail</i> option only) Version of the PoE firmware.
<b>PFE-<i>&lt;number&gt;</i></b>	( <i>detail</i> option only) Version of the Packet Forwarding Engine used in the switch.
<b>PHY-</b>	( <i>detail</i> option only) Version of the physical layer device (PHY) used in the switch.

Table 13: show chassis firmware Output Fields (*continued*)

Field Name	Field Description
<b>microcode</b>	( <i>detail</i> option only) Microcode of the physical layer devices (PHY) used in the switch.
<b>uboot</b>	( <i>detail</i> option only) Version of the u-boot used in the switch.
<b>loader</b>	( <i>detail</i> option only) Version of the loader used in the switch.

## Sample Output

### show chassis firmware (M10 Router)

```
user@host> show chassis firmware
```

Part	Type	Version
Forwarding engine board	ROM	Juniper ROM Monitor Version 4.1b2
	O/S	Version 4.1I1 by usera on 2000-04-24 11:27

### show chassis firmware (M20 Router)

```
user@host> show chassis firmware
```

Part	Type	Version
System switch board	ROM	Juniper ROM Monitor Version 3.4b26
	O/S	Version 3.4I16 by userc on 2000-02-29 2
FPC 1	ROM	Juniper ROM Monitor Version 3.0b1
	O/S	Version 3.4I4 by userc on 2000-02-25 21
FPC 2	ROM	Juniper ROM Monitor Version 3.0b1
	O/S	Version 3.4I4 by userc on 2000-02-25 21

### show chassis firmware (M40 Router)

```
user@host> show chassis firmware
```

Part	Type	Version
System control board	ROM	Juniper ROM Monitor Version 2.0i126Copyri
	O/S	Version 2.0i1 by root on Thu Jul 23 00:51

FPC 5	ROM	Juniper ROM Monitor Version 2.0i49Copyrig
	O/S	Version 2.0i1 by root on Thu Jul 23 00:59

### show chassis firmware (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-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

### show chassis firmware sfc (TX Matrix Plus Router)

user@host> show chassis firmware sfc 0

```
sfc0-re0:
-----
Part                Type      Version
Global FPC 4
Global FPC 6
Global FPC 7
Global FPC 12
Global FPC 14
Global FPC 15
Global FPC 20
Global FPC 21
Global FPC 22
Global FPC 23
Global FPC 24
Global FPC 25
Global FPC 26
Global FPC 28
Global FPC 29
Global FPC 31
SPMB 0              ROM      Juniper ROM Monitor Version 9.5b1
                   O/S      Version 9.6-20090507.0 by userb on 2009-0
SPMB 1              ROM      Juniper ROM Monitor Version 9.5b1
                   O/S      Version 9.6-20090507.0 by userb on 2009-0
```

### show chassis firmware (QFX Series and OCX Series)

user@switch> show chassis firmware

Part	Type	Version
FPC 0		
Routing Engine 0	U-Boot loader	U-Boot 1.1.6 (Sep 15 2010 - 02:11:11) 1.0.5 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 - 22:56:52)	U-Boot	Bank A: U-Boot 2011.12-gfbea47a (Feb 26 2016
	CTRL FPGA	4.1
	PORT FPGA	2.0
FPC 5 - 22:56:52)	U-Boot	Bank A: U-Boot 2011.12-gfbea47a (Feb 26 2016
	CTRL FPGA	3.1
	PORT FPGA	2.0
FPC 6 - 22:56:52)	U-Boot	Bank B: U-Boot 2011.12-gfbea47a (Feb 26 2016
	CTRL FPGA	3.1
	PORT FPGA	2.0

FPM	FPGA	1.9
FTC 0	FPGA	2.0
FTC 1	FPGA	2.0
SIB 0	FPGA	3.0
SIB 1	FPGA	3.0

### show chassis firmware interconnect-device (QFabric System)

```
user@switch> show chassis firmware interconnect-device interconnect1
```

Part	Type	Version
Routing Engine 0	U-Boot	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_16ql.0 by userb
on 2015-08-15 04:18:02 UTC		
FEB	O/S	Version 15.2-20150815_dev_rbu_1_16ql.0 by userb
on 2015-08-15 04:18:02 UTC		



## show chassis fan

### List of Syntax

[Syntax on page 462](#)

[Syntax \(MX Series Routers\) on page 462](#)

[Syntax \(MX104, MX204, MX2010, MX2020, MX2008, and MX10003 Universal Routing Platform\) on page 462](#)

[Syntax \(QFX Series\) on page 462](#)

[Syntax \(TX Matrix Router\) on page 462](#)

[Syntax \(TX Matrix Plus Router\) on page 462](#)

### 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>
```

## 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.

Command introduced in Junos OS Release 11.1 for the QFX Series.

Command introduced in Junos OS Release 11.4 for EX Series switches.

Command introduced in Junos OS Release 12.1 for T4000 routers.

Command introduced in Junos OS Release 12.3 for MX2010 and MX2020 Universal Routing Platforms, PTX5000 Packet Transport Routers, and ACX Series Routers.

Command introduced in Junos OS Release 13.2 for MX104 Universal Routing Platforms.

Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

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

Command introduced in Junos OS Release 17.2 for MX2008 and PTX10008 Routers.

Command introduced in Junos OS Release 17.3 for MX150 Router Appliance.

Command introduced in Junos OS Release 17.4 for MX204 Universal Routing Platforms.

Command introduced in Junos OS Release 18.1R1 for EX9251 Switches.

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

Command output introduced for Junos OS Evolved Release 19.1R1.

## 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 *member-id***—(MX Series routers only) (Optional) Display information about the fan tray and fans for the specified member of the Virtual Chassis configuration. For an MX Series Virtual Chassis, replace *member-id* variable with a value 0 or 1.

**interconnect-device *name***—(QFX3000-G QFabric systems only) (Optional) Display information about the fan tray and fans for the specified QFX3008-I Interconnect device.

**lcc *number***—(TX Matrix and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display information about the fan tray and fans for the specified T640 router (line-card chassis) that is connected to a TX Matrix router. On a TX Matrix Plus router, display information about the fan tray and fans for the specified router (line-card chassis) that is connected to a TX Matrix Plus router.

Replace *number* with the following values depending on the LCC configuration:

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**satellite** [*slot-id slot-id* | *device-alias alias-name*]—(Junos Fusion only) (Optional) Display information about the fan tray and fans for the specified satellite device or devices in a Junos Fusion, or for all satellite devices if no satellite devices are specified.

**scc**—(TX Matrix routers only) (Optional) Display information about the fan tray and fans for the TX Matrix router (switch-card chassis).

**sfc number**—(TX Matrix Plus routers only) (Optional) Display information about the fan tray and fans for the TX Matrix Plus router (switch-fabric chassis). Replace *number* variable with 0.

### Required Privilege Level

view

### List of Sample Output

[show chassis fan on page 465](#)

[show chassis fan \(QFabric Systems\) on page 466](#)

[show chassis fan \(EX Series Switches\) on page 468](#)

[show chassis fan \(T4000 Core Router\) on page 468](#)

[show chassis fan \(TX Matrix Router\) on page 469](#)

[show chassis fan \(TX Matrix Plus Router\) on page 470](#)

[show chassis fan \(TX Matrix Plus Router with 3D SIBs\) on page 472](#)

[show chassis fan \(PTX5000 Packet Transport Router\) on page 475](#)

[show chassis fan \(MX150\) on page 475](#)

[show chassis fan \(MX104 Router\) on page 476](#)

[show chassis fan \(MX2010 Router\) on page 476](#)

[show chassis fan \(ACX4000 Router\) on page 477](#)

[show chassis fan \(ACX5048 Router\) on page 477](#)

[show chassis fan \(QFX5100 Switch and OCX Series\) on page 477](#)

[show chassis fan \(EX9251 switches\) on page 477](#)

[show chassis fan \(EX9253 switches\) on page 478](#)

[show chassis fan \(Junos OS Evolved\) on page 478](#)

### Output Fields

Table 14 on page 465 lists the output fields for the **show chassis fan** command. Output fields are listed in the approximate order in which they appear.

Table 14: show chassis fan Output Fields

Field Name	Field Description
<b>Item</b>	Fan item identifier.
<b>Status</b>	Status of the fan: <ul style="list-style-type: none"> <li>• <b>OK</b>—Fan is running properly and within the normal range.</li> <li>• <b>Check</b>—Fan is in <b>Check</b> state because of some fault or alarm condition.</li> </ul>
<b>RPM</b>	(T Series routers, TX Matrix routers, TX Matrix Plus routers, MX Series 5G Universal Routing Platforms, QFX3108 Interconnect devices, and EX Series switches only) Fan speed in revolutions per minute (RPM).
<b>% RPM</b>	(PTX10003, MX2010 routers, MX2020 routers, MX2008 routers, and PTX Series Packet Transport Routers only) Percentage of the fan speed being used.
<b>Measurement</b>	(T Series routers, TX Matrix routers, TX Matrix Plus routers, MX Series 5G Universal Routing Platforms, QFX3108 Interconnect devices, and EX Series switches only) Fan speed status based on different chassis cooling requirements: <ul style="list-style-type: none"> <li>• Spinning at high speed</li> <li>• Spinning at intermediate speed</li> <li>• Spinning at normal speed</li> <li>• Spinning at low speed (except EX Series switches)</li> </ul> (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.

## 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

## show chassis hardware

### List of Syntax

[Syntax on page 479](#)

[Syntax \(EX Series, MX104, MX204, MX2010, MX2020, MX10003, MX10008, and MX2008 Universal Routing Platforms\) on page 479](#)

[Syntax \(TX Matrix Router\) on page 479](#)

[Syntax \(TX Matrix Plus Router\) on page 479](#)

[Syntax \(MX Series Routers\) on page 480](#)

[Syntax \(QFX Series\) on page 480](#)

### 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>
```

## Release Information

Command introduced before Junos OS Release 7.4.

**models** option introduced in Junos OS Release 8.2.

Command introduced in Junos OS Release 9.0 for EX Series switches.

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

Command introduced in Junos OS Release 11.1 for QFX Series.

Command introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers.

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

Command introduced in Junos OS Release 12.3 for MX2010 and MX2020 Universal Routing Platforms.

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

Command introduced in Junos OS Release 15.1X54-D20 for ACX5048 and ACX5096 Routers.

Command introduced in Junos OS Release 17.2 for MX2008 Universal Routing Platforms and PTX10008 Routers.

Command introduced in Junos OS Release 17.3 for MX10003 Universal Routing Platforms and MX150 Router Appliance.

Command introduced in Junos OS Release 17.4 for MX204 Routers.

Command introduced in Junos OS Release 18.1R1 for EX9251 Switches.

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

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

## Description

Display a list of all Flexible PIC Concentrators (FPCs) and PICs installed in the router or switch chassis, including the hardware version level and serial number.

In the EX Series switch command output, FPC refers to the following:

- On EX2200 switches, EX3200 switches, EX4200 standalone switches, and EX4500 switches—Refers to the switch; FPC *number* is always 0.
- On EX4200 switches in a Virtual Chassis configuration—Refers to the member of a Virtual Chassis; FPC *number* equals the member ID, from 0 through 9.
- On EX8208 and EX8216 switches—Refers to a line card; FPC *number* equals the slot number for the line card.

On QFX3500, QFX5100, and OCX Series standalone switches, and PTX1000 routers both the FPC and FPC *number* are always 0.

On T4000 Type 5 FPCs, there are no **top temperature sensor** or **bottom temperature sensor** parameters. Instead, **fan intake temperature sensor** and **fan exhaust temperature sensors** parameters are displayed.

Starting from Junos OS Release 11.4, the output of the **show chassis hardware models** operational mode command displays the enhanced midplanes FRU model numbers (CHAS-BP3-MX240-S, CHAS-BP3-MX480-S or CHAS-BP3-MX960-S) based on the router. Prior to release 11.4, the FRU model numbers are left blank when the router has enhanced midplanes. Note that the enhanced midplanes are introduced through the Junos OS Release 13.3, but can be supported on all Junos OS releases.

Starting with Junos OS Release 14.1, the output of the **show chassis hardware detail | extensive | clei-models | models** operational mode command displays the new DC power supply module (PSM) and power distribution unit (PDU) that are added to provide power to the high-density FPC (FPC2-PTX-P1A) and other components in a PTX5000 Packet Transport Router.

## Options

**none**—Display information about hardware. For a TX Matrix router, display information about the TX Matrix router and its attached T640 routers. For a TX Matrix Plus router, display information about the TX Matrix Plus router and its attached routers.

**clei-models**—(Optional) Display Common Language Equipment Identifier (CLEI) barcode and model number for orderable field-replaceable units (FRUs).

**detail**—(Optional) Include RAM and disk information in output.

**extensive**—(Optional) Display ID EEPROM information.

**all-members**—(MX Series routers only) (Optional) Display hardware-specific information for all the members of the Virtual Chassis configuration.

**interconnect-device *name***—(QFabric systems only) (Optional) Display hardware-specific information for the Interconnect device.

**lcc *number***—(TX Matrix routers and TX Matrix Plus router only) (Optional) On a TX Matrix router, display hardware information for a specified T640 router (line-card chassis) that is connected to the TX Matrix router. On a TX Matrix Plus router, display hardware information for a specified router (line-card chassis) that is connected to the TX Matrix Plus router.

Replace *number* with the following values depending on the LCC configuration:

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**local**—(MX Series routers only) (Optional) Display hardware-specific information for the local Virtual Chassis members.

**member *member-id***—(MX Series routers and EX Series switches) (Optional) Display hardware-specific information for the specified member of the Virtual Chassis configuration. Replace *member-id* variable with a value 0 or 1.

**models**—(Optional) Display model numbers and part numbers for orderable FRUs and, for components that use ID EEPROM format v2, the CLEI code.

**node-device *name***—(QFabric systems only) (Optional) Display hardware-specific information for the Node device.

**satellite [*slot-id slot-id* | *device-alias alias-name*]**—(Junos Fusion only) (Optional) Display hardware information for the specified satellite device in a Junos Fusion, or for all satellite devices in the Junos Fusion if no satellite devices are specified.

**scc**—(TX Matrix router only) (Optional) Display hardware information for the TX Matrix router (switch-card chassis).

**sfc *number***—(TX Matrix Plus router only) (Optional) Display hardware information for the TX Matrix Plus router (switch-fabric chassis). Replace *number* variable with 0.

### Additional Information

The **show chassis hardware detail** command now displays DIMM information for the following Routing Engines, as shown in [Table 15 on page 483](#).

Table 15: Routing Engines Displaying DIMM Information

Routing Engines	Routers
RE-S-1800x2 and RE-S-1800x4	MX240, MX480, and MX960 routers
RE-A-1800x2	M120 and M320 routers

In Junos OS Release 11.4 and later, the output for the **show chassis hardware models** operational mode command for MX Series routers display the enhanced midplanes FRU model numbers—CHAS-BP3-MX240-S, CHAS-BP3-MX480-S, or CHAS-BP3-MX960-S—based on the router. In releases before Junos OS Release 11.4, the FRU model numbers are left blank when the router has enhanced midplanes. Note that the enhanced midplanes are introduced through Junos OS Release 13.3, but can be supported on all Junos OS releases.

Starting with Junos OS Release 17.3R1, the output of the **show chassis hardware** command displays the mode in which vMX is running (performance mode or lite mode) in the part number field for the FPC. **RIOT-PERF** indicates performance mode and **RIOT-LITE** indicates lite mode.

### Required Privilege Level

view

### RELATED DOCUMENTATION

| [show chassis power](#)

### List of Sample Output

[show chassis hardware \(MX10008 Router\) on page 486](#)

[show chassis hardware clei-models \(PTX10016 Routers\) on page 487](#)

[show chassis hardware detail \(EX9251 Switch\) on page 488](#)

[show chassis hardware extensive \(T640 Router\) on page 489](#)

[show chassis hardware interconnect-device \(QFabric Systems\) on page 490](#)

[show chassis hardware lcc \(TX Matrix Router\) on page 491](#)

[show chassis hardware models \(MX2010 Router\) on page 492](#)

[show chassis hardware node-device \(QFabric Systems\) on page 492](#)

[show chassis hardware scc \(TX Matrix Router\) on page 493](#)

[show chassis hardware sfc \(TX Matrix Plus Router\) on page 493](#)

### Output Fields

[Table 16 on page 484](#) lists the output fields for the **show chassis hardware** command. Output fields are listed in the approximate order in which they appear.

Table 16: show chassis hardware Output Fields

Field Name	Field Description	Level of Output
<b>Item</b>	Show information about the device hardware.	All levels
<b>Version</b>	Revision level of the chassis component.	All levels
<b>Part number</b>	Part number of the chassis component.	All levels
<b>Serial number</b>	Serial number of the chassis component. The serial number of the backplane is also the serial number of the router chassis. Use this serial number when you need to contact Juniper Networks Customer Support about the router or switch chassis.	All levels
<b>Assb ID or Assembly ID</b>	( <b>extensive</b> keyword only) Identification number that describes the FRU hardware.	<b>extensive</b>
<b>Assembly Version</b>	( <b>extensive</b> keyword only) Version number of the FRU hardware.	<b>extensive</b>
<b>Assembly Flags</b>	( <b>extensive</b> keyword only) Flags.	<b>extensive</b>
<b>FRU model number</b>	( <b>clei-models</b> , <b>extensive</b> , and <b>models</b> keyword only) Model number of the FRU hardware component.	none specified
<b>CLEI code</b>	( <b>clei-models</b> and <b>extensive</b> keyword only) Common Language Equipment Identifier code. This value is displayed only for hardware components that use ID EEPROM format v2. This value is not displayed for components that use ID EEPROM format v1.	none specified
<b>EEPROM Version</b>	ID EEPROM version used by the hardware component: <b>0x00</b> (version 0), <b>0x01</b> (version 1), or <b>0x02</b> (version 2).	<b>extensive</b>
<b>Description</b>	<p>Brief description of the hardware item:</p> <ul style="list-style-type: none"> <li>• Type of power supply.</li> <li>• Type of PIC. If the PIC type is not supported on the current software release, the output states <b>Hardware Not Supported</b>.</li> <li>• Type of FPC: <b>FPC Type 1</b>, <b>FPC Type 2</b>, <b>FPC Type 3</b>, <b>FPC Type 4</b> , or <b>FPC TypeOC192</b>.</li> </ul> <p>On EX Series switches, a brief description of the FPC.</p> <p>The following list shows the PIM abbreviation in the output and the corresponding PIM name.</p>	All levels

Table 16: show chassis hardware Output Fields (*continued*)

Field Name	Field Description	Level of Output
	<ul style="list-style-type: none"> <li>• <b>2x FE</b>—Either two built-in Fast Ethernet interfaces (fixed PIM) or dual-port Fast Ethernet PIM</li> <li>• <b>4x FE</b>—4-port Fast Ethernet ePIM</li> <li>• <b>1x GE Copper</b>—Copper Gigabit Ethernet ePIM (one 10-Mbps, 100-Mbps, or 1000-Mbps port)</li> <li>• <b>1x GE SFP</b>—SFP Gigabit Ethernet ePIM (one fiber port)</li> <li>• <b>2x Serial</b>—Dual-port serial PIM</li> <li>• <b>2x T1</b>—Dual-port T1 PIM</li> <li>• <b>2x E1</b>—Dual-port E1 PIM</li> <li>• <b>2x CT1E1</b>—Dual-port channelized T1/E1 PIM</li> <li>• <b>1x T3</b>—T3 PIM (one port)</li> <li>• <b>1x E3</b>—E3 PIM (one port)</li> <li>• <b>4x BRI S/T</b>—4-port ISDN BRI S/T PIM</li> <li>• <b>4x BRI U</b>—4-port ISDN BRI U PIM</li> <li>• <b>1x ADSL Annex A</b>—ADSL 2/2+ Annex A PIM (one port, for POTS)</li> <li>• <b>1x ADSL Annex B</b>—ADSL 2/2+ Annex B PIM (one port, for ISDN)</li> <li>• <b>2x SHDSL (ATM)</b>—G SHDSL PIM (2-port two-wire module or 1-port four-wire module)</li> <li>• <b>1x TGM550</b>—TGM550 Telephony Gateway Module (Avaya VoIP gateway module with one console port, two analog <b>LINE</b> ports, and two analog <b>TRUNK</b> ports)</li> <li>• <b>1x DS1 TIM510</b>—TIM510 E1/T1 Telephony Interface Module (Avaya VoIP media module with one E1 or T1 trunk termination port and ISDN PRI backup)</li> <li>• <b>4x FXS, 4x FX0, TIM514</b>—TIM514 Analog Telephony Interface Module (Avaya VoIP media module with four analog <b>LINE</b> ports and four analog <b>TRUNK</b> ports)</li> <li>• <b>4x BRI TIM521</b>—TIM521 BRI Telephony Interface Module (Avaya VoIP media module with four ISDN BRI ports)</li> <li>• <b>Crypto Accelerator Module</b>—For enhanced performance of cryptographic algorithms used in IP Security (IPsec) services</li> <li>• <b>MPC M 16x 10GE</b>—16-port 10-Gigabit Module Port Concentrator that supports SFP+ optical transceivers. (Not on EX Series switches.)</li> <li>• For hosts, the Routing Engine type.</li> <li>• For small form-factor pluggable transceiver (SFP) modules, the type of fiber: <b>LX</b>, <b>SX</b>, <b>LH</b>, or <b>T</b>.</li> <li>• LCD description for EX Series switches (except EX2200 switches).</li> </ul>	



Table 16: show chassis hardware Output Fields (*continued*)

Field Name	Field Description	Level of Output
	<ul style="list-style-type: none"> <li>• <b>MPC2</b>—1-port MPC2 that supports two separate slots for MICs.</li> <li>• <b>MPC3E</b>—1-port MPC3E that supports two separate slots for MICs (MIC-3D-1X100GE-CFP and MIC-3D-20GE-SFP) on MX960, MX480, and MX240 routers. The MPC3E maps one MIC to one PIC (1 MIC, 1 PIC), which differs from the mapping of legacy MPCs.</li> <li>• 100GBASE-LR4, pluggable CFP optics</li> <li>• Supports the Enhanced MX Switch Control Board with fabric redundancy and existing SCBs without fabric redundancy.</li> <li>• Interoperates with existing MX Series line cards, including Flexible Port Concentrators (FPC), Dense Port Concentrators (DPCs), and Modular Port Concentrators (MPCs).</li> <li>• <b>MPC4E</b>—Fixed configuration MPC4E that is available in two flavors: MPC4E-3D-32XGE-SFPP and MPC4E-3D-2CGE-8XGE on MX2020, MX960, MX480, and MX240 routers.</li> <li>• LCD description for MX Series routers</li> </ul>	

## Sample Output

show chassis hardware (MX10008 Router)

user@host> show chassis hardware

```

Hardware inventory:
Item          Version  Part number  Serial number  Description
Chassis                               DE487         JNP10008 [MX10008]
Midplane      REV 27   750-054097   ACPD4307      Midplane 8
Routing Engine 0                BUILTIN      BUILTIN      RE X10 LT
Routing Engine 1                BUILTIN      BUILTIN      RE X10
CB 0          REV 02   750-079563   CAFF4580      Control Board
CB 1          REV 04   750-079563   CAGL8034      Control Board
..
...
..
4
FPC 3         REV 04   750-084779   CAKR7019      JNP10K-LC2101
  CPU         REV 05   750-073391   CAKJ2854      LC 2101 PMB
  PIC 0                BUILTIN      BUILTIN      4xQSFP28 SYNC
    Xcvr 0      REV 01   740-058734   1ACQ104300K   QSFP-100GBASE-SR4

```

PIC 1			BUILTIN	BUILTIN	4xQSFP28 SYNC
Xcvr 0	REV 01	740-061405	1ACQ12110AN		QSFP-100GBASE-SR4
PIC 2			BUILTIN	BUILTIN	4xQSFP28 SYNC
Xcvr 0	REV 01	740-046565	QG1105B2		QSFP+-40G-SR4
PIC 3			BUILTIN	BUILTIN	4xQSFP28 SYNC
Xcvr 0	REV 01	740-045627	QH08036X		40GBASE eSR4
PIC 4			BUILTIN	BUILTIN	4xQSFP28 SYNC
Xcvr 0	REV 01	740-067443	XWR0RY7		QSFP+-40G-SR4
Xcvr 1	REV 01	740-067443	XWR0RYH		QSFP+-40G-SR4
Xcvr 2	REV 01	740-067443	XWR0RYP		QSFP+-40G-SR4
Xcvr 3	REV 01	740-067443	XWS028S		QSFP+-40G-SR4
PIC 5			BUILTIN	BUILTIN	4xQSFP28 SYNC
Xcvr 3	REV 01	740-058734	1ACQ113406C		QSFP-100GBASE-SR4
FPD Board	REV 07	711-054687	ACPC7142		Front Panel Display
PEM 0	REV 02	740-049388	1EDL62102N9		Power Supply AC
PEM 1	REV 02	740-049388	1EDL60300KX		Power Supply AC
PEM 2	REV 02	740-049388	1EDL60300DL		Power Supply AC
PEM 3	REV 02	740-049388	1EDL61701BT		Power Supply AC
PEM 4	REV 02	740-049388	1EDL62102P7		Power Supply AC
PEM 5	REV 02	740-049388	1EDL62102PP		Power Supply AC
FTC 0	REV 14	750-050108	ACPE4038		Fan Controller 8
FTC 1	REV 14	750-050108	ACPE4032		Fan Controller 8
Fan Tray 0	REV 09	760-054372	ACPD6799		Fan Tray 8
Fan Tray 1	REV 09	760-054372	ACNZ3584		Fan Tray 8
SFB 0	REV 24	750-050058	ACPD4587		Switch Fabric (SIB) 8
SFB 1	REV 24	750-050058	ACNZ0635		Switch Fabric (SIB) 8
SFB 2	REV 24	750-050058	ACPD4908		Switch Fabric (SIB) 8
SFB 3	REV 24	750-050058	ACNZ0617		Switch Fabric (SIB) 8
SFB 4	REV 24	750-050058	ACNZ0527		Switch Fabric (SIB) 8
SFB 5	REV 23	750-050058	ACNX6980		Switch Fabric (SIB) 8

### show chassis hardware clei-models (PTX10016 Routers)

user@host> show chassis hardware clei-models

Hardware inventory:				
Item	Version	Part number	CLEI code	FRU model number
Midplane	REV 24	750-077138	CMMUN00ARA	JNP10016
CB 0	REV 04	711-065897	PROTOXCLEI	PROTO-ASSEMBLY
CB 1	REV 05	711-065897	PROTOXCLEI	PROTO-ASSEMBLY
FPC 2				
PIC 0		BUILTIN		
FPC 4	REV 35	750-071976	CMUIANABAA	JNP10K-LC1101
PIC 0		BUILTIN		

FPC 5	REV 13	750-068822	CMUIAM9BAC	QFX10000-36Q
PIC 0		BUILTIN		
FPC 6	REV 41	750-071976	CMUIANABAB	JNP10K-LC1101
PIC 0		BUILTIN		
FPC 7	REV 35	750-071976	CMUIANABAA	JNP10K-LC1101
PIC 0		BUILTIN		
FPC 8	REV 35	750-071976	CMUIANABAA	JNP10K-LC1101
PIC 0		BUILTIN		
FPC 9	REV 41	750-071976	CMUIANABAB	JNP10K-LC1101
PIC 0		BUILTIN		
FPC 10	REV 35	750-071976	CMUIANABAA	JNP10K-LC1101
PIC 0		BUILTIN		
FPC 11	REV 35	750-071976	CMUIANABAA	JNP10K-LC1101
PIC 0		BUILTIN		
FPC 13	REV 41	750-071976	CMUIANABAB	JNP10K-LC1101
PIC 0		BUILTIN		
FPC 15	REV 37	750-071976	CMUIANABAA	JNP10K-LC1101
PIC 0		BUILTIN		
Power Supply 0	REV 01	740-073147	CMUPADPBAA	JNP10K-PWR-DC
Power Supply 1	REV 01	740-073147	CMUPADPBAA	JNP10K-PWR-DC
Power Supply 2	REV 01	740-073147	CMUPADPBAA	JNP10K-PWR-DC
Power Supply 3	REV 01	740-073147	CMUPADPBAA	JNP10K-PWR-DC
Power Supply 4	REV 01	740-073147	CMUPADPBAA	JNP10K-PWR-DC
Power Supply 5	REV 01	740-073147	CMUPADPBAA	JNP10K-PWR-DC
Power Supply 6	REV 01	740-073147	CMUPADPBAA	JNP10K-PWR-DC
Power Supply 7	REV 01	740-073147	CMUPADPBAA	JNP10K-PWR-DC
Power Supply 8	REV 01	740-073147	CMUPADPBAA	JNP10K-PWR-DC
Power Supply 9	REV 01	740-073147	CMUPADPBAA	JNP10K-PWR-DC
Fan Tray 0				QFX5100-FAN-AFO
Fan Tray 1				QFX5100-FAN-AFO
SIB 0	REV 15	750-077140	CMUCAH6CAA	JNP10016-SF
SIB 1	REV 15	750-077140	CMUCAH6CAA	JNP10016-SF
SIB 2	REV 15	750-077140	CMUCAH6CAA	JNP10016-SF
SIB 3	REV 15	750-077140	CMUCAH6CAA	JNP10016-SF
SIB 4	REV 15	750-077140	CMUCAH6CAA	JNP10016-SF
SIB 5	REV 15	750-077140	CMUCAH6CAA	JNP10016-SF
FPD Board	REV 07	711-054687		

### show chassis hardware detail (EX9251 Switch)

user@switch> show chassis hardware

Hardware inventory:				
Item	Version	Part number	Serial number	Description

```

Chassis                                BLANK                                EX9251
Routing Engine 0                      BUILTIN                            BUILTIN                            RE-S-2X00x6
CB 0                                REV 05    750-069579    CAGT1382                            EX9251
FPC 0                                BUILTIN                            BUILTIN                            MPC
  PIC 0                            BUILTIN                            BUILTIN                            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 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 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
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
PIC 0		BUILTIN	BUILTIN
Xcvr 8	REV 01	740-030658	AD0946A028B
			FPC CPU
			48x 10G-SFP+
			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
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
Midplane      REV 05    710-022574   TS4027         SFC Midplane
FPM Display   REV 03    710-024027   DX0282         TXP FPM Display
CIP 0         REV 04    710-023792   DW4889         TXP CIP
CIP 1         REV 04    710-023792   DW4887         TXP CIP
PEM 0         Rev 07    740-027463   UM26368        Power Entry Module
```



Routing Engine 0	REV 01	740-026942	737A-1064	SFC RE
Routing Engine 1	REV 01	740-026942	737A-1082	SFC RE
CB 0	REV 09	710-022606	DW6099	SFC Control Board
CB 1	REV 09	710-022606	DW6096	SFC Control Board
SPMB 0		BUILTIN		SFC Switch CPU
SPMB 1		BUILTIN		SFC Switch CPU
SIB F13 0	REV 04	710-022600	DX0841	F13 SIB
B Board	REV 03	710-023431	DX0966	F13 SIB Mezz
SIB F13 1	REV 04	750-024564	DW5776	F13 SIB
B Board	REV 03	710-023431	DW9028	F13 SIB
SIB F13 3	REV 04	750-024564	DW5762	F13 SIB
B Board	REV 03	710-023431	DW9059	F13 SIB
SIB F13 4	REV 04	750-024564	DW5797	F13 SIB
B Board	REV 03	710-023431	DW9041	F13 SIB
SIB F13 6	REV 04	750-024564	DW5770	F13 SIB
B Board	REV 03	710-023431	DW9079	F13 SIB Mezz
SIB F13 7	REV 04	750-024564	DW5758	F13 SIB
B Board	REV 03	710-023431	DW9047	F13 SIB
SIB F13 8	REV 04	750-024564	DW5761	F13 SIB
B Board	REV 03	710-023431	DW9043	F13 SIB Mezz
SIB F13 9	REV 04	750-024564	DW5754	F13 SIB
B Board	REV 03	710-023431	DW9078	F13 SIB Mezz
SIB F13 11	REV 04	710-022600	DX0826	F13 SIB
B Board	REV 03	710-023431	DX0967	F13 SIB Mezz
SIB F13 12	REV 04	750-024564	DW5794	F13 SIB
B Board	REV 03	710-023431	DW9044	F13 SIB Mezz
SIB F2S 0/0	REV 05	710-022603	DW7897	F2S SIB
B Board	REV 05	710-023787	DW7657	NEO PMB
SIB F2S 0/2	REV 05	710-022603	DW7833	F2S SIB
B Board	REV 05	710-023787	DW7526	NEO PMB
SIB F2S 0/4	REV 05	710-022603	DW7875	F2S SIB
B Board	REV 05	710-023787	DW7588	NEO PMB
SIB F2S 0/6	REV 05	710-022603	DW7860	F2S SIB
B Board	REV 05	710-023787	DW7589	NEO PMB
SIB F2S 1/0	REV 04	710-022603	DW4820	F2S SIB
B Board	REV 05	710-023787	DW8510	NEO PMB
SIB F2S 1/2	REV 05	710-022603	DW7849	F2S SIB
B Board	REV 05	710-023787	DW7525	NEO PMB
SIB F2S 1/4	REV 05	710-022603	DW7927	F2S SIB
B Board	REV 05	710-023787	DW7556	F2S SIB Mezz
SIB F2S 1/6	REV 05	710-022603	DW7866	F2S SIB
B Board	REV 05	710-023787	DW7651	NEO PMB
SIB F2S 2/0	REV 05	710-022603	DW7880	F2S SIB
B Board	REV 05	710-023787	DW7523	NEO PMB

SIB F2S 2/2	REV 05	710-022603	DW7895	F2S SIB
B Board	REV 05	710-023787	DW7591	NEO PMB
SIB F2S 2/4	REV 05	710-022603	DW7907	F2S SIB
B Board	REV 05	710-023787	DW7590	NEO PMB
SIB F2S 2/6	REV 05	710-022603	DW7785	F2S SIB
B Board	REV 05	710-023787	DW7524	NEO PMB
SIB F2S 3/0	REV 05	710-022603	DW7782	F2S SIB
B Board	REV 05	710-023787	DW7634	NEO PMB
SIB F2S 3/2	REV 05	710-022603	DW7793	F2S SIB
B Board	REV 05	710-023787	DW7548	NEO PMB
SIB F2S 3/4	REV 05	710-022603	DW7779	F2S SIB
B Board	REV 05	710-023787	DW7587	NEO PMB
SIB F2S 3/6	REV 05	710-022603	DW7930	F2S SIB
B Board	REV 05	710-023787	DW7505	NEO PMB
SIB F2S 4/0	REV 05	710-022603	DW7867	F2S SIB
B Board	REV 05	710-023787	DW7656	NEO PMB
SIB F2S 4/2	REV 05	710-022603	DW7917	F2S SIB
B Board	REV 05	710-023787	DW7640	NEO PMB
SIB F2S 4/4	REV 05	710-022603	DW7929	F2S SIB
B Board	REV 05	710-023787	DW7643	NEO PMB
SIB F2S 4/6	REV 05	710-022603	DW7870	F2S SIB
B Board	REV 05	710-023787	DW7635	NEO PMB
Fan Tray 0	REV 06	760-024497	DV7831	Front Fan Tray
Fan Tray 1	REV 06	760-024497	DV9614	Front Fan Tray
Fan Tray 2	REV 06	760-024502	DV9618	Rear Fan Tray
Fan Tray 3	REV 06	760-024502	DV9616	Rear Fan Tray
Fan Tray 4	REV 06	760-024502	DV7807	Rear Fan Tray
Fan Tray 5	REV 06	760-024502	DV7828	Rear Fan Tray

# show chassis led satellite

## Syntax

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

## Release Information

Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.  
Command introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.

## 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

## RELATED DOCUMENTATION

<a href="#">Configuring Satellite Device Alarm Handling Using an Environment Monitoring Satellite Policy in a Junos Fusion   59</a>
<a href="#">Understanding Junos Fusion Provider Edge Components   5</a>
<a href="#">Understanding Junos Fusion Enterprise Components</a>

## List of Sample Output

[show chassis led satellite on page 499](#)

## Output Fields

[Table 17 on page 497](#) lists the output fields for the **show chassis led satellite** command. Output fields are listed in the approximate order in which they appear.

Table 17: show chassis led Output Fields

Field Name	Field Description
<b>Beacon LED</b>	<p>(Applies when QFX5100, QFX5110, and QFX5200 switches are in an satellite device role only) Indicates if the beacon feature is on or off. The beacon feature is always off in a Junos Fusion.</p> <p>The <b>Beacon LED</b> output maps to the <b>ID-Identification</b> LED state.</p> <p>For more information, see:</p> <ul style="list-style-type: none"> <li>• <i>Chassis Status LEDs on a QFX5100 Device</i></li> <li>• <i>QFX5110 Chassis Status LEDs</i></li> <li>• <i>QFX5200 Chassis Status LEDs</i></li> </ul>
<b>System LED</b>	<p>Indicates the state of the System (<b>SYS</b>) LED on the satellite device.</p> <p>For more information, see:</p> <ul style="list-style-type: none"> <li>• <i>Chassis Status LEDs on EX4300 Switches</i></li> <li>• <i>Chassis Status LEDs on a QFX5100 Device</i></li> <li>• <i>QFX5110 Chassis Status LEDs</i></li> <li>• <i>QFX5200 Chassis Status LEDs</i></li> </ul>
<b>Master LED</b>	<p>Indicates the state of the Master (<b>MST</b>) LED on the satellite device.</p> <p>For more information, see:</p> <ul style="list-style-type: none"> <li>• <i>Chassis Status LEDs on EX4300 Switches</i></li> <li>• <i>Chassis Status LEDs on a QFX5100 Device</i></li> <li>• <i>QFX5110 Chassis Status LEDs</i></li> <li>• <i>QFX5200 Chassis Status LEDs</i></li> </ul>
<b>Alarm LED</b>	<p>Indicates the state of the Alarm (<b>ALM</b>) LED on the satellite device.</p> <p>For more information, see:</p> <ul style="list-style-type: none"> <li>• <i>Chassis Status LEDs on EX4300 Switches</i></li> <li>• <i>Chassis Status LEDs on a QFX5100 Device</i></li> <li>• <i>QFX5110 Chassis Status LEDs</i></li> <li>• <i>QFX5200 Chassis Status LEDs</i></li> </ul>

Table 17: show chassis led Output Fields (continued)

Field Name	Field Description
<b>Mgmt Port0 LED</b>	<p>(Applies when QFX5100, QFX5110, and QFX5200 switches are in an satellite device role only) Indicates the state of the management port 0 (<b>em0</b>) LED status on the satellite device.</p> <p>This port is always off in a Junos Fusion.</p> <p>For more information, see:</p> <ul style="list-style-type: none"> <li>• <i>Management Port LEDs on a QFX5100 Device</i></li> <li>• <i>QFX5110 Management Port LEDs</i></li> <li>• <i>QFX5200 Management Port LEDs</i></li> </ul>
<b>Mgmt Port1 LED</b>	<p>(Applies when QFX5100, QFX5110, and QFX5200 switches are in an satellite device role only) Indicates the state of the management port 1 (<b>em0</b>) LED status on the satellite device.</p> <p>This port is always off in a Junos Fusion.</p> <p>For more information, see:</p> <ul style="list-style-type: none"> <li>• <i>Management Port LEDs on a QFX5100 Device</i></li> <li>• <i>QFX5110 Management Port LEDs</i></li> <li>• <i>QFX5200 Management Port LEDs</i></li> </ul>
<b>Interface</b>	<p>The interface name on the satellite device.</p> <p>For more information, see:</p> <ul style="list-style-type: none"> <li>• <i>Management Port LEDs on a QFX5100 Device</i></li> <li>• <i>QFX5110 Management Port LEDs</i></li> <li>• <i>QFX5200 Management Port LEDs</i></li> </ul>
<b>Status LED</b>	<p>The state of the Status LED for the particular interface on the satellite device.</p> <p>For more information, see:</p> <ul style="list-style-type: none"> <li>• <i>Network Port, Built-In QSFP+ Port, Uplink Port, and Uplink Module Port LEDs on EX4300 Switches</i></li> <li>• <i>Access Port and Uplink Port LEDs on a QFX5100 Device</i></li> <li>• <i>QFX5110 Network Port LEDs</i></li> <li>• <i>QFX5200 Access Port and Uplink Port LEDs</i></li> </ul>

Table 17: show chassis led Output Fields (continued)

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

## Sample Output

### show chassis led satellite

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

```

                                LED status for: FPC 101
                                -----
LEDs status:
  Beacon LED: OFF
  System LED: GREEN
  Master LED: OFF
  Alarm LED : YELLOW
  Mgmt Port0 LED: OFF
  Mgmt Port1 LED: OFF

Interface                STATUS LED    LINK/ACTIVITY LED
-----
xe-101/0/0                green
xe-101/0/1                green
xe-101/0/10               off
xe-101/0/48:0             green
xe-101/0/48:1             green
xe-101/0/48:2             green
xe-101/0/48:3             green

                                LED status for: FPC 102
                                -----
LEDs status:
```

Beacon LED: OFF  
System LED: GREEN  
Master LED: OFF  
Alarm LED : YELLOW  
Mgmt Port0 LED: OFF  
Mgmt Port1 LED: OFF

Interface	STATUS LED	LINK/ACTIVITY LED
-----		
xe-102/0/0	green	
xe-102/0/1	green	
xe-102/0/10	off	
xe-102/0/48:0	green	
xe-102/0/48:1	green	
xe-102/0/48:2	green	
xe-102/0/48:3	green	

## show chassis routing-engine

### List of Syntax

[Syntax on page 501](#)

[Syntax \(ACX Series, PTX Series, and MX104 Universal Routing Platforms.\) on page 501](#)

[Syntax \(EX Series Switches\) on page 501](#)

[Syntax \(QFX Series\) on page 501](#)

[Syntax \(MX Series Routers\) on page 501](#)

[Syntax \(MX204 and MX10003 Universal Routing Platforms\) on page 502](#)

[Syntax \(TX Matrix Routers\) on page 502](#)

[Syntax \(TX Matrix Plus Routers\) on page 502](#)

[Syntax \(Junos OS Evolved\) on page 502](#)

### 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>
```

### Release Information

Command introduced before Junos OS Release 7.4.

Command introduced in Junos OS Release 9.0 for EX Series switches.

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

Command introduced in Junos OS Release 11.1 for QFX Series.

**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.

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

Command introduced in Junos OS Release 12.3 for MX2010 and MX2020 Universal Routing Platforms.

Command introduced in Junos OS Release 13.2 for MX104 Universal Routing Platforms.

Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

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

Command introduced in Junos OS Release 17.2 for PTX10008 Routers.

Command introduced in Junos OS Release 17.3 for MX10003 Universal Routing Platforms.

Command introduced in Junos OS Release 17.4 for MX204 Universal Routing Platforms.

Command introduced in Junos OS Release 18.1R1 for EX9251 switches.

## 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 **disk /dev/disk-name status** to display the status of a particular disk.

**interconnect-device *number***—(QFabric systems only) (Optional) Display Routing Engine information for a specified Interconnect device.

**lcc *number***—(TX Matrix and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display Routing Engine information for a specified T640 router (line-card chassis) that is connected to the TX Matrix router. On a TX Matrix Plus router, display Routing Engine information for a specified router (line-card chassis) that is connected to the TX Matrix Plus router.

Replace *number* with the following values depending on the LCC configuration:

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**local**—(MX Series routers only) (Optional) Display Routing Engine information for the local Virtual Chassis member.

**member *member-id***—(MX Series routers only) (Optional) Display Routing Engine information for the specified member of the Virtual Chassis configuration. For an MX Series Virtual Chassis, replace *member-id* with a value of 0 or 1.

**node-device *number***—(QFabric systems only) (Optional) Display Routing Engine information for a specified Node device.

**satellite [*slot-id slot-id* [*device-alias alias-name*]**—(Junos Fusion only) (Optional) Display Routing Engine information for the specified satellite device in a Junos Fusion, or for all satellite devices in the Junos Fusion if no satellite devices are specified.

**scc**—(TX Matrix routers only) (Optional) Display Routing Engine information for the TX Matrix router (switch-card chassis).

**sfc *number***—(TX Matrix Plus routers only) (Optional) Display Routing Engine information for the TX Matrix Plus router (or switch-fabric chassis). Replace *number* with 0.

**slot**—(Systems with multiple Routing Engines) (Optional) Display information for an individual Routing Engine. Replace *slot* with 0 or 1. For QFX3500 switches, there is only one Routing Engine, so you do not need to specify the slot number.

### Required Privilege Level

view

## RELATED DOCUMENTATION

*request chassis routing-engine master*

*Configuring Routing Engine Redundancy*

*Switching the Global Master and Backup Roles in a Virtual Chassis Configuration*

### List of Sample Output

[show chassis routing-engine \(M5 Router\) on page 509](#)

[show chassis routing-engine \(M20 Router\) on page 509](#)

[show chassis routing-engine \(MX104 Router\) on page 510](#)

[show chassis routing-engine \(MX240 Router\) on page 511](#)

[show chassis routing-engine \(MX480 Router\) on page 512](#)

[show chassis routing-engine \(MX960 Router\) on page 513](#)

[show chassis routing-engine \(T320 Router\) on page 515](#)

[show chassis routing-engine \(T4000 Router\) on page 516](#)

[show chassis routing-engine \(TX Matrix Router\) on page 517](#)

[show chassis routing-engine lcc \(TX Matrix Router\) on page 518](#)

[show chassis routing-engine bios \(TX Matrix Router\) on page 519](#)

[show chassis routing-engine \(TX Matrix Plus Router\) on page 519](#)

[show chassis routing-engine lcc \(TX Matrix Plus Router\) on page 521](#)

[show chassis routing-engine bios \(TX Matrix Plus Router\) on page 523](#)  
[show chassis routing-engine \(QFX Series\) on page 523](#)  
[show chassis routing-engine \(OCX Series\) on page 523](#)  
[show chassis routing engine interconnect-device \(QFabric Systems\) on page 524](#)  
[show chassis routing-engine \(PTX Series Packet Transport Router\) on page 525](#)  
[show chassis routing-engine \(EX9200 Switch\) on page 526](#)  
[show chassis routing-engine \(EX9251 Switch\) on page 527](#)  
[show chassis routing-engine \(ACX2000 Universal Metro Router\) on page 528](#)  
[show chassis routing-engine \(ACX1000 Universal Metro Router\) on page 528](#)  
[show chassis routing-engine \(Displaying the guest reboot reason on PTX5000, MX240, MX480, MX960, MX2010, and MX2020\) on page 529](#)

## Output Fields

Table 18 on page 505 lists the output fields for the **show chassis routing-engine** command. Output fields are listed in the approximate order in which they appear.

Table 18: show chassis routing-engine Output Fields

Field Name	Field Description
<b>Slot</b>	(Systems with single and multiple Routing Engines) Slot number.
<b>Current state</b>	(Systems with multiple Routing Engines) Current state of the Routing Engine: <b>Master</b> , <b>Backup</b> , or <b>Disabled</b> .
<b>Election priority</b>	(Systems with multiple Routing Engines) Election priority for the Routing Engine: <b>Master</b> or <b>Backup</b> .
<b>Temperature</b>	Temperature of the air flowing past the Routing Engine.
<b>CPU Temperature</b>	Temperature of the CPU.
<b>DRAM</b>	<p>Total DRAM available to the Routing Engine's processor.</p> <p><b>NOTE:</b> 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 18: show chassis routing-engine Output Fields (*continued*)

Field Name	Field Description
<b>Memory utilization</b>	<p>Percentage of Routing Engine memory being used.</p> <p><b>NOTE:</b> For platforms running Junos OS with upgraded FreeBSD, the way memory utilization is calculated has changed. Starting in Junos OS Release 15.1R1, inactive memory is no longer included in the calculation for memory utilization. Inactive memory is now considered as free. That is, the value for used memory decreases and results in more memory to be available for other processes. For platforms that run Junos OS with upgraded FreeBSD, see <i>Release Information for Junos OS with Upgraded FreeBSD</i>.</p>
<b>CPU utilization</b>	<p>Information about the Routing Engine's CPU utilization:</p> <ul style="list-style-type: none"> <li>• <b>User</b>—Percentage of CPU time being used by user processes.</li> <li>• <b>Background</b>—Percentage of CPU time being used by background processes.</li> <li>• <b>Kernel</b>—Percentage of CPU time being used by kernel processes.</li> <li>• <b>Interrupt</b>—Percentage of CPU time being used by interrupts.</li> <li>• <b>Idle</b>—Percentage of CPU time that is idle.</li> </ul>
<b>5 sec CPU Utilization</b>	<p>Information about the Routing Engine's CPU utilization in the past 5 seconds:</p> <ul style="list-style-type: none"> <li>• <b>User</b>—Percentage of CPU time being used by user processes.</li> <li>• <b>Background</b>—Percentage of CPU time being used by background processes.</li> <li>• <b>Kernel</b>—Percentage of CPU time being used by kernel processes.</li> <li>• <b>Interrupt</b>—Percentage of CPU time being used by interrupts.</li> <li>• <b>Idle</b>—Percentage of CPU time that is idle.</li> </ul>
<b>1 min CPU Utilization</b>	<p>Information about the Routing Engine's CPU utilization in the past 1 minute:</p> <ul style="list-style-type: none"> <li>• <b>User</b>—Percentage of CPU time being used by user processes.</li> <li>• <b>Background</b>—Percentage of CPU time being used by background processes.</li> <li>• <b>Kernel</b>—Percentage of CPU time being used by kernel processes.</li> <li>• <b>Interrupt</b>—Percentage of CPU time being used by interrupts.</li> <li>• <b>Idle</b>—Percentage of CPU time that is idle.</li> </ul>
<b>5 min CPU Utilization</b>	<p>Information about the Routing Engine's CPU utilization in the past 5 minutes:</p> <ul style="list-style-type: none"> <li>• <b>User</b>—Percentage of CPU time being used by user processes.</li> <li>• <b>Background</b>—Percentage of CPU time being used by background processes.</li> <li>• <b>Kernel</b>—Percentage of CPU time being used by kernel processes.</li> <li>• <b>Interrupt</b>—Percentage of CPU time being used by interrupts.</li> <li>• <b>Idle</b>—Percentage of CPU time that is idle.</li> </ul>

Table 18: show chassis routing-engine Output Fields (*continued*)

Field Name	Field Description
<b>15 min CPU Utilization</b>	<p>Information about the Routing Engine's CPU utilization in the past 15 minutes:</p> <ul style="list-style-type: none"> <li>• <b>User</b>—Percentage of CPU time being used by user processes.</li> <li>• <b>Background</b>—Percentage of CPU time being used by background processes.</li> <li>• <b>Kernel</b>—Percentage of CPU time being used by kernel processes.</li> <li>• <b>Interrupt</b>—Percentage of CPU time being used by interrupts.</li> <li>• <b>Idle</b>—Percentage of CPU time that is idle.</li> </ul>
<b>Model</b>	Routing Engine model number.
<b>Serial ID</b>	(Systems with multiple Routing Engines) Identification number of the Routing Engine in this slot.
<b>Start time</b>	Time at which the Routing Engine started running.
<b>Uptime</b>	How long the Routing Engine has been running.
Routing Engine BIOS Version	BIOS version being run by the Routing Engine.

Table 18: show chassis routing-engine Output Fields (*continued*)

Field Name	Field Description
Last reboot reason	<p>Reason for last reboot, including:</p> <ul style="list-style-type: none"> <li>• <b>power cycle/failure</b>—Halt of the Routing Engine using the <b>halt</b> command, powering down using the power button on the chassis or any other method (such as removal of the control board or Routing Engine), and then powering back the Routing Engine. A halt of the operating system also occurs if you enter the <b>request system halt</b> command. You can enter this command to halt the system operations on the chassis or specific Routing Engines. To restart the software, press any key on the keyboard.</li> <li>• <b>watchdog</b>—Reboot due to a hardware watchdog. A watchdog is a hardware monitoring process that examines the health and performance of the router to enable the device to recover from failures. A watchdog checks for problems at certain intervals, and reboots the routing engine if a problem is encountered.</li> <li>• <b>reset-button reset</b>—(Not available on the EX Series switch) Reboot due to pressing of the reset button on the Routing Engine.</li> <li>• <b>power-button hard power off</b>—Reboot due to pressing of the power button on the chassis. A powering down of the software also occurs if you enter the <b>request system power-off</b> command. You can enter this command to power down the chassis or specific Routing Engines; you can then restart the software.</li> <li>• <b>misc hardware reason</b>—Reboot due to miscellaneous hardware reasons.</li> <li>• <b>thermal shutdown</b>—Reboot due to the router or switch reaching a critical temperature at which point it is unsafe to continue operations.</li> <li>• <b>hard disk failure</b>—Reboot due to a hard disk or solid-state drive (SSD) failure.</li> <li>• <b>reset from debugger</b>—Reboot due to reset from the debugger.</li> <li>• <b>chassis control reset</b>—Restart the chassis process that manages PICs, FPCs, and other hardware components. The chassis control module that runs the Routing Engine performs management and monitoring functions, and it provides a single access point for operational and maintenance functions. A reset of the chassis management process occurs when you enter the <b>restart chassis-control</b> command.</li> <li>• <b>bios auto recovery reset</b>—Reboot due to a BIOS auto-recovery reset.</li> <li>• <b>could not be determined</b>—Reboot due to an undetermined reason.</li> <li>• <b>Router rebooted after a normal shutdown</b>—Reboot due to a normal shutdown. This reason is displayed if the Routing Engine is powered down by pushing and holding the online/offline button on the Routing Engine faceplate for 30 seconds, and then powered back. A reboot of the software also occurs if you enter the <b>request system reboot</b> command. You can enter this command to reboot the chassis or specific Routing Engines.</li> <li>• <b>Hypervisor reboot</b>—When both Linux host and Junos OS is rebooted using the <b>request vmhost reboot</b> command.</li> <li>• <b>VJUNOS Reboot</b>—When Junos OS is rebooted using the <b>request system reboot</b> command.</li> </ul>
Load averages	Routing Engine load averages for the last 1, 5, and 15 minutes.

## Sample Output

### show chassis routing-engine (M5 Router)

user@host> show chassis routing-engine

```

Routing Engine status:
  Temperature                25 degrees C / 77 degrees F
  DRAM                       768 MB
  Memory utilization          21 percent
  CPU utilization:
    User                      0 percent
    Background                0 percent
    Kernel                    0 percent
    Interrupt                  0 percent
    Idle                       100 percent
  Model                       RE-2.0
  Serial ID                   31000007349bf701
  Start time                   2003-12-04 09:42:17 PST
  Uptime                       26 days, 1 hour, 12 minutes, 27 seconds
  Last reboot reason           Router rebooted after a normal shutdown
  Load averages:              1 minute   5 minute   15 minute
                                0.00        0.01        0.00

```

### show chassis routing-engine (M20 Router)

user@host> show chassis routing-engine

```

Routing Engine status:
  Slot 0:
    Current state              Master
    Election priority           Master (default)
    Temperature                 29 degrees C / 84 degrees F
    DRAM                       768 MB
    Memory utilization          20 percent
    CPU utilization:
      User                      1 percent
      Background                0 percent
      Kernel                    2 percent
      Interrupt                  0 percent
      Idle                       97 percent
    Model                       RE-2.0
    Serial ID                   58000007348d9a01
    Start time                   2003-12-30 07:05:47 PST

```



```

Uptime                3 hours, 41 minutes, 14 seconds
Last reboot reason     Router rebooted after a normal shutdown
Load averages:         1 minute   5 minute   15 minute
                       0.00        0.02        0.00

Routing Engine status:
Slot 1:
  Current state         Backup
  Election priority     Backup (default)
  Temperature           29 degrees C / 84 degrees F
  DRAM                  768 MB
  Memory utilization    0 percent
  CPU utilization:
    User                0 percent
    Background          0 percent
    Kernel              1 percent
    Interrupt           0 percent
    Idle                99 percent
  Model                 RE-2.0
  Serial ID             d800000734745701
  Start time            2003-06-17 16:37:33 PDT
  Uptime                195 days, 18 hours, 47 minutes, 9 seconds
  Last reboot reason    Router rebooted after a normal shutdown

```

### show chassis routing-engine (MX104 Router)

```
user@host> show chassis routing-engine
```

```

Routing Engine status:
Slot 0:
  Current state         Master
  Election priority     Master (default)
  Temperature           32 degrees C / 89 degrees F
  CPU temperature        42 degrees C / 107 degrees F
  DRAM                  3840 MB (3840 MB installed)
  Memory utilization    18 percent
  CPU utilization:
    User                0 percent
    Background          0 percent
    Kernel              3 percent
    Interrupt           2 percent
    Idle                94 percent
  Model                 RE-MX-104
  Serial ID             CAAR5925
  Start time            2013-06-05 13:17:08 IST

```

```

Uptime                1 hour, 15 minutes, 8 seconds
Last reboot reason     0x200:normal shutdown
Load averages:         1 minute   5 minute   15 minute
                        0.87       0.90       0.41

Routing Engine status:
Slot 1:
  Current state         Backup
  Election priority     Backup (default)
  Temperature           32 degrees C / 89 degrees F
  CPU temperature       38 degrees C / 100 degrees F
  DRAM                  3840 MB (3840 MB installed)
  Memory utilization    13 percent
  CPU utilization:
    User                0 percent
    Background          0 percent
    Kernel              1 percent
    Interrupt           2 percent
    Idle                97 percent
  Model                 RE-MX-104
  Serial ID             CAAM6369
  Start time            2013-06-05 13:07:37 IST
  Uptime                1 hour, 24 minutes, 34 seconds
  Last reboot reason    0x200:normal shutdown
  Load averages:       1 minute   5 minute   15 minute
                        0.19       0.15       0.06

```

### show chassis routing-engine (MX240 Router)

```
user@host> show chassis routing-engine
```

```

Routing Engine status:
Slot 0:
  Current state         Master
  Election priority     Master (default)
  Temperature           36 degrees C / 96 degrees F
  CPU temperature       35 degrees C / 95 degrees F
  DRAM                  3314 MB (8192 MB installed)
  Memory utilization    37 percent
  5 sec CPU utilization:
    User                0 percent
    Background          0 percent
    Kernel              1 percent
    Interrupt           0 percent
    Idle                99 percent

```

```

1 min CPU utilization:
  User          0 percent
  Background    0 percent
  Kernel        1 percent
  Interrupt     0 percent
  Idle          99 percent
5 min CPU utilization:
  User          0 percent
  Background    0 percent
  Kernel        1 percent
  Interrupt     0 percent
  Idle          99 percent
15 min CPU utilization:
  User          0 percent
  Background    0 percent
  Kernel        1 percent
  Interrupt     0 percent
  Idle          99 percent
Model          RE-S-1800x4
Serial ID      9009074155
Start time     2014-10-13 00:35:41 PDT
Uptime         98 days, 2 hours, 6 minutes, 35 seconds
Last reboot reason Router rebooted after a normal shutdown.
Load averages: 1 minute   5 minute   15 minute
                0.12      0.12      0.13

Routing Engine status:
Slot 1:
  Current state      Present

```

### show chassis routing-engine (MX480 Router)

```
user@host> show chassis routing-engine
```

```

Routing Engine status:
Slot 0:
  Current state      Master
  Election priority   Master (default)
  Temperature        33 degrees C / 91 degrees F
  CPU temperature     32 degrees C / 89 degrees F
  DRAM               16323 MB (16384 MB installed)
  Memory utilization  7 percent
  5 sec CPU utilization:
    User             1 percent

```

```

Background          0 percent
Kernel              1 percent
Interrupt            0 percent
Idle                 98 percent
1 min CPU utilization:
User                 2 percent
Background           0 percent
Kernel               1 percent
Interrupt             0 percent
Idle                 97 percent
5 min CPU utilization:
User                 1 percent
Background           0 percent
Kernel               1 percent
Interrupt             0 percent
Idle                 97 percent
15 min CPU utilization:
User                 1 percent
Background           0 percent
Kernel               1 percent
Interrupt             0 percent
Idle                 97 percent
Model                RE-S-1800x4
Serial ID             9009122628
Start time            2019-05-29 21:58:46 PDT
Uptime                11 days, 5 hours, 8 minutes, 55 seconds
Last reboot reason    Router rebooted after a normal shutdown.
Load averages:        1 minute   5 minute   15 minute
                       0.28       0.22       0.22

```

### show chassis routing-engine (MX960 Router)

user@host> show chassis routing-engine

```

Routing Engine status:
Slot 0:
  Current state          Master
  Election priority       Master (default)
  Temperature             34 degrees C / 93 degrees F
  CPU temperature         33 degrees C / 91 degrees F
  DRAM                   16325 MB (16384 MB installed)
  Memory utilization      7 percent
  5 sec CPU utilization:

```

```

User                1 percent
Background          0 percent
Kernel              3 percent
Interrupt            1 percent
Idle                95 percent
1 min CPU utilization:
User                0 percent
Background          0 percent
Kernel              3 percent
Interrupt            0 percent
Idle                97 percent
5 min CPU utilization:
User                0 percent
Background          0 percent
Kernel              3 percent
Interrupt            0 percent
Idle                97 percent
15 min CPU utilization:
User                0 percent
Background          0 percent
Kernel              2 percent
Interrupt            0 percent
Idle                97 percent
Model                RE-S-1800x4
Serial ID            9013043129
Start time           2019-04-29 13:07:15 CEST
Uptime               15 days, 22 hours, 42 minutes, 57 seconds
Last reboot reason    Router rebooted after a normal shutdown.
Load averages:        1 minute   5 minute   15 minute
                       0.17       0.20       0.22

Routing Engine status:
Slot 1:
Current state         Backup
Election priority      Backup (default)
Temperature            33 degrees C / 91 degrees F
CPU temperature        32 degrees C / 89 degrees F
DRAM                  16330 MB (16384 MB installed)
Memory utilization     9 percent
5 sec CPU utilization:
User                0 percent
Background          0 percent
Kernel              0 percent
Interrupt            0 percent
Idle                100 percent

```

```

Model                RE-S-1800x4
Serial ID             9013043081
Start time            2019-04-29 13:05:17 CEST
Uptime                15 days, 22 hours, 44 minutes, 52 seconds
Last reboot reason    0x1:power cycle/failure
Load averages:        1 minute   5 minute   15 minute
                       0.17       0.17       0.12

```

### show chassis routing-engine (T320 Router)

user@host> show chassis routing-engine

```

Slot 0:
  Current state          Master
  Election priority      Master (default)
  Temperature            51 degrees C / 123 degrees F
  CPU temperature        55 degrees C / 131 degrees F
  DRAM                   3584 MB
  Memory utilization     11 percent
  CPU utilization:
    User                 0 percent
    Background           0 percent
    Kernel               2 percent
    Interrupt            0 percent
    Idle                 97 percent
  Model                  RE-A-2000
  Serial ID              9009010618
  Start time             2012-10-10 01:24:05 PDT
  Uptime                 5 days, 10 hours, 49 minutes, 23 seconds
  Last reboot reason     0x1:power cycle/failure
  Load averages:        1 minute   5 minute   15 minute
                       0.00       0.05       0.04

Routing Engine status:
  Slot 1:
    Current state        Backup
    Election priority     Backup (default)
    Temperature           45 degrees C / 113 degrees F
    CPU temperature       48 degrees C / 118 degrees F
    DRAM                  3584 MB
    Memory utilization    9 percent
    CPU utilization:
      User                0 percent
      Background          0 percent
      Kernel              0 percent

```

```

Interrupt          0 percent
Idle               100 percent
Model              RE-A-2000
Serial ID          9009003642
Start time         2012-10-10 01:24:04 PDT
Uptime             5 days, 10 hours, 49 minutes, 28 seconds
Last reboot reason 0x1:power cycle/failure

```

### show chassis routing-engine (T4000 Router)

user@host> show chassis routing-engine

```

Routing Engine status:
Slot 0:
  Current state          Master
  Election priority      Master (default)
  Temperature            33 degrees C / 91 degrees F
  CPU temperature        50 degrees C / 122 degrees F
  DRAM                   8960 MB
  Memory utilization     18 percent
  CPU utilization:
    User                 0 percent
    Background           0 percent
    Kernel               4 percent
    Interrupt            1 percent
    Idle                 95 percent
  Model                  RE-DUO-1800
  Serial ID              P737F-002248
  Start time             2012-02-09 22:49:53 PST
  Uptime                 2 hours, 21 minutes, 35 seconds
  Last reboot reason     Router rebooted after a normal shutdown.
  Load averages:        1 minute   5 minute   15 minute
                        0.00         0.04         0.00

Routing Engine status:
Slot 1:
  Current state          Backup
  Election priority      Backup (default)
  Temperature            32 degrees C / 89 degrees F
  CPU temperature        46 degrees C / 114 degrees F
  DRAM                   8960 MB
  Memory utilization     24 percent
  CPU utilization:
    User                 0 percent
    Background           0 percent

```

```

Kernel                0 percent
Interrupt             0 percent
Idle                  99 percent
Model                 RE-DUO-1800
Serial ID             P737F-002653
Start time            2012-02-08 20:12:51 PST
Uptime                1 day, 4 hours, 58 minutes, 28 seconds
Last reboot reason    Router rebooted after a normal shutdown.

```

### show chassis routing-engine (TX Matrix Router)

user@host> show chassis routing-engine

```

scc-re0:
-----
Routing Engine status:
Slot 0:
  Current state           Master
  Election priority       Master (default)
  Temperature             34 degrees C / 93 degrees F
  CPU temperature         33 degrees C / 91 degrees F
  DRAM                   2048 MB
  Memory utilization      12 percent
  CPU utilization:
    User                  0 percent
    Background            0 percent
    Kernel                2 percent
    Interrupt             0 percent
    Idle                  98 percent
  Model                   RE-4.0
  Serial ID               P11123900153
  Start time              2004-08-05 18:42:05 PDT
  Uptime                  9 days, 22 hours, 49 minutes, 50 seconds
  Last reboot reason      Router rebooted after a normal shutdown
  Load averages:         1 minute   5 minute   15 minute
                        0.00         0.08         0.07

```

```

lcc0-re0:
-----
Routing Engine status:
Slot 0:
  Current state           Master
  Election priority       Master (default)
  Temperature             33 degrees C / 91 degrees F

```



```

CPU temperature          30 degrees C / 86 degrees F
DRAM                    2048 MB
Memory utilization       12 percent
CPU utilization:
  User                   0 percent
  Background             0 percent
  Kernel                 1 percent
  Interrupt              0 percent
  Idle                   98 percent
Model                   RE-3.0
Serial ID                210865700363
Start time              2004-08-05 18:42:05 PDT
Uptime                  9 days, 22 hours, 48 minutes, 20 seconds
Last reboot reason      Router rebooted after a normal shutdown
Load averages:          1 minute   5 minute   15 minute
                        0.00        0.02        0.00

```

```
lcc2-re0:
```

```
-----
Routing Engine status:
```

```
Slot 0:
```

```

Current state           Master
Election priority        Master (default)
Temperature             34 degrees C / 93 degrees F
CPU temperature          35 degrees C / 95 degrees F
DRAM                    2048 MB
Memory utilization       12 percent
CPU utilization:
  User                   0 percent
  Background             0 percent
  Kernel                 2 percent
  Interrupt              0 percent
  Idle                   98 percent
Model                   RE-4.0
Serial ID                P11123900126
Start time              2004-08-05 18:42:05 PDT
Uptime                  9 days, 22 hours, 49 minutes, 4 seconds
Last reboot reason      Router rebooted after a normal shutdown
Load averages:          1 minute   5 minute   15 minute
                        0.01        0.01        0.0

```

**show chassis routing-engine lcc (TX Matrix Router)**

```
user@host> show chassis routing-engine 0 lcc 0
```

```
lcc0-re0:
-----
Routing Engine status:
  Slot 0:
    Current state           Master
    Election priority       Master (default)
    Temperature             33 degrees C / 91 degrees F
    CPU temperature         30 degrees C / 86 degrees F
    DRAM                    2048 MB
    Memory utilization       12 percent
    CPU utilization:
      User                  0 percent
      Background            0 percent
      Kernel                1 percent
      Interrupt             0 percent
      Idle                  98 percent
    Model                   RE-3.0
    Serial ID               210865700363
    Start time              2004-08-05 18:42:05 PDT
    Uptime                  7 days, 22 hours, 49 minutes, 6 seconds
    Last reboot reason      Router rebooted after a normal shutdown
    Load averages:         1 minute   5 minute   15 minute
                           0.00        0.00        0.00
```

### show chassis routing-engine bios (TX Matrix Router)

```
user@host> show chassis routing-engine bios
```

```
scc-re0:
-----
Routing Engine BIOS Version: V1.0.0
lcc0-re0:
-----
Routing Engine BIOS Version: V1.0.17
lcc2-re0:
-----
Routing Engine BIOS Version: V1.0.0
```

### show chassis routing-engine (TX Matrix Plus Router)

```
user@host> show chassis routing-engine
```

sfc0-re0:

-----  
Routing Engine status:

Slot 0:

Current state	Master
Election priority	Master (default)
Temperature	27 degrees C / 80 degrees F
CPU temperature	42 degrees C / 107 degrees F
DRAM	3327 MB
Memory utilization	12 percent
CPU utilization:	
User	0 percent
Background	0 percent
Kernel	2 percent
Interrupt	0 percent
Idle	98 percent
Model	RE-TXP-SFC
Serial ID	737A-1024
Start time	2009-05-11 17:39:49 PDT
Uptime	3 hours, 45 minutes, 25 seconds
Last reboot reason	Router rebooted after a normal shutdown.
Load averages:	1 minute    5 minute    15 minute
	0.00            0.00            0.00

Routing Engine status:

Slot 1:

Current state	Backup
Election priority	Backup (default)
Temperature	29 degrees C / 84 degrees F
CPU temperature	43 degrees C / 109 degrees F
DRAM	3327 MB
Memory utilization	11 percent
CPU utilization:	
User	0 percent
Background	0 percent
Kernel	0 percent
Interrupt	0 percent
Idle	100 percent
Model	RE-TXP-SFC
Serial ID	737A-1024
Start time	2009-05-11 17:08:54 PDT
Uptime	4 hours, 16 minutes, 52 seconds
Last reboot reason	0x1:power cycle/failure

lcc0-re0:

```
-----
Routing Engine status:
```

```
Slot 0:
```

```

Current state           Master
Election priority       Master (default)
Temperature             30 degrees C / 86 degrees F
CPU temperature         43 degrees C / 109 degrees F
DRAM                   3327 MB
Memory utilization      9 percent
CPU utilization:
  User                  0 percent
  Background            0 percent
  Kernel                2 percent
  Interrupt             0 percent
  Idle                  98 percent
Model                  RE-TXP-LCC
Serial ID              737F-1024
Start time              2009-05-11 17:40:32 PDT
Uptime                  3 hours, 44 minutes, 51 seconds
Last reboot reason      Router rebooted after a normal shutdown.
Load averages:         1 minute   5 minute   15 minute
                        0.00       0.00       0.00
```

```
Routing Engine status:
```

```
Slot 1:
```

```

Current state           Backup
Election priority       Backup (default)
Temperature             30 degrees C / 86 degrees F
CPU temperature         43 degrees C / 109 degrees F
DRAM                   3327 MB
Memory utilization      9 percent
CPU utilization:
  User                  0 percent
  Background            0 percent
  Kernel                0 percent
  Interrupt             0 percent
  Idle                  100 percent
Model                  RE-TXP-LCC
Serial ID              737F-1024
Start time              2009-05-06 17:31:32 PDT
Uptime                  5 days, 3 hours, 54 minutes, 19 seconds
Last reboot reason      Router rebooted after a normal shutdown.
```

**show chassis routing-engine lcc (TX Matrix Plus Router)**

```
user@host> show chassis routing-engine 0 lcc 0
```

```
lcc0-re0:
```

```
-----
Routing Engine status:
```

```
Slot 0:
```

```

Current state           Master
Election priority       Master (default)
Temperature             30 degrees C / 86 degrees F
CPU temperature         43 degrees C / 109 degrees F
DRAM                   3327 MB
Memory utilization      9 percent
CPU utilization:
  User                  0 percent
  Background            0 percent
  Kernel                2 percent
  Interrupt             0 percent
  Idle                  98 percent
Model                  RE-TXP-LCC
Serial ID              737F-1024
Start time             2009-05-11 17:40:32 PDT
Uptime                 3 hours, 45 minutes, 26 seconds
Last reboot reason     Router rebooted after a normal shutdown.
Load averages:         1 minute   5 minute  15 minute
                       0.00       0.00     0.00
```

```
Routing Engine status:
```

```
Slot 1:
```

```

Current state           Backup
Election priority       Backup (default)
Temperature             30 degrees C / 86 degrees F
CPU temperature         43 degrees C / 109 degrees F
DRAM                   3327 MB
Memory utilization      9 percent
CPU utilization:
  User                  0 percent
  Background            0 percent
  Kernel                0 percent
  Interrupt             0 percent
  Idle                  100 percent
Model                  RE-TXP-LCC
Serial ID              737F-1024
Start time             2009-05-06 17:31:32 PDT
Uptime                 5 days, 3 hours, 54 minutes, 59 seconds
Last reboot reason     Router rebooted after a normal shutdown.
```

**show chassis routing-engine bios (TX Matrix Plus Router)**

```
user@host> show chassis routing-engine bios
```

```
sfc0-re0:
-----
Routing Engine BIOS Version: V0.0.Z

lcc0-re0:
-----
Routing Engine BIOS Version: V0.0.N
```

**show chassis routing-engine (QFX Series)**

```
user@switch> show chassis routing-engine
```

```
Routing Engine status:
Slot 0:
Current state Master
Election priority Master (default)
DRAM 2820 MB
Memory utilization 49 percent
CPU utilization:
User 1 percent
Background 0 percent
Kernel 1 percent
Interrupt 0 percent
Idle 97 percent
Model QFX3500-48S4Q
Serial ID S/N ED3709
Uptime 3 days, 4 hours, 29 minutes, 42 seconds
Last reboot reason 0x200:chassis control reset
Load averages: 1 minute 5 minute 15 minute
0.37 0.26 0.19
```

**show chassis routing-engine (OCX Series)**

```
user@switch> show chassis routing-engine
```

```
Routing Engine status:
Slot 0:
Current state Master
Election priority Master (default)
DRAM 2820 MB
```

```

Memory utilization 49 percent
CPU utilization:
User 1 percent
Background 0 percent
Kernel 1 percent
Interrupt 0 percent
Idle 97 percent
Model OCX-1100-48SX-AFI
Serial ID S/N ED3709
Uptime 3 days, 4 hours, 29 minutes, 42 seconds
Last reboot reason 0x200:chassis control reset
Load averages: 1 minute 5 minute 15 minute
0.37 0.26 0.19

```

### **show chassis routing engine interconnect-device (QFabric Systems)**

user@switch> **show chassis routing-engine**

```

Routing Engine status:
  Slot 0:
    Current state           Master
    Election priority       Master (default)
    Temperature             48 degrees C / 118 degrees F
    DRAM                   3312 MB
    Memory utilization      63 percent
    CPU utilization:
      User                  14 percent
      Background            0 percent
      Kernel                5 percent
      Interrupt             0 percent
      Idle                  81 percent
    Model                   RE-QFXC08-CB4S
    Serial ID               BUILTIN
    Start time              2011-07-06 13:26:15 UTC
    Uptime                  11 hours, 24 minutes, 57 seconds
    Last reboot reason      0x4:reset-button reset
    Load averages:         1 minute   5 minute   15 minute
                           2.62        2.31        2.28

Routing Engine status:
  Slot 1:
    Current state           Backup
    Election priority       Backup (default)
    Temperature             39 degrees C / 102 degrees F
    DRAM                   3312 MB

```

```

Memory utilization          59 percent
CPU utilization:
  User                      9 percent
  Background                0 percent
  Kernel                    1 percent
  Interrupt                 0 percent
  Idle                      91 percent
Model                      RE-QFXC08-CB4S
Serial ID                   BUILTIN
Start time                  2011-07-06 13:24:58 UTC
Uptime                      11 hours, 26 minutes, 18 seconds
Last reboot reason          0x4:reset-button reset

```

### show chassis routing-engine (PTX Series Packet Transport Router)

user@switch> show chassis routing-engine

```

Routing Engine status:
Slot 0:
  Current state              Master
  Election priority          Master (default)
  Temperature                60 degrees C / 140 degrees F
  CPU temperature            76 degrees C / 168 degrees F
  DRAM                       17152 MB
  Memory utilization         11 percent
  CPU utilization:
    User                     0 percent
    Background               0 percent
    Kernel                   4 percent
    Interrupt                0 percent
    Idle                     95 percent
  Model                      RE-DUO-2600
  Serial ID                  P737A-002231
  Start time                 2011-12-21 16:54:37 PST
  Uptime                     25 minutes, 44 seconds
  Last reboot reason         Router rebooted after a normal shutdown.
  Load averages:            1 minute   5 minute   15 minute
                             0.01       0.02       0.06

Routing Engine status:
Slot 1:
  Current state              Backup
  Election priority          Backup (default)
  Temperature                50 degrees C / 122 degrees F

```



```

CPU temperature          64 degrees C / 147 degrees F
DRAM                    17152 MB
Memory utilization       10 percent
CPU utilization:
  User                   0 percent
  Background             0 percent
  Kernel                 0 percent
  Interrupt              0 percent
  Idle                   99 percent
Model                   RE-DUO-2600
Serial ID                P737A-002438
Start time              2011-12-21 16:52:26 PST
Uptime                  27 minutes, 49 seconds
Last reboot reason      Router rebooted after a normal shutdown.

```

### show chassis routing-engine (EX9200 Switch)

user@switch> show chassis routing-engine

```

Routing Engine status:
Slot 0:
  Current state          Master
  Election priority      Master (default)
  Temperature            35 degrees C / 95 degrees F
  CPU temperature        33 degrees C / 91 degrees F
  DRAM                   8157 MB
    Installed Memory     8192 MB
  Memory utilization     18 percent
CPU utilization:
  User                   1 percent
  Background             0 percent
  Kernel                 4 percent
  Interrupt              1 percent
  Idle                   94 percent
Model                   RE-S-EX9200-1800X4
Serial ID                9009119555
Start time              2014-03-12 14:58:05 UTC
Uptime                  1 hour, 41 minutes, 51 seconds
Last reboot reason      Router rebooted after a normal shutdown.
Load averages:          1 minute   5 minute   15 minute
                        0.02        0.02        0.00

Routing Engine status:
Slot 1:
  Current state          Backup

```

Election priority	Backup (default)
-------------------	------------------

```
[...Output truncated...]
```

**show chassis routing-engine (EX9251 Switch)**

```
user@switch> show chassis routing-engine
```

```
Routing Engine status:
Temperature                50 degrees C / 122 degrees F
CPU temperature             50 degrees C / 122 degrees F
DRAM                       16340 MB (16384 MB installed)
Memory utilization          6 percent
5 sec CPU utilization:
    User                    2 percent
    Background              0 percent
    Kernel                  19 percent
    Interrupt               0 percent
    Idle                     79 percent
1 min CPU utilization:
    User                    2 percent
    Background              0 percent
    Kernel                  19 percent
    Interrupt               0 percent
    Idle                     79 percent
5 min CPU utilization:
    User                    2 percent
    Background              0 percent
    Kernel                  19 percent
    Interrupt               0 percent
    Idle                     79 percent
15 min CPU utilization:
    User                    2 percent
    Background              0 percent
    Kernel                  19 percent
    Interrupt               0 percent
    Idle                     79 percent
Model                      RE-S-2X00x6
Start time                 2018-03-08 05:11:33 PST
Uptime                     10 days, 18 hours, 59 minutes, 15 seconds
Last reboot reason         0x4000:VJUNOS reboot
Load averages:             1 minute   5 minute   15 minute
                           1.06       1.09      1.08
```

**show chassis routing-engine (ACX2000 Universal Metro Router)**

```
user@host> show chassis routing-engine
```

```
Routing Engine status:
  Temperature           53 degrees C / 127 degrees F
  DRAM                  1536 MB
  Memory utilization    25 percent
  CPU utilization:
    User                0 percent
    Background          0 percent
    Kernel              0 percent
    Interrupt           1 percent
    Idle                99 percent
  Model                 RE-ACX-2000
  Start time            2012-05-09 00:57:07 PDT
  Uptime                5 days, 3 hours, 16 minutes, 15 seconds
  Last reboot reason    Router rebooted after a normal shutdown.
  Load averages:       1 minute   5 minute   15 minute
                       0.00        0.03        0.05
```

**show chassis routing-engine (ACX1000 Universal Metro Router)**

```
user@host> show chassis routing-engine
```

```
Routing Engine status:
  Temperature           36 degrees C / 96 degrees F
  DRAM                  768 MB
  Memory utilization    50 percent
  CPU utilization:
    User                3 percent
    Background          0 percent
    Kernel              6 percent
    Interrupt           0 percent
    Idle                91 percent
  Model                 RE-ACX-1000
  Start time            2012-05-10 07:12:23 PDT
  Uptime                4 days, 10 hours, 46 minutes, 53 seconds
  Last reboot reason    Router rebooted after a normal shutdown.
  Load averages:       1 minute   5 minute   15 minute
                       0.00        0.00        0.00
```

**show chassis routing-engine** (Displaying the guest reboot reason on PTX5000, MX240, MX480, MX960, MX2010, and MX2020)

```
user@host> show chassis routing-engine re0 | match "Last reboot reason"
```

```
Last reboot reason 0x4000:VJUNOS reboot
```

## show chassis satellite

### Syntax

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

### Release Information

Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### 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** *device-alias*—(Optional) Display satellite device connection information for the satellite device 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-name*—(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** *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

### RELATED DOCUMENTATION

### List of Sample Output

[show chassis satellite on page 538](#)

[show chassis satellite device-alias on page 539](#)

[show chassis satellite fpc-slot 130 on page 540](#)

[show chassis satellite terse on page 540](#)

[show chassis satellite detail on page 540](#)

### Output Fields

[Table 19 on page 531](#) lists the output fields for the **show chassis satellite** command. Output fields are listed in the approximate order in which they appear.

Table 19: show chassis satellite Output Fields

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

Table 19: show chassis satellite Output Fields *(continued)*

Field Name	Field Description	Level of Output
Device State		brief terse extensive none

Table 19: show chassis satellite Output Fields (continued)

Field Name	Field Description	Level of Output
	<p>The state of the satellite device within the Junos Fusion.</p> <p>The most common device states:</p> <ul style="list-style-type: none"> <li>• <b>Online</b>—the satellite device is online and active. This is the satellite device state during normal operating procedure.</li> <li>• <b>Offline</b>—the satellite device is offline and not detected. This state is typically seen when the satellite device has been disconnected from the aggregation device, or when all cascade or uplink ports connecting the satellite device to the aggregation device are down.</li> <li>• <b>Present</b>—the satellite device is recognized by the aggregation device, but is not online. This state is typically seen before a satellite device goes online, or while satellite device configuration is in progress or finalizing.</li> <li>• <b>Rebooting</b>—the satellite device is rebooting.</li> <li>• <b>Disable</b>—the satellite device has been disabled.</li> <li>• <b>Misconfig</b>—the satellite device is not properly configured. This state is typically seen when the system ID, cascade port, or FPC slot ID defined for the satellite device has a misconfiguration.</li> <li>• <b>Miswire</b>—the satellite device is miswired. This state is typically seen when a satellite device is wired to two aggregation devices but is not configured for multihoming. Use <b>show chassis satellite detail</b> to gather more information on the issue when the device state is <b>Miswire</b>.</li> </ul> <p>Other less common device states include:</p> <ul style="list-style-type: none"> <li>• <b>ModeChanging</b>—the device is converting from a standalone device to a satellite device, or from a satellite device to a standalone device.</li> <li>• <b>ModeChangeFail</b>—the mode change operation failed.</li> <li>• <b>MinorUpgradeOn</b>—A minor satellite software upgrade is in progress.</li> <li>• <b>MajorUpgradeOn</b>—A major satellite software upgrade is in progress.</li> <li>• <b>Upgrade-pending</b>—the satellite device is waiting for a satellite software upgrade.</li> </ul>	



Table 19: show chassis satellite Output Fields (continued)

Field Name	Field Description	Level of Output
	<ul style="list-style-type: none"> <li>● <b>ProvSessionDn</b>—the provisioning session is down.</li> <li>● <b>ReconcileState</b>—the satellite provisioning daemon has restarted and is reconciling the satellite device state.</li> </ul>	
<b>Cascade Ports</b>	<p>The cascade port or ports.</p> <p>A cascade port is a port on the aggregation device that connects to a satellite device in a Junos Fusion.</p>	brief extensive none
<b>Port State</b>	<p>The state of the cascade port on the aggregation device.</p> <p>Port states include:</p> <ul style="list-style-type: none"> <li>● <b>online</b>—the cascade port is online and active. This is the port state during normal operating procedure.</li> <li>● <b>txUpRxDn</b>—Tx or Rx forwarding is disabled on the cascade port. This state is often seen when a second aggregation device is added to a Junos Fusion topology, and the devices in the Junos Fusion are synchronizing to the new topology.</li> <li>● <b>miswire</b>—the cascade port is miswired. This state is typically seen when a satellite device is interconnected to two aggregation devices but multihoming is not configured. Use <b>show chassis satellite detail</b> to gather more information on the issue when the device state is <b>Miswire</b>.</li> <li>● <b>present</b>—The cascade port recognized the satellite device and is up.</li> <li>● <b>misconfig</b>—the cascade port is assigned, but this interface is not working correctly due to a misconfiguration.</li> <li>● <b>down</b>—the cascade port is down.</li> <li>● <b>offline</b>—the satellite device was previously recognized from this interface, but is no longer present.</li> <li>● <b>absent</b>—the cascade port is configured but no satellite device is detected on the interface.</li> </ul>	brief extensive none
<b>Extended Ports Total</b>	<p>The total number of extended ports on the satellite device.</p> <p>An extended port is a network-facing port on the satellite device that sends and receives network traffic for the Junos Fusion.</p>	brief none terse

Table 19: show chassis satellite Output Fields (continued)

Field Name	Field Description	Level of Output
<b>Extended Ports Up</b>	The number of active extended ports.	brief none terse
<b>Model</b>	The hardware model of the satellite device.	terse
<b>Version</b>	The version of satellite device software running on the satellite device.	terse
<b>Satellite Alias</b>	The satellite device's alias.  The satellite device's alias is configured using the <b>set chassis satellite-management fpc slot-id alias alias</b> statement.	detail
<b>FPC slot</b>	The FPC slot number of the satellite device.  The slot number can be configured using the <b>set chassis satellite-management fpc slot-id</b> statement.	detail
<b>Operational State</b>	The operational state of the satellite device.  The state UFDDown indicates that uplink failure detection disabled the satellite device's extended ports due to an uplink port failure.	detail
<b>Product Model</b>	The hardware model of the satellite device.	detail
<b>Product Family</b>	The product family of the satellite device.	detail
<b>Serial number</b>	The serial number of the satellite device.	detail
<b>System ID</b>	The system ID of the satellite device. The system ID is also the satellite device's MAC address.	detail
<b>Software package version</b>	The satellite software version running on the satellite device.	detail

Table 19: show chassis satellite Output Fields (continued)

Field Name	Field Description	Level of Output
<b>Host software version</b>	The host operating system software version running on the satellite device.	detail
<b>Management Address</b>	<p>The management IP address of the satellite device.</p> <p>This management IP address belongs to an internal routing instance. This management address is assigned by the control plane internally based on FPC slot ID and is used for the control plane traffic between the aggregation device and satellite device.</p> <p>All management in a Junos Fusion should be done through the aggregation device. The management IP address of the satellite device is useful for debugging purposes by expert users only.</p>	detail
<b>UFD config state</b>	Uplink failure detection configuration state.	detail
<b>Minimum link</b>	Uplink failure detection minimum active uplink port setting.	detail
<b>Holdddown timer (seconds)</b>	Uplink failure detection holdddown timer setting, in seconds.	detail
<b>UFD operational state</b>	Uplink failure detection operational state.	detail
<b>Candidate uplink interfaces (pic/port)</b>	Uplink failure detection candidate uplink interfaces.	detail
<b>Extended Ports</b>	<p>The number of extended ports for the satellite device.</p> <p>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.</p>	extensive
<b>When</b>	The date and time of the event.	extensive

Table 19: show chassis satellite Output Fields (continued)

Field Name	Field Description	Level of Output
<b>Event</b>	The event.	extensive
<b>Action</b>	The actions that resulted from the event.	extensive
<b>Fields for Cascade interfaces</b>		
<b>Interface Name</b>	The name of the cascade interface on the aggregation device.	detail
<b>State</b>	The state of the cascade interface.	detail
<b>Uplink Interface</b>	The name of the uplink interface on the satellite device.	detail
<b>Adjacency state</b>	The adjacency state of the cascade to uplink interface link.	detail
<b>Last transition</b>	The amount of time that has passed since the last transition of the cascade to uplink interface link.	detail
<b>Adjacency down count (Interface Name)</b>	The number of times the cascade to uplink interface link has gone into the down state.	detail
<b>RX Packet</b>	The number of packets received on the cascade interface.	detail
<b>Last received packet</b>	The amount of time that has passed since the last packet was received on the cascade interface.	detail
<b>Peer adjacency information</b>	The amount of time that has passed since the last peer adjacency transition.	detail
<b>Adjacency down count (Peer adjacency information)</b>	The number of times the cascade to uplink interface link has gone into the down state.	detail
<b>Last down cause</b>	The cause of the last adjacency failure.	detail

Table 19: show chassis satellite Output Fields (continued)

Field Name	Field Description	Level of Output
<b>SDPD restart detected</b>	The number of times that the satellite device protocol process has restarted.	detail
<b>Fields for Process information</b>		
<b>Process Name</b>	The name of the process.	detail
<b>PID</b>	The process identification number of the process.	detail
<b>State</b>	The current state of the process.	detail
<b>Number of restart detected</b>	The number of times the process has restarted.	detail
<b>Uptime</b>	The amount of time that the process has been running.	detail

## Sample Output

**show chassis satellite**

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

Alias	Slot	Device State	Cascade Ports	Port State	Extended Ports Total/Up
qfx5100-24q-01	100	Online	xe-0/0/1 xe-0/3/0	online	9/2
qfx5100-24q-02	101	Online	xe-0/0/2 xe-0/3/1	online	20/12
qfx5100-24q-03	102	Online	xe-0/0/3 xe-0/3/2	online	16/6
qfx5100-24q-04	103	Online	xe-0/0/4 xe-0/3/3	online	16/4
qfx5100-24q-05	104	Online	xe-0/0/5 xe-0/3/4	online	13/3
qfx5100-24q-06	105	Online	xe-0/0/6 xe-0/3/5	online	24/15
qfx5100-24q-07	106	Online	xe-0/0/7	online	24/15

qfx5100-24q-08	107	Online	xe-0/3/6	online	21/12
			xe-0/0/8	online	
			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	Cascade	Port	Extended Ports
		State	Ports	State	Total/Up
ex4300-22	130	Online	xe-0/2/7	online	49/1

## Sample Output

### show chassis satellite fpc-slot 130

```
user@aggregation-device> show chassis satellite fpc-slot 130
```

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

## Sample Output

### show chassis satellite terse

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

Slot	Device State	Model	Extended Ports Total/Up	Version
101	Online	QFX5100-48S-6Q	7/7	3.0R1.1
102	Online	QFX5100-48S-6Q	7/7	3.0R1.1
103	Online	QFX5100-48S-6Q	6/5	3.0R1.1
104	Online	QFX5100-48S-6Q	14/14	3.0R1.1
105	Online	QFX5100-48S-6Q	18/18	3.0R1.1
106	Online	QFX5100-48S-6Q	17/16	3.0R1.1
107	Online	EX4300-48T	52/6	3.0R1.1
108	Online	EX4300-48T	52/15	3.0R1.1
109	Online	EX4300-48T	51/14	3.0R1.1
110	Online	EX4300-48T	51/14	3.0R1.1
111	Online	EX4300-48T	51/13	3.0R1.1
112	Online	EX4300-48T	51/12	3.0R1.1
113	Online	EX4300-48T	51/13	3.0R1.1
114	Online	QFX5100-24Q-2P	17/13	3.0R1.1

### show chassis satellite detail

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

```
Satellite Alias: qfx5100-48s-02
FPC Slot: 101
Operational State: Online
Product Model: QFX5100-48S-6Q
```

```
Product Family: i386
Serial number: ABC123DEF456
System id: 00:11:22:aa:bb:cc
Software package version: 3.0R1.1
Host software version: 1.0.0
Management Address: 172.16.0.101/32
Cascade interfaces:
  Interface Name: xe-0/0/2 State: online
    Uplink Interface: xe-001/0/48:0
    Adjacency state: Two-Way
    Last transition: 00:10:22
    Adjacency down count: 0
    Rx Packet: 65 Last received packet: 00:00:02
    Peer adjacency information: 00:10:22
      Adjacency down count: 3
      Last down cause: Interface Down
      SDPD restart detected: 3
  Interface Name: xe-0/2/1 State: online
    Uplink Interface: xe-001/0/48:1
    Adjacency state: Two-Way
    Last transition: 00:10:22
    Adjacency down count: 0
    Rx Packet: 64 Last received packet: 00:00:02
    Peer adjacency information: 00:10:22
      Adjacency down count: 3
      Last down cause: Interface Down
      SDPD restart detected: 3
  Interface Name: xe-2/0/0 State: online
    Uplink Interface: xe-001/0/48:2
    Adjacency state: Two-Way
    Last transition: 00:10:22
    Adjacency down count: 0
    Rx Packet: 65 Last received packet: 00:00:02
    Peer adjacency information: 00:10:22
      Adjacency down count: 3
      Last down cause: Interface Down
      SDPD restart detected: 3
  Interface Name: xe-2/1/6 State: online
    Uplink Interface: xe-001/0/48:3
    Adjacency state: Two-Way
    Last transition: 00:10:22
    Adjacency down count: 0
    Rx Packet: 65 Last received packet: 00:00:02
    Peer adjacency information: 00:10:22
```



```

        Adjacency down count: 3
        Last down cause: Hold timer expire
        SDPD restart detected: 3
Process information:
    Process Name: Provisioning PID: 6716 State: Running
        Number of restart detected: 0
        Uptime: 00:10:22
    Process Name: PFE PID: 3194 State: Running
        Number of restart detected: 0
        Uptime: 00:10:22
UFD config state: Enable (persist), Minimum link: 1,
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>

```

## show chassis satellite extended-port

### Syntax

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

### Release Information

Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### Description

Display the status of the extended ports on the satellite devices in a Junos Fusion.

The extended ports are the network-facing ports on satellite devices that send and receive network traffic for a Junos Fusion.

### Options

**none**—(Same as **brief** and **terse**) Display extended port status information.

**brief | detail | extensive | terse**—(Optional) Display the specified level of output.

**fpc *fpc-slot***—Display extended port status information for the specified FPC slot only. In a Junos Fusion, one FPC slot ID is assigned to each satellite device, so you can use this option to display extended port status information for all extended ports on one satellite device.

**interface-name *interface-name***—Display extended port status information for the extended port interface only.

**history**—Display extended port history.

**statistics**—Display extended port statistics.

**since *time***—(Optional) Display extended port status information for the satellite devices that have been added to the Junos Fusion on or after a certain date or time, which is entered in the YYYY-MM-DD.HH:MM:SS format.

To display extended port status information for all satellite devices added since a specified date, enter the specific date as the time as the *time*. For instance, **2015-12-22**.

To display extended port status information for all satellite devices added since a specified time, enter the specific date and time as the *time*. For instance, **2015-12-22.11:01:00**.

**Required Privilege Level**  
view

RELATED DOCUMENTATION

Configuring or Expanding a Junos Fusion Enterprise

Configuring Junos Fusion Provider Edge | 44

**List of Sample Output**  
[show chassis satellite extended-port on page 546](#)

**Output Fields**

[Table 20 on page 545](#) lists the output fields for the **show chassis satellite extended-port** command. Output fields are listed in the approximate order in which they appear.

Table 20: show chassis satellite extended-port Output Fields

Field Name	Field Description	Level of Output
<b>Fields for Interface</b>		
<b>Name</b>	The interface name of the extended port.	brief terse detail extensive none
<b>State</b>	The state of the extended port.	brief terse detail extensive none
<b>Rx Request State</b>	The receive request state of the extended port.	brief terse detail extensive none
<b>Tx Request State</b>	The transmit request state of the extended port.	brief terse detail extensive none

Table 20: show chassis satellite extended-port Output Fields (*continued*)

Field Name	Field Description	Level of Output
<b>Admin State</b>	The administrative state of the extended port.	brief terse detail extensive none
<b>Op State</b>	The operational state of the extended port.	brief terse detail extensive none
<b>IFD Idx</b>	The internal interface index.	brief terse detail extensive none
<b>PCID</b>	The port's E-channel identifier (ECID), abbreviated as PCID.	brief terse detail extensive none
<b>When</b>	The date and time of the event.	detail extensive
<b>Event</b>	The event.	detail extensive
<b>Action</b>	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		Tx		Admin/Op		IFD	PCID
		Request	State	Request	State	State	Idx		
et-100/0/2	AddComplete	None		Ready		Up/Dn	838		110
et-104/0/2	AddComplete	None		Ready		Up/Dn	813		110
et-107/0/23	AddComplete	None		Ready		Up/Up	544		194
ge-109/0/0	AddComplete	None		Ready		Up/Up	402		115
ge-109/0/1	AddComplete	None		Ready		Up/Dn	403		114
ge-109/0/10	AddComplete	None		Ready		Up/Dn	412		113
ge-109/0/11	AddComplete	None		Ready		Up/Dn	413		112
ge-109/0/12	AddComplete	None		Ready		Up/Dn	414		123
ge-109/0/13	AddComplete	None		Ready		Up/Dn	415		122
ge-109/0/14	AddComplete	None		Ready		Up/Dn	416		125
ge-109/0/15	AddComplete	None		Ready		Up/Dn	417		124
ge-109/0/16	AddComplete	None		Ready		Up/Dn	418		131
ge-109/0/17	AddComplete	None		Ready		Up/Dn	419		130
ge-109/0/18	AddComplete	None		Ready		Up/Dn	420		133
ge-109/0/19	AddComplete	None		Ready		Up/Dn	421		132
ge-109/0/2	AddComplete	None		Ready		Up/Dn	404		117
ge-109/0/20	AddComplete	None		Ready		Up/Dn	422		127
ge-109/0/21	AddComplete	None		Ready		Up/Dn	423		126
ge-109/0/22	AddComplete	None		Ready		Up/Dn	424		129
ge-109/0/23	AddComplete	None		Ready		Up/Dn	425		128
ge-109/0/24	AddComplete	None		Ready		Up/Dn	426		103
ge-109/0/25	AddComplete	None		Ready		Up/Dn	427		102
ge-109/0/26	AddComplete	None		Ready		Up/Dn	428		105
ge-109/0/27	AddComplete	None		Ready		Up/Dn	429		104
ge-109/0/28	AddComplete	None		Ready		Up/Dn	430		107
ge-109/0/29	AddComplete	None		Ready		Up/Dn	431		106
ge-109/0/3	AddComplete	None		Ready		Up/Dn	405		116
ge-109/0/30	AddComplete	None		Ready		Up/Dn	432		109
ge-109/0/31	AddComplete	None		Ready		Up/Dn	433		108
ge-109/0/32	AddComplete	None		Ready		Up/Dn	434		135
ge-109/0/33	AddComplete	None		Ready		Up/Dn	435		134
ge-109/0/34	AddComplete	None		Ready		Up/Dn	436		137
ge-109/0/35	AddComplete	None		Ready		Up/Dn	437		136
ge-109/0/36	AddComplete	None		Ready		Up/Dn	438		144
ge-109/0/37	AddComplete	None		Ready		Up/Dn	439		143
ge-109/0/38	AddComplete	None		Ready		Up/Dn	440		146
ge-109/0/39	AddComplete	None		Ready		Up/Dn	441		145
ge-109/0/4	AddComplete	None		Ready		Up/Dn	406		119
ge-109/0/40	AddComplete	None		Ready		Up/Dn	442		140
ge-109/0/41	AddComplete	None		Ready		Up/Dn	443		139

ge-109/0/42	AddComplete	None	Ready	Up/Dn	444	142
ge-109/0/43	AddComplete	None	Ready	Up/Dn	445	141
ge-109/0/44	AddComplete	None	Ready	Up/Dn	446	148
ge-109/0/45	AddComplete	None	Ready	Up/Dn	447	147
ge-109/0/46	AddComplete	None	Ready	Up/Dn	448	150
ge-109/0/47	AddComplete	None	Ready	Up/Dn	449	149
ge-109/0/5	AddComplete	None	Ready	Up/Dn	407	118
ge-109/0/6	AddComplete	None	Ready	Up/Dn	408	121
ge-109/0/7	AddComplete	None	Ready	Up/Dn	409	120
ge-109/0/8	AddComplete	None	Ready	Up/Dn	410	111
ge-109/0/9	AddComplete	None	Ready	Up/Dn	411	110
ge-110/0/0	AddComplete	None	Ready	Up/Up	728	115
ge-110/0/1	AddComplete	None	Ready	Up/Dn	729	114

## show chassis satellite interface

### Syntax

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

### Release Information

Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### 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

### RELATED DOCUMENTATION

*Configuring or Expanding a Junos Fusion Enterprise*

Configuring Junos Fusion Provider Edge | 44



## List of Sample Output

[show chassis satellite interface on page 551](#)

[show chassis satellite interface \(Junos Fusion Data Center with EVPN-VXLAN\) on page 554](#)

## Output Fields

[Table 21 on page 550](#) lists the output fields for the **show chassis satellite interface** command. Output fields are listed in the approximate order in which they appear.

**Table 21: show chassis satellite interface Output Fields**

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

Table 21: show chassis satellite interface Output Fields (continued)

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

## show chassis satellite neighbor

### Syntax

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

### Release Information

Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### 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

### RELATED DOCUMENTATION

*Configuring or Expanding a Junos Fusion Enterprise*

[Configuring Junos Fusion Provider Edge](#) | 44

### List of Sample Output

[show chassis satellite neighbor on page 559](#)

## Output Fields

Table 22 on page 557 lists the output fields for the **show chassis satellite neighbor** command. Output fields are listed in the approximate order in which they appear.

Table 22: show chassis satellite neighbor Output Fields

Field Name	Field Description	Level of Output
<b>Fields for Interface</b>		
<b>Interface</b>	<p>A cascade port interface on the aggregation device in the Junos Fusion.</p> <p>A cascade port interface on an aggregation device connects to a satellite device in a Junos Fusion.</p>	brief terse detail extensive none
<b>State</b>	The state of the interface.	brief terse detail extensive none
<b>Port Info</b>	<p>The uplink port interface on the satellite device.</p> <p>An uplink port interface on a satellite device connects the satellite device to an aggregation device in a Junos Fusion.</p>	brief terse detail extensive none
<b>System Name</b>	<p>The system name, or alias, of the satellite device.</p> <p>The satellite device's alias is configured using the <b>set chassis satellite-management fpc slot-id alias alias</b> statement.</p>	brief terse detail extensive none
<b>Model</b>	The hardware model of the satellite device.	brief terse detail extensive none
<b>SW Version</b>	The version of satellite software running on the satellite device.	brief terse detail extensive none



Table 22: show chassis satellite neighbor Output Fields (continued)

Field Name	Field Description	Level of Output
<b>Adjacency up-down transition count</b>	The number of times that the adjacency has transitioned between up and down.	brief detail extensive
<b>Last transition</b>	The last transition of the adjacency state.	brief detail extensive
<b>Device Serial Number</b>	The serial number of the satellite device.	brief detail extensive
<b>Chassis ID</b>	The chassis ID of the satellite device. The chassis ID of the satellite device is the satellite's device's MAC address. The chassis ID is also specified as the system ID in some Junos Fusion configuration tasks.	brief detail extensive
<b>Device Family Name</b>	The device family name.	brief detail extensive
<b>Version Sequence Number</b>	The version sequence number.	brief detail extensive
<b>System Description</b>	A plain-text description of the hardware and software currently running on the satellite device.	brief detail extensive
<b>Build date</b>	The date and time that the satellite software was built.	brief detail extensive
<b>Hello interval</b>	The current hello interval configuration.	brief detail extensive
<b>Satellite hello interval</b>	The current satellite device hello interval configuration.	brief detail extensive

Table 22: show chassis satellite neighbor Output Fields (continued)

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

```

# show chassis satellite software

## Syntax

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

## Release Information

Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.  
Command introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.

## 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

## RELATED DOCUMENTATION

*Configuring or Expanding a Junos Fusion Enterprise*

[Configuring Junos Fusion Provider Edge | 44](#)

## List of Sample Output

[show chassis satellite software on page 563](#)

[show chassis satellite software detail on page 564](#)

## Output Fields

[Table 23 on page 562](#) lists the output fields for the **show chassis satellite neighbor** command. Output fields are listed in the approximate order in which they appear.

Table 23: show chassis satellite software Output Fields

Field Name	Field Description	Level of Output
<b>Fields for Interface</b>		
<b>Version</b>	The versions of satellite software that are installed and associated with a software upgrade group.	brief none

Table 23: show chassis satellite software Output Fields (continued)

Field Name	Field Description	Level of Output
<b>Platforms</b>	The hardware platform information.	brief none
<b>Group</b>	The name of the assigned satellite software group or groups, if assigned.	brief none
<b>Software Package Version</b>	The satellite software package version.	detail
<b>Platform</b>	The platform type.	detail
<b>Host Version</b>	The host version of software for the platform.	detail
<b>Current Groups</b>	<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
<b>Former Groups</b>	<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
                  QFX5100-96S-8Q
                  QFX5100-48SH-6Q
                  QFX5100-48TH-6Q
  ppc           1.1.2      EX4300-24P
                  EX4300-24T
                  EX4300-48P
                  EX4300-48T
                  EX4300-48T-BF
                  EX4300-48T-DC
                  EX4300-48T-DC-BF
  arm           1.0.0      EX2300-24P
                  EX2300-24T-DC
                  EX2300-C-12T
                  EX4300-C-12P
  arm563xx      1.0.0      EX3400-24P
                  EX3400-24T
                  EX3400-48T
                  EX3400-48P

Current Groups: group1
                group2
                group3
                group4
                group5
```

# show chassis satellite statistics

## Syntax

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

## Release Information

Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.  
Command introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.

## 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

## RELATED DOCUMENTATION

- [Configuring or Expanding a Junos Fusion Enterprise](#)
- [Configuring Junos Fusion Provider Edge | 44](#)

## List of Sample Output

- [show chassis satellite statistics on page 567](#)
- [show chassis satellite statistics device-alias qfx5100-48s-02 on page 570](#)
- [show chassis satellite statistics fpc-slot 101 on page 571](#)

## Output Fields

[Table 24 on page 566](#) lists the output fields for the **show chassis satellite statistics** command. Output fields are listed in the approximate order in which they appear.



Table 24: show chassis satellite statistics Output Fields

Field Name	Field Description
<b>Fields for Interface</b>	
<b>Serial Number</b>	The serial number of the satellite device.
<b>Slot-ID</b>	The FPC slot ID of the satellite device.
<b>CSP down transition count</b>	The number of times that the Control and Status Protocol (CSP) session has gone down.
<b>Last transition (CSP down transition count)</b>	The last time that the Control and Status Protocol (CSP) session transitioned.
<b>Reachability down transition count</b>	The number of times the satellite device has been in the reachability down state.
<b>Reachability change transition count (Reachability down transition count)</b>	The number of times that the satellite device's reachability state has transitioned.
<b>S/W image update count</b>	The number of times that the satellite software has been updated on the satellite device.
<b>Extended Port add/delete/up/down request/response</b>	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.
<b>Extended Port Params change request</b>	The number of times that an extended port—a network-facing port on the satellite device—has had a change request.
<b>Extended Port up/down operational state transition</b>	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.
<b>Rx sync complete</b>	The number of times the receive synchronization state has been completed.
<b>Uplink ready rx count</b>	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.
<b>Uplink ready tx count</b>	The number of times the uplink port—the port on the satellite device that connects to the aggregation device—has been placed in the ready-to-transmit state.

## Sample Output

### show chassis satellite statistics

user@aggregation-device> **show chassis satellite statistics**

```

Serial Number: TA3714160468 Slot-ID: 101
  CSP down transition count: 0 Last transition: 05:23:56
  Reachability down transition count: 0
  Reachability change transition count: 4 Last transition: 05:23:16
  S/W image update count: 0
  Extended Port add/delete/up/down request/response: 7/0/7/2 7/0/7/2
  Extended Port Params change request: 0
  Extended Port up/down operational state transition: 7/0
  Rx sync complete: 1
  Uplink ready rx count: 4
  Uplink ready tx count: 4
Serial Number: TA3714160046 Slot-ID: 102
  CSP down transition count: 0 Last transition: 05:23:55
  Reachability down transition count: 0
  Reachability change transition count: 4 Last transition: 05:23:19
  S/W image update count: 0
  Extended Port add/delete/up/down request/response: 7/0/7/2 7/0/7/2
  Extended Port Params change request: 0
  Extended Port up/down operational state transition: 7/0
  Rx sync complete: 1
  Uplink ready rx count: 4
  Uplink ready tx count: 4
Serial Number: TA3714140404 Slot-ID: 103
  CSP down transition count: 0 Last transition: 05:23:57
  Reachability down transition count: 0
  Reachability change transition count: 4 Last transition: 05:23:14
  S/W image update count: 0
  Extended Port add/delete/up/down request/response: 6/0/5/3 6/0/5/3
  Extended Port Params change request: 0
  Extended Port up/down operational state transition: 5/0
  Rx sync complete: 1
  Uplink ready rx count: 4
  Uplink ready tx count: 4
Serial Number: TA3714141327 Slot-ID: 104
  CSP down transition count: 0 Last transition: 05:23:57
  Reachability down transition count: 0
  Reachability change transition count: 4 Last transition: 05:23:15
  S/W image update count: 0
  Extended Port add/delete/up/down request/response: 14/0/14/2 14/0/14/2

```

```

Extended Port Params change request: 0
Extended Port up/down operational state transition: 14/0
Rx sync complete: 1
Uplink ready rx count: 4
Uplink ready tx count: 4
Serial Number: TA3714140200 Slot-ID: 105
  CSP down transition count: 0 Last transition: 05:23:59
  Reachability down transition count: 0
  Reachability change transition count: 4 Last transition: 05:23:15
  S/W image update count: 0
  Extended Port add/delete/up/down request/response: 18/0/18/2 18/0/18/2
  Extended Port Params change request: 6
  Extended Port up/down operational state transition: 18/0
  Rx sync complete: 1
  Uplink ready rx count: 4
  Uplink ready tx count: 4
Serial Number: TA3714140904 Slot-ID: 106
  CSP down transition count: 0 Last transition: 05:23:57
  Reachability down transition count: 0
  Reachability change transition count: 4 Last transition: 05:23:16
  S/W image update count: 0
  Extended Port add/delete/up/down request/response: 17/0/16/3 17/0/16/3
  Extended Port Params change request: 2
  Extended Port up/down operational state transition: 16/0
  Rx sync complete: 1
  Uplink ready rx count: 4
  Uplink ready tx count: 4
Serial Number: PE3714040197 Slot-ID: 107
  CSP down transition count: 0 Last transition: 05:24:32
  Reachability down transition count: 0
  Reachability change transition count: 4 Last transition: 05:23:18
  S/W image update count: 0
  Extended Port add/delete/up/down request/response: 52/0/7/50 52/0/7/50
  Extended Port Params change request: 0
  Extended Port up/down operational state transition: 7/1
  Rx sync complete: 1
  Uplink ready rx count: 4
  Uplink ready tx count: 4
Serial Number: PE3714080398 Slot-ID: 108
  CSP down transition count: 0 Last transition: 05:24:32
  Reachability down transition count: 0
  Reachability change transition count: 4 Last transition: 05:23:18
  S/W image update count: 0
  Extended Port add/delete/up/down request/response: 52/0/15/40 52/0/15/40

```

```

Extended Port Params change request: 0
Extended Port up/down operational state transition: 15/0
Rx sync complete: 1
Uplink ready rx count: 4
Uplink ready tx count: 4
Serial Number: PE3714080103 Slot-ID: 109
  CSP down transition count: 0 Last transition: 05:23:22
  Reachability down transition count: 0
  Reachability change transition count: 3 Last transition: 05:23:19
  S/W image update count: 0
  Extended Port add/delete/up/down request/response: 51/0/14/37 51/0/14/37
  Extended Port Params change request: 51
  Extended Port up/down operational state transition: 14/0
  Rx sync complete: 1
  Uplink ready rx count: 3
  Uplink ready tx count: 3
Serial Number: PE3714090246 Slot-ID: 110
  CSP down transition count: 0 Last transition: 05:23:22
  Reachability down transition count: 0
  Reachability change transition count: 3 Last transition: 05:23:19
  S/W image update count: 0
  Extended Port add/delete/up/down request/response: 51/0/14/37 51/0/14/37
  Extended Port Params change request: 42
  Extended Port up/down operational state transition: 14/0
  Rx sync complete: 1
  Uplink ready rx count: 3
  Uplink ready tx count: 3
Serial Number: PE3714080417 Slot-ID: 111
  CSP down transition count: 0 Last transition: 05:23:22
  Reachability down transition count: 0
  Reachability change transition count: 3 Last transition: 05:23:19
  S/W image update count: 0
  Extended Port add/delete/up/down request/response: 51/0/13/38 51/0/13/38
  Extended Port Params change request: 51
  Extended Port up/down operational state transition: 13/0
  Rx sync complete: 1
  Uplink ready rx count: 3
  Uplink ready tx count: 3
Serial Number: PE3714080018 Slot-ID: 112
  CSP down transition count: 0 Last transition: 05:23:22
  Reachability down transition count: 0
  Reachability change transition count: 2 Last transition: 05:23:18
  S/W image update count: 0
  Extended Port add/delete/up/down request/response: 51/0/12/39 51/0/12/39

```

```

Extended Port Params change request: 51
Extended Port up/down operational state transition: 12/0
Rx sync complete: 1
Uplink ready rx count: 2
Uplink ready tx count: 2
Serial Number: PE3714080030 Slot-ID: 113
  CSP down transition count: 0 Last transition: 05:23:22
  Reachability down transition count: 0
  Reachability change transition count: 3 Last transition: 05:23:18
  S/W image update count: 0
  Extended Port add/delete/up/down request/response: 51/0/13/38 51/0/13/38
  Extended Port Params change request: 51
  Extended Port up/down operational state transition: 13/0
  Rx sync complete: 1
  Uplink ready rx count: 3
  Uplink ready tx count: 3
Serial Number: TB3714070145 Slot-ID: 114
  CSP down transition count: 0 Last transition: 05:23:58
  Reachability down transition count: 0
  Reachability change transition count: 4 Last transition: 05:23:15
  S/W image update count: 0
  Extended Port add/delete/up/down request/response: 17/0/13/7 17/0/13/7
  Extended Port Params change request: 0
  Extended Port up/down operational state transition: 13/0
  Rx sync complete: 1
  Uplink ready rx count: 4
  Uplink ready tx count: 4

```

## Sample Output

**show chassis satellite statistics device-alias qfx5100-48s-02**

user@aggregation-device> **show chassis satellite statistics device-alias qfx5100-48s-02**

```

Serial Number: TA3714160468 Slot-ID: 101
  CSP down transition count: 0 Last transition: 05:52:44
  Reachability down transition count: 0
  Reachability change transition count: 4 Last transition: 05:52:04
  S/W image update count: 0
  Extended Port add/delete/up/down request/response: 7/0/7/2 7/0/7/2
  Extended Port Params change request: 0
  Extended Port up/down operational state transition: 7/0

```

```
Rx sync complete: 1
Uplink ready rx count: 4
Uplink ready tx count: 4
```

## Sample Output

**show chassis satellite statistics fpc-slot 101**

user@aggregation-device> **show chassis satellite statistics fpc-slot 101**

```
Serial Number: TA3714160468 Slot-ID: 101
  CSP down transition count: 0 Last transition: 05:52:44
  Reachability down transition count: 0
  Reachability change transition count: 4 Last transition: 05:52:04
  S/W image update count: 0
  Extended Port add/delete/up/down request/response: 7/0/7/2 7/0/7/2
  Extended Port Params change request: 0
  Extended Port up/down operational state transition: 7/0
  Rx sync complete: 1
  Uplink ready rx count: 4
  Uplink ready tx count: 4
```

## show chassis satellite unprovision

### Syntax

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

### Release Information

Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### 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 44](#) or *Configuring or Expanding a Junos Fusion Enterprise* for information on associating an FPC ID with a Junos Fusion.

### Options

**none**—(Same as **brief**) Display unprovisioned satellite device information.

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

**cluster *cluster-name***—(Optional) Display unprovisioned satellite device information for the specified satellite device cluster only.

**since *time***—(Optional) Display unprovisioned satellite device information for the satellite devices that have been unprovisioned from a Junos Fusion on or after a certain date or time, which is entered in the YYYY-MM-DD.HH:MM:SS format.

To display unprovisioned satellite device information for all satellite devices unprovisioned since a specified date, enter the specific date as the *time*. For instance, **2015-12-22**.

To display unprovisioned satellite device information for all satellite devices added since a specified time, enter the specific date and time as the *time*. For instance, **2015-12-22.11:01:00**.

### Required Privilege Level

view

### RELATED DOCUMENTATION

*Configuring or Expanding a Junos Fusion Enterprise*

[Configuring Junos Fusion Provider Edge | 44](#)

### List of Sample Output

[show chassis satellite unprovision on page 575](#)

[show chassis satellite unprovision detail on page 576](#)

### Output Fields

[Table 25 on page 573](#) lists the output fields for the **show chassis satellite unprovision** command. Output fields are listed in the approximate order in which they appear.

Table 25: show chassis satellite unprovision Output Fields

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



Table 25: show chassis satellite unprovision Output Fields (*continued*)

Field Name	Field Description	Level of Output
<b>Product Family</b>	The product family of the satellite device.	detail
<b>Serial number</b>	The serial number of the satellite device.	detail
<b>System id</b>	The MAC address of the satellite device.	detail
<b>Software package version</b>	The satellite software package version running on the satellite device.	detail
<b>Host software version</b>	The host software version.	detail
<b>Fields for Cascade interfaces</b>		
<b>Interface Name</b>	The interface name of the cascade port on the aggregation device.	detail
<b>State</b>	The state of the cascade port.	detail
<b>Uplink Interface</b>	The uplink interface name. The uplink interface is the interface on the satellite device that connects to the aggregation device.	detail
<b>Adjacency State</b>	The adjacency state of the uplink interface to cascade port link.	detail
<b>Last transition</b>	The amount of time that has passed since the last link transition.	detail
<b>Adjacency down count</b>	The number of times that the uplink interface to cascade port link has gone into the adjacency down count.	detail
<b>Rx Packet</b>	The number of received packets.	detail
<b>Last received packet</b>	The amount of time that has passed since the last received packet.	detail
<b>Peer adjacency information</b>	The amount of time that the adjacency has been active.	detail
<b>Last down cause</b>	The cause of the last time the adjacency went down.	detail

Table 25: show chassis satellite unprovision Output Fields (*continued*)

Field Name	Field Description	Level of Output
<b>SDPD restart detected</b>	The number of times that the SDPD has restarted.	detail
<b>Fields for process information</b>		
<b>Process Name</b>	The name of the process.	detail
<b>PID</b>	The PID of the process.	detail
<b>State</b>	The current state of the process.	detail
<b>Number of restart detected</b>	The number of times that the process has restarted.	detail
<b>Uptime</b>	The amount of time that the process has been active.	detail
<b>When</b>	The date and time of the event.	extensive
<b>Event</b>	The event.	extensive
<b>Action</b>	The actions that resulted from the event.	extensive

## Sample Output

**show chassis satellite unprovision**

user@aggregation-device> **show chassis satellite unprovision**

System-Id	Serial-Number	Device	Cascade	Port
AA:BB:CC:aa:bb:cc	TABCDE111111	State	Ports	State
		Present	xe-0/0/1	present
			xe-0/1/2	present
AA:BB:CC:aa:bb:zz	PABCDE111111	Present	xe-0/0/2	present
			xe-0/3/2	present

## Sample Output

### show chassis satellite unprovision detail

user@aggregation-device> show chassis satellite unprovision detail

```
Operational State: Present
Product Model: QFX5100-48S-6Q
Product Family: i386
Serial number: TABCDE111111
System id: AA:BB:CC:aa:bb:cc
Software package version: 3.0R1
Host software version: 0.2.3
Cascade interfaces:
  Interface Name: xe-0/0/1 State: present
    Uplink Interface: xe-0/0/25
    Adjacency state: Two-Way
    Last transition: 3d 22:06:55
    Adjacency down count: 0
    Rx Packet: 33875 Last received packet: 00:00:09
    Peer adjacency information: 3d 22:06:55
      Adjacency down count: 3
      Last down cause: TTL is 0
      SDPD restart detected: 3
  Interface Name: xe-0/1/2 State: present
    Uplink Interface: xe-0/0/24
    Adjacency state: Two-Way
    Last transition: 3d 22:06:58
    Adjacency down count: 0
    Rx Packet: 33875 Last received packet: 00:00:09
    Peer adjacency information: 3d 22:06:58
      Adjacency down count: 5
      Last down cause: TTL is 0
      SDPD restart detected: 3
Process information:
  Process Name: Provisioning PID: 2488 State: Running
    Number of restart detected: 0
    Uptime: 3d 22:06:58
  Process Name: PFE PID: 2631 State: Running
    Number of restart detected: 0
    Uptime: 3d 22:06:58
Operational State: Present
Product Model: EX4300-48T
Product Family: ppc
Serial number: PABCDE111111
```

```
System id: AA:BB:CC:aa:bb:zz
Software package version: 3.0R1
Host software version: 0.2.4
Cascade interfaces:
  Interface Name: xe-0/0/2 State: present
    Uplink Interface: xe-0/2/1
    Adjacency state: Two-Way
    Last transition: 3d 22:06:56
    Adjacency down count: 0
    Rx Packet: 33876 Last received packet: 00:00:05
    Peer adjacency information: 3d 22:06:56
      Adjacency down count: 1
      Last down cause: TTL is 0
      SDPD restart detected: 2
  Interface Name: xe-0/3/2 State: present
    Uplink Interface: xe-0/2/0
    Adjacency state: Two-Way
    Last transition: 3d 22:06:57
    Adjacency down count: 0
    Rx Packet: 33876 Last received packet: 00:00:05
    Peer adjacency information: 3d 22:06:57
      Adjacency down count: 3
      Last down cause: TTL is 0
      SDPD restart detected: 2
Process information:
  Process Name: Provisioning PID: 1603 State: Running
    Number of restart detected: 0
    Uptime: 3d 22:06:57
  Process Name: PFE PID: 1615 State: Running
    Number of restart detected: 0
    Uptime: 3d 22:06:57
```

## show chassis satellite upgrade-group

### Syntax

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

### Release Information

Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### 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.

**upgrade-group-name**—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 upgrade-group-name** statement for standalone satellite devices and is the cluster name for satellite device clusters.

### Required Privilege Level

view

## RELATED DOCUMENTATION

*Configuring or Expanding a Junos Fusion Enterprise*

### List of Sample Output

[show chassis satellite upgrade-group on page 580](#)

[show chassis satellite upgrade-group detail on page 581](#)

### Output Fields

Table 26 on page 579 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 26: show chassis satellite upgrade-group Output Fields

Field Name	Field Description	Level of Output
<b>Fields for Interface</b>		
<b>Group</b>	<p>The satellite software upgrade group name.</p> <p>The satellite software upgrade group name is the name of the satellite device cluster when used with a satellite device cluster. A satellite software upgrade group with the name of the satellite device cluster is created automatically when a satellite device cluster is configured.</p> <p>The satellite software upgrade group name is set using the <b>set chassis satellite-management upgrade-groups upgrade-group-name</b> statement for standalone satellite devices.</p>	<p>brief</p> <p>terse</p> <p>extensive</p> <p>none</p>
<b>Sw-Version</b>	The version of satellite software associated with the satellite software upgrade group.	<p>brief</p> <p>terse</p> <p>extensive</p> <p>none</p>
<b>Group State</b>	The state of the satellite software upgrade group.	<p>brief</p> <p>terse</p> <p>extensive</p> <p>none</p>
<b>Slot</b>	The FPC slot identification number of the satellite device that is a member of the satellite software upgrade group.	<p>brief</p> <p>terse</p> <p>detail</p> <p>extensive</p> <p>none</p>

Table 26: show chassis satellite upgrade-group Output Fields (continued)

Field Name	Field Description	Level of Output
<b>Device State</b>	The state of the satellite software for the specified member of the satellite software upgrade group.  The <b>version-in-sync</b> output appears when the satellite device is running the satellite software version that is associated with the satellite software upgrade group.	brief terse detail extensive none
<b>Software upgrade group</b>	The name of the satellite software upgrade group.	detail
<b>Software package version</b>	The satellite software package associated with the satellite software upgrade group.	detail
<b>Previous software package version</b>	The satellite software package that was previously associated with the satellite software upgrade group.  This output only appears if the satellite software upgrade group was previously associated with another version of satellite software.	detail

## Sample Output

**show chassis satellite upgrade-group**

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

Group	Sw-Version	Group State	Slot	Device State
__ungrouped__				
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
```



## show chassis temperature-thresholds

### List of Syntax

[Syntax on page 582](#)

[Syntax \(TX Matrix Routers\) on page 582](#)

[Syntax \(TX Matrix Plus Routers\) on page 582](#)

[Syntax \(MX Series Routers\) on page 582](#)

[Syntax \(QFX Series\) on page 582](#)

### 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>
```

### Release Information

Command introduced in Junos OS Release 8.0.

Command introduced in Junos OS Release 9.0 for EX Series switches.

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

Command introduced in Junos OS Release 11.1 for QFX Series.

Command introduced in Junos OS Release 12.1 for T4000 Core Routers.

Command introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers.

Command introduced in Junos OS Release 12.3 for MX2010 and MX2020 Universal Routing Platforms.

Command introduced in Junos OS Release 13.2 for MX104 Universal Routing Platforms.

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

Command introduced in Junos OS Release 17.2 for MX2008 Universal Routing Platforms and PTX10008 Routers.

Command introduced in Junos OS Release 17.3 for MX10003 Universal Routing Platforms and MX150 Router Appliance.

Command introduced in Junos OS Release 17.4 for MX204 Universal Routing Platforms.

Command introduced in Junos OS Release 18.1R1 for EX9251 switches.

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

### 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 *name***—(QFabric systems only) (Optional) Display the chassis temperature threshold settings of the Interconnect device.

**lcc *number***—(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 *member-id***—(MX Series routers only) (Optional) Display the chassis temperature threshold settings of the specified member of the Virtual Chassis configuration. Replace *member-id* with a value of 0 or 1.

**node-device *name***—(QFabric systems only) (Optional) Display the chassis temperature threshold settings of the Node device.

**satellite [*slot-id slot-ID* | *device-alias alias-name*]**—(Junos Fusion only) (Optional) Display the chassis temperature threshold settings for the specified satellite device or devices in a Junos Fusion, or for all satellite devices if no satellite devices are specified.

**scc**—(TX Matrix routers only) (Optional) Display the temperature threshold details of the TX Matrix router (switch-card chassis).

**sfc *number***—(TX Matrix Plus routers only) (Optional) On TX Matrix Plus routers, display the temperature threshold details of the TX Matrix Plus router, which is the switch-fabric chassis. Replace *number* with 0.

### Required Privilege Level

view

### List of Sample Output

[show chassis temperature-thresholds on page 586](#)

[show chassis temperature-thresholds \(MX150\) on page 586](#)

[show chassis temperature-thresholds \(MX104 Router\) on page 587](#)

[show chassis temperature-thresholds \(MX240, MX480, MX960 Routers with Application Services Modular Line Card\) on page 587](#)

[show chassis temperature-thresholds \(MX480 Router with MPC4E\) on page 588](#)

[show chassis temperature-thresholds \(MX2010 Router with MPC7E, MPC8E, and MPC9E\) on page 588](#)

[show chassis temperature-thresholds \(MX2020 Router with MPC4E\) on page 593](#)

[show chassis temperature-thresholds \(MX2008 Routers\) on page 595](#)

[show chassis temperature-thresholds \(MX204 Router\) on page 599](#)

[show chassis temperature-thresholds \(PTX10008 Routers\) on page 600](#)

[show chassis temperature-thresholds \(T4000 Core Routers\) on page 602](#)

[show chassis temperature-thresholds \(TX Matrix Plus Router\) on page 603](#)

[show chassis temperature-thresholds lcc \(TX Matrix Plus Router\) on page 604](#)

[show chassis temperature-thresholds sfc \(TX Matrix Plus Router\) on page 605](#)

[show chassis temperature-thresholds \(TX Matrix Plus routers with 3D SIBs\) on page 606](#)

[show chassis temperature-thresholds \(QFX3500 Switch and QFX3600\) on page 607](#)

[show chassis temperature-thresholds interconnect-device \(QFabric System\) on page 608](#)

[show chassis temperature-thresholds \(PTX5000 Packet Transport Router\) on page 608](#)

[show chassis temperature-thresholds \(PTX1000 Packet Transport Router\) on page 610](#)

[show chassis temperature-thresholds \(MX Routers with Media Services Blade \[MSB\]\) on page 610](#)

[show chassis temperature-thresholds \(EX9251 Switches\) on page 611](#)

[show chassis temperature-thresholds \(EX9253 switches\) on page 612](#)

## Output Fields

Table 27 on page 585 lists the output fields for the **show chassis temperature-thresholds** command. Output fields are listed in the approximate order in which they appear.

Table 27: show chassis temperature-thresholds Output Fields

Field name	Field Description
Item	Chassis component. If per FRU per slot thresholds are configured, the components about which information is displayed include the chassis, the Routing Engines, FPCs, and FEBs. If per FRU per slot thresholds are not configured, the components about which information is displayed include the chassis and the Routing Engines.
Fan speed	<p><b>NOTE:</b> On the QFX3500 switch and QFX3600 switch, there are four fan speeds: <b>low</b>, <b>medium-low</b>, <b>medium-high</b>, and <b>high</b>. The fan speed changes at the threshold when going from a low speed to a higher speed. When the fan speed changes from a higher speed to a lower speed, the temperature changes two degrees below the threshold.</p> <p>Temperature threshold settings, in degrees Celsius, for the fans to operate at normal and high speeds.</p> <ul style="list-style-type: none"> <li>• Normal—The fans operate at normal speed if the component is at or below this temperature and all the fans are present and functioning normally.</li> </ul> <p><b>NOTE:</b> On a TX Matrix Plus router with 3D SIBs, the threshold temperature at the XF junction is set to 70°C for <b>Normal</b> fan speed, which is less than or equal to 4800 RPM.</p> <ul style="list-style-type: none"> <li>• High—The fans operate at high speed if the component has exceeded this temperature or a fan has failed or is missing.</li> </ul> <p><b>NOTE:</b> On a TX Matrix Plus router with 3D SIBs, the threshold temperature at the XF junction is set to 75°C for <b>High</b> fan speed, which is greater than or equal to 5000 RPM.</p> <p><b>NOTE:</b> For MX480 Routers, there are three fan speeds: Low, Medium, and High.</p> <p>An alarm is not triggered until the temperature exceeds the threshold settings for a yellow alarm or a red alarm.</p>
Yellow alarm	<p>Temperature threshold settings, in degrees Celsius, that trigger a yellow alarm.</p> <ul style="list-style-type: none"> <li>• Normal—The temperature that must be exceeded on the component to trigger a yellow alarm when the fans are running at full speed.</li> <li>• Bad fan—The temperature that must be exceeded on the component to trigger a yellow alarm when one or more fans have failed or are missing.</li> </ul>

Table 27: 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"> <li>• Normal—The temperature that must be exceeded on the component to trigger a red alarm when the fans are running at full speed.</li> <li>• Bad fan—The temperature that must be exceeded on the component to trigger a red alarm when one or more fans have failed or are missing.</li> </ul>
Fire Shutdown	(T4000 routers, TX Matrix Plus router with 3D SIBs, and PTX Series Packet Transport Routers only)—Temperature threshold settings, in degrees Celsius, for the network device to shut down.

## Sample Output

### show chassis temperature-thresholds

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

Item	Fan speed (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
```

	Fan speed	Yellow alarm		Red alarm		Fire Shutdown	
		(degrees C)		(degrees C)		(degrees C)	
Item		Normal	High	Normal	Bad fan	Normal	Bad fan
Chassis default	Normal	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 2		55	60	75	65	95	80
FPC 3		55	60	75	65	95	80
FPC 4		55	60	75	65	90	80

### show chassis temperature-thresholds (MX2010 Router with MPC7E, MPC8E, and MPC9E)

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

	Fan speed	Yellow alarm		Red alarm	
		(degrees C)		(degrees C)	
Item		Normal	High	Normal	Bad fan
FPC 3 Intake	75	53	59	72	67
FPC 3 Exhaust A	98	77	85	98	93
FPC 3 Exhaust B	98	54	62	80	75
FPC 3 EA0 Chip	100	64	72	90	90
FPC 3 EA0_XR0 Chip	106	79	87	102	102
FPC 3 EA0_XR1 Chip		79	87	102	102

106	108				
FPC 3 EA1 Chip		64	72	90	90
100	105				
FPC 3 EA1_XR0 Chip		79	87	102	102
106	108				
FPC 3 EA1_XR1 Chip		79	87	102	102
106	108				
FPC 3 PEX Chip		74	82	100	100
105	110				
FPC 3 EA2 Chip		64	72	90	90
100	105				
FPC 3 EA2_XR0 Chip		79	87	102	102
106	108				
FPC 3 EA2_XR1 Chip		79	87	102	102
106	108				
FPC 3 EA3 Chip		64	72	90	90
100	105				
FPC 3 EA3_XR0 Chip		79	87	102	102
106	108				
FPC 3 EA3_XR1 Chip		79	87	102	102
106	108				
FPC 3 EA0_HMC0 Logic die		81	89	103	103
107	111				
FPC 3 EA0_HMC0 DRAM botm		76	84	98	98
102	106				
FPC 3 EA0_HMC1 Logic die		81	89	103	103
107	111				
FPC 3 EA0_HMC1 DRAM botm		76	84	98	98
102	106				
FPC 3 EA0_HMC2 Logic die		81	89	103	103
107	111				
FPC 3 EA0_HMC2 DRAM botm		76	84	98	98
102	106				
FPC 3 EA1_HMC0 Logic die		81	89	103	103
107	111				
FPC 3 EA1_HMC0 DRAM botm		76	84	98	98
102	106				
FPC 3 EA1_HMC1 Logic die		81	89	103	103
107	111				
FPC 3 EA1_HMC1 DRAM botm		76	84	98	98
102	106				
FPC 3 EA1_HMC2 Logic die		81	89	103	103
107	111				
FPC 3 EA1_HMC2 DRAM botm		76	84	98	98



102	106				
FPC 3	EA2_HMC0 Logic die	81	89	103	103
107	111				107
FPC 3	EA2_HMC0 DRAM botm	76	84	98	98
102	106				102
FPC 3	EA2_HMC1 Logic die	81	89	103	103
107	111				107
FPC 3	EA2_HMC1 DRAM botm	76	84	98	98
102	106				102
FPC 3	EA2_HMC2 Logic die	81	89	103	103
107	111				107
FPC 3	EA2_HMC2 DRAM botm	76	84	98	98
102	106				102
FPC 3	EA3_HMC0 Logic die	81	89	103	103
107	111				107
FPC 3	EA3_HMC0 DRAM botm	76	84	98	98
102	106				102
FPC 3	EA3_HMC1 Logic die	81	89	103	103
107	111				107
FPC 3	EA3_HMC1 DRAM botm	76	84	98	98
102	106				102
FPC 3	EA3_HMC2 Logic die	81	89	103	103
107	111				107
FPC 3	EA3_HMC2 DRAM botm	76	84	98	98
102	106				102
FPC 4	Intake	46	55	65	60
76	90				81
FPC 4	Exhaust A	61	70	80	75
95	110				100
FPC 4	Exhaust B	61	70	80	75
90	105				95
FPC 4	EA0 Chip	86	95	105	100
112	123				117
FPC 4	EA0_XR0 Chip	86	95	105	100
105	116				110
FPC 4	EA0_XR1 Chip	86	95	105	100
110	121				115
FPC 4	EA1 Chip	86	95	105	100
112	123				117
FPC 4	EA1_XR0 Chip	86	95	105	100
105	116				110
FPC 4	EA1_XR1 Chip	86	95	105	100
110	121				115
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	111				107
FPC 7 EA0_HMC1 DRAM botm		76	84	98	98
102	106				102
FPC 7 EA0_HMC2 Logic die		81	89	103	103
107	111				107
FPC 7 EA0_HMC2 DRAM botm		76	84	98	98
102	106				102
FPC 7 EA1_HMC0 Logic die		81	89	103	103
107	111				107
FPC 7 EA1_HMC0 DRAM botm		76	84	98	98
102	106				102
FPC 7 EA1_HMC1 Logic die		81	89	103	103
107	111				107
FPC 7 EA1_HMC1 DRAM botm		76	84	98	98
102	106				102
FPC 7 EA1_HMC2 Logic die		81	89	103	103
107	111				107
FPC 7 EA1_HMC2 DRAM botm		76	84	98	98
102	106				102
FPC 7 EA2_HMC0 Logic die		81	89	103	103
107	111				107
FPC 7 EA2_HMC0 DRAM botm		76	84	98	98
102	106				102
FPC 7 EA2_HMC1 Logic die		81	89	103	103
107	111				107
FPC 7 EA2_HMC1 DRAM botm		76	84	98	98
102	106				102
FPC 7 EA2_HMC2 Logic die		81	89	103	103
107	111				107
FPC 7 EA2_HMC2 DRAM botm		76	84	98	98
102	106				102
FPC 7 EA3_HMC0 Logic die		81	89	103	103
107	111				107
FPC 7 EA3_HMC0 DRAM botm		76	84	98	98
102	106				102
FPC 7 EA3_HMC1 Logic die		81	89	103	103
107	111				107
FPC 7 EA3_HMC1 DRAM botm		76	84	98	98
102	106				102
FPC 7 EA3_HMC2 Logic die		81	89	103	103
107	111				107

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 (degrees C)		Red alarm (degrees C)		Fire Shutdown (degrees C)		(degrees C)
Item	Normal	High	Normal	Bad fan	Normal	Bad fan	Normal
Routing Engine 0	70	80	95	95	110	110	112
Routing Engine 1	70	80	95	95	110	110	112
CB 0 IntakeA-Zone0	60	65	78	75	85	80	95
CB 0 IntakeB-Zone1	60	65	78	75	85	80	95
CB 0 IntakeC-Zone0	60	65	78	75	85	80	95
CB 0 ExhaustA-Zone0	60	65	78	75	85	80	95
CB 0 ExhaustB-Zone1	60	65	78	75	85	80	95
CB 0 TCBC-Zone0	60	65	78	75	85	80	95
CB 1 IntakeA-Zone0	60	65	78	75	85	80	95
CB 1 IntakeB-Zone1	60	65	78	75	85	80	95
CB 1 IntakeC-Zone0	60	65	78	75	85	80	95
CB 1 ExhaustA-Zone0	60	65	78	75	85	80	95
CB 1 ExhaustB-Zone1	60	65	78	75	85	80	95
CB 1 TCBC-Zone0	60	65	78	75	85	80	95
SPMB 0 Intake	56	62	75	63	83	76	95
SPMB 1 Intake	56	62	75	63	83	76	95
SFB 0 Intake-Zone0	56	62	70	70	85	85	89
SFB 0 Exhaust-Zone1	56	62	70	70	85	85	89
SFB 0 IntakeA-Zone0	56	62	70	70	85	85	89
SFB 0 IntakeB-Zone1	56	62	70	70	85	85	89
SFB 0 Exhaust-Zone0	56	62	70	70	85	85	89
SFB 0 SFB-XF2-Zone1	70	75	90	85	95	90	100
SFB 0 SFB-XF1-Zone0	70	75	90	85	95	90	100
SFB 0 SFB-XF0-Zone0	70	75	90	85	95	90	100
SFB 1 Intake-Zone0	56	62	70	70	85	85	89
SFB 1 Exhaust-Zone1	56	62	70	70	85	85	89
SFB 1 IntakeA-Zone0	56	62	70	70	85	85	89
SFB 1 IntakeB-Zone1	56	62	70	70	85	85	89
SFB 1 Exhaust-Zone0	56	62	70	70	85	85	89
SFB 1 SFB-XF2-Zone1	70	75	90	85	95	90	100

SFB 1	SFB-XF1-Zone0	70	75	90	85	95	90	100
SFB 1	SFB-XF0-Zone0	70	75	90	85	95	90	100
SFB 2	Intake-Zone0	56	62	70	70	85	85	89
SFB 2	Exhaust-Zone1	56	62	70	70	85	85	89
SFB 2	IntakeA-Zone0	56	62	70	70	85	85	89
SFB 2	IntakeB-Zone1	56	62	70	70	85	85	89
SFB 2	Exhaust-Zone0	56	62	70	70	85	85	89
SFB 2	SFB-XF2-Zone1	70	75	90	85	95	90	100
SFB 2	SFB-XF1-Zone0	70	75	90	85	95	90	100
SFB 2	SFB-XF0-Zone0	70	75	90	85	95	90	100
SFB 3	Intake-Zone0	56	62	70	70	85	85	89
SFB 3	Exhaust-Zone1	56	62	70	70	85	85	89
SFB 3	IntakeA-Zone0	56	62	70	70	85	85	89
SFB 3	IntakeB-Zone1	56	62	70	70	85	85	89
SFB 3	Exhaust-Zone0	56	62	70	70	85	85	89
SFB 3	SFB-XF2-Zone1	70	75	90	85	95	90	100
SFB 3	SFB-XF1-Zone0	70	75	90	85	95	90	100
SFB 3	SFB-XF0-Zone0	70	75	90	85	95	90	100
SFB 4	Intake-Zone0	56	62	70	70	85	85	89
SFB 4	Exhaust-Zone1	56	62	70	70	85	85	89
SFB 4	IntakeA-Zone0	56	62	70	70	85	85	89
SFB 4	IntakeB-Zone1	56	62	70	70	85	85	89
SFB 4	Exhaust-Zone0	56	62	70	70	85	85	89
SFB 4	SFB-XF2-Zone1	70	75	90	85	95	90	100
SFB 4	SFB-XF1-Zone0	70	75	90	85	95	90	100
SFB 4	SFB-XF0-Zone0	70	75	90	85	95	90	100
SFB 5	Intake-Zone0	56	62	70	70	85	85	89
SFB 5	Exhaust-Zone1	56	62	70	70	85	85	89
SFB 5	IntakeA-Zone0	56	62	70	70	85	85	89
SFB 5	IntakeB-Zone1	56	62	70	70	85	85	89
SFB 5	Exhaust-Zone0	56	62	70	70	85	85	89
SFB 5	SFB-XF2-Zone1	70	75	90	85	95	90	100
SFB 5	SFB-XF1-Zone0	70	75	90	85	95	90	100
SFB 5	SFB-XF0-Zone0	70	75	90	85	95	90	100
SFB 6	Intake-Zone0	56	62	70	70	85	85	89
SFB 6	Exhaust-Zone1	56	62	70	70	85	85	89
SFB 6	IntakeA-Zone0	56	62	70	70	85	85	89
SFB 6	IntakeB-Zone1	56	62	70	70	85	85	89
SFB 6	Exhaust-Zone0	56	62	70	70	85	85	89
SFB 6	SFB-XF2-Zone1	70	75	90	85	95	90	100
SFB 6	SFB-XF1-Zone0	70	75	90	85	95	90	100
SFB 6	SFB-XF0-Zone0	70	75	90	85	95	90	100
SFB 7	Intake-Zone0	56	62	70	70	85	85	89
SFB 7	Exhaust-Zone1	56	62	70	70	85	85	89

SFB 7 IntakeA-Zone0	56	62	70	70	85	85	89
SFB 7 IntakeB-Zone1	56	62	70	70	85	85	89
SFB 7 Exhaust-Zone0	56	62	70	70	85	85	89
SFB 7 SFB-XF2-Zone1	70	75	90	85	95	90	100
SFB 7 SFB-XF1-Zone0	70	75	90	85	95	90	100
SFB 7 SFB-XF0-Zone0	70	75	90	85	95	90	100
FPC 0	55	60	75	65	90	80	95
FPC 9	55	60	75	65	90	80	95
FPC 10	55	60	75	65	90	80	95
FPC 14	55	60	75	65	95	80	100
FPC 19	55	60	75	65	90	80	95
ADC 0 Intake	50	55	60	60	65	65	80
ADC 0 Exhaust	50	55	60	60	65	65	80
ADC 0 ADC-XF1	70	75	90	85	95	90	100
ADC 0 ADC-XF0	70	75	90	85	95	90	100
ADC 9 Intake	50	55	60	60	65	65	80
ADC 9 Exhaust	50	55	60	60	65	65	80
ADC 9 ADC-XF1	70	75	90	85	95	90	100
ADC 9 ADC-XF0	70	75	90	85	95	90	100
ADC 10 Intake	50	55	60	60	65	65	80
ADC 10 Exhaust	50	55	60	60	65	65	80
ADC 10 ADC-XF1	70	75	90	85	95	90	100
ADC 10 ADC-XF0	70	75	90	85	95	90	100
ADC 14 Intake	50	55	60	60	65	65	80
ADC 14 Exhaust	50	55	60	60	65	65	80
ADC 14 ADC-XF1	70	75	90	85	95	90	100
ADC 14 ADC-XF0	70	75	90	85	95	90	100
ADC 19 Intake	50	55	60	60	65	65	80
ADC 19 Exhaust	50	55	60	60	65	65	80
ADC 19 ADC-XF1	70	75	90	85	95	90	100
ADC 19 ADC-XF0	70	75	90	85	95	90	100

### show chassis temperature-thresholds (MX2008 Routers)

user@host> show chassis temperature-thresholds

Shutdown	Fan speed		Yellow alarm		Red alarm		Fire
	(degrees C)		(degrees C)		(degrees C)		(degrees
Item	Normal	High	Normal	Bad fan	Normal	Bad fan	C)
Normal							
Routing Engine 0 CPU	58	63	78	75	93	90	
98							

Routing Engine 1 CPU 98	58	63	78	75	93	90	
CB 0 Inlet1 85	55	60	65	62	75	72	
CB 0 Inlet2 90	45	50	61	58	80	77	
CB 0 Inlet3 90	57	62	68	65	80	77	
CB 0 Inlet4 95	55	60	80	77	90	87	
CB 0 Exhaust1 85	55	60	65	62	75	72	
CB 0 Exhaust2 90	50	55	60	57	80	77	
CB 0 Exhaust3 96	70	75	81	78	91	88	
CB 0 Exhaust4	75	80	90	87	100	97	105
CB 1 Inlet1 85	55	60	65	62	75	72	
CB 1 Inlet2 90	45	50	61	58	80	77	
CB 1 Inlet3 90	57	62	68	65	80	77	
CB 1 Inlet4 95	55	60	80	77	90	87	
CB 1 Exhaust1 85	55	60	65	62	75	72	
CB 1 Exhaust2 90	50	55	60	57	80	77	
CB 1 Exhaust3 96	70	75	81	78	91	88	
CB 1 Exhaust4	75	80	90	87	100	97	105
SFB 0 Inlet1 81	49	54	62	59	76	73	
SFB 0 Inlet2 88	65	70	71	68	83	80	
SFB 0 Exhaust1 80	45	50	61	58	75	72	
SFB 0 Exhaust2 85	60	65	69	66	80	77	
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 81	49	54	62	59	76	73	

SFB 1 Inlet2 88	65	70	71	68	83	80	
SFB 1 Exhaust1 80	45	50	61	58	75	72	
SFB 1 Exhaust2 85	60	65	69	66	80	77	
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 81	49	54	62	59	76	73	
SFB 2 Inlet2 88	65	70	71	68	83	80	
SFB 2 Exhaust1 80	45	50	61	58	75	72	
SFB 2 Exhaust2 85	60	65	69	66	80	77	
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 81	49	54	62	59	76	73	
SFB 3 Inlet2 88	65	70	71	68	83	80	
SFB 3 Exhaust1 80	45	50	61	58	75	72	
SFB 3 Exhaust2 85	60	65	69	66	80	77	
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 81	49	54	62	59	76	73	
SFB 4 Inlet2 88	65	70	71	68	83	80	
SFB 4 Exhaust1 80	45	50	61	58	75	72	
SFB 4 Exhaust2 85	60	65	69	66	80	77	
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 81	49	54	62	59	76	73	
SFB 5 Inlet2 88	65	70	71	68	83	80	
SFB 5 Exhaust1 80	45	50	61	58	75	72	



SFB 5 Exhaust2 85	60	65	69	66	80	77	
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 81	49	54	62	59	76	73	
SFB 6 Inlet2 88	65	70	71	68	83	80	
SFB 6 Exhaust1 80	45	50	61	58	75	72	
SFB 6 Exhaust2 85	60	65	69	66	80	77	
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 81	49	54	62	59	76	73	
SFB 7 Inlet2 88	65	70	71	68	83	80	
SFB 7 Exhaust1 80	45	50	61	58	75	72	
SFB 7 Exhaust2 85	60	65	69	66	80	77	
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 95	55	60	75	65	90	80	
FPC 3	55	60	75	65	105	80	110
FPC 5	55	60	75	65	105	80	110
FPC 7 95	55	60	75	65	90	80	
FPC 9 Intake 95	60	65	75	75	85	85	
FPC 9 Exhaust A 95	60	65	75	75	85	85	
FPC 9 Exhaust B 95	60	65	75	75	85	85	
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

Fire Shutdown		Fan speed		Yellow alarm		Red alarm	
		(degrees C)		(degrees C)		(degrees	
Item	(degrees C)	Normal	High	Normal	Bad fan	Normal	Bad
fan	Normal						
Routing Engine		48	54	85	85	100	
100	102						
CB Top Right Inlet Sensor		35	40	63	63	85	
85	95						
CB Top Left Inlet Sensor		40	45	65	65	85	

85	95					
CB Top Right Exhaust Sensor		45	50	68	68	85
85	95					
CB Top Left Exhaust Sensor		65	70	78	78	85
85	95					
CB CPU Core-0 Temp		65	70	80	80	90
90	100					
CB CPU Core-1 Temp		65	70	80	80	90
90	100					
CB CPU Core-2 Temp		65	70	80	80	90
90	100					
CB CPU Core-3 Temp		65	70	80	80	90
90	100					
CB CPU Core-4 Temp		65	70	80	80	90
90	100					
CB CPU Core-5 Temp		65	70	80	80	90
90	100					
CB CPU Core-6 Temp		65	70	80	80	90
90	100					
CB CPU Core-7 Temp		65	70	80	80	90
90	100					
FPC EA0_HMC0 Logic die		85	90	95	95	105
105	110					
FPC EA0_HMC0 DRAM botm		80	85	90	90	105
105	110					
FPC EA0_HMC1 Logic die		85	90	95	95	105
105	110					
FPC EA0_HMC1 DRAM botm		80	85	90	90	105
105	110					
FPC EA0 Chip		92	97	103	103	109
109	115					
FPC EA0-XR0 Chip		85	90	98	98	103
103	110					
FPC EA0-XR1 Chip		85	90	98	98	103
103	110					

### show chassis temperature-thresholds (PTX10008 Routers)

user@host> 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	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		Yellow alarm		Red alarm	
	(degrees C)		(degrees C)		(degrees C)	
	Normal	High	Normal	Bad fan	Normal	Bad fan
Chassis default	48	54	65	55	75	65
Routing Engine 0	55	65	85	85	100	100
Routing Engine 1	55	65	85	85	100	100
SIB F13 0	64	70	76	72	90	84
SIB F13 3	64	70	76	72	90	84
SIB F13 6	64	70	76	72	90	84
SIB F13 8	64	70	76	72	90	84
SIB F13 11	64	70	76	72	90	84
SIB F13 12	64	70	76	72	90	84
SIB F2S 16	64	70	76	72	90	84
SIB F2S 17	64	70	76	72	90	84
SIB F2S 18	64	70	76	72	90	84
SIB F2S 19	64	70	76	72	90	84
SIB F2S 20	64	70	76	72	90	84
SIB F2S 21	64	70	76	72	90	84
SIB F2S 22	64	70	76	72	90	84
SIB F2S 23	64	70	76	72	90	84
SIB F2S 24	64	70	76	72	90	84
SIB F2S 25	64	70	76	72	90	84
SIB F2S 26	64	70	76	72	90	84
SIB F2S 27	64	70	76	72	90	84
SIB F2S 28	64	70	76	72	90	84
SIB F2S 29	64	70	76	72	90	84
SIB F2S 30	64	70	76	72	90	84
SIB F2S 31	64	70	76	72	90	84
SIB F2S 32	64	70	76	72	90	84
SIB F2S 33	64	70	76	72	90	84

```

SIB F2S 34          64    70    76    72    90    84
SIB F2S 35          64    70    76    72    90    84

```

```
lcc0-re0:
```

```

-----
                Fan speed          Yellow alarm          Red alarm
                (degrees C)        (degrees C)          (degrees C)
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
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:
```

```

-----
                Fan speed          Yellow alarm          Red alarm
                (degrees C)        (degrees C)          (degrees C)
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
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:
```

```

-----
                Fan speed          Yellow alarm          Red alarm
                (degrees C)        (degrees C)          (degrees C)

```

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
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		Yellow alarm		Red alarm	
	(degrees C)		(degrees C)		(degrees C)	
	Normal	High	Normal	Bad fan	Normal	Bad fan
Chassis default	48	54	65	55	75	65
Routing Engine 0	55	65	85	85	100	100
Routing Engine 1	55	65	85	85	100	100
SIB F13 0	64	70	76	72	90	84
SIB F13 3	64	70	76	72	90	84
SIB F13 6	64	70	76	72	90	84
SIB F13 8	64	70	76	72	90	84
SIB F13 11	64	70	76	72	90	84
SIB F13 12	64	70	76	72	90	84
SIB F2S 16	64	70	76	72	90	84
SIB F2S 17	64	70	76	72	90	84
SIB F2S 18	64	70	76	72	90	84
SIB F2S 19	64	70	76	72	90	84
SIB F2S 20	64	70	76	72	90	84
SIB F2S 21	64	70	76	72	90	84
SIB F2S 22	64	70	76	72	90	84
SIB F2S 23	64	70	76	72	90	84
SIB F2S 24	64	70	76	72	90	84
SIB F2S 25	64	70	76	72	90	84
SIB F2S 26	64	70	76	72	90	84
SIB F2S 27	64	70	76	72	90	84



SIB F2S 28	64	70	76	72	90	84
SIB F2S 29	64	70	76	72	90	84
SIB F2S 30	64	70	76	72	90	84
SIB F2S 31	64	70	76	72	90	84
SIB F2S 32	64	70	76	72	90	84
SIB F2S 33	64	70	76	72	90	84
SIB F2S 34	64	70	76	72	90	84
SIB F2S 35	64	70	76	72	90	84

### show chassis temperature-thresholds (TX Matrix Plus routers with 3D SIBs)

user@host> show chassis temperature-thresholds

sfc0-re0:

Shutdown Item	Fan speed		Yellow alarm		Red alarm		Fire
	(degrees C)		(degrees C)		(degrees C)		(degrees
	Normal	High	Normal	Bad fan	Normal	Bad fan	C)
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		Yellow alarm		Red alarm		Fire
	(degrees C)		(degrees C)		(degrees C)		(degrees
	Normal	High	Normal	Bad fan	Normal	Bad fan	C)
Shutdown							
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
rmal						
FPC Sensor TopLeft I	48	56	53	43	56	46
FPC Sensor TopRight I	46	54	51	41	54	44
FPC Sensor TopLeft E	58	65	62	52	65	55
FPC Sensor TopRight E	56	64	61	51	64	54
FPC Sensor TopMiddle I	58	64	61	51	64	54
FPC Sensor TopMiddle E	67	74	71	61	74	64
FPC Sensor Bottom I	59	67	64	54	67	57
FPC Sensor Bottom E	66	73	70	60	73	63
FPC Sensor Die Temp	69	75	72	62	75	65
FPC Sensor Mgmnt 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	
	(degrees C)		(degrees C)		(degrees C)	
	Normal	High	Normal	Bad fan	Normal	Bad fan
Chassis default	48	54	65	55	75	65

### show chassis temperature-thresholds (PTX5000 Packet Transport Router)

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

user@switch> show chassis temperature-thresholds							
Shutdown	Fan speed		Yellow alarm		Red alarm		Fire
	(degrees C)		(degrees C)		(degrees C)		(degrees
	C)		C)		C)		
Item	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

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

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

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

Shutdown	Fan speed		Yellow alarm		Red alarm		Fire
	(degrees C)		(degrees C)		(degrees C)		(degrees
	C)						
Item	Normal	High	Normal	Bad fan	Normal	Bad fan	
Normal							
Routing Engine 0			48	54	85	85	100
100 102							
CB 0 Exhaust Temp Sensor			60	65	75	75	85
85 95							
CB 0 Inlet Temp Sensor			60	65	75	75	85

85	95				
CB 0 CPU DIE Temp Sensor		83	90	98	98
105	110				105
CB 1 Exhaust Temp Sensor		60	65	75	75
85	95				85
CB 1 Inlet Temp Sensor		60	65	75	75
85	95				85
CB 1 CPU DIE Temp Sensor		83	90	98	98
105	110				105
FPC 0 Intake Temp Sensor		40	45	75	70
80	95				85
FPC 0 Exhaust-A Temp Sensor		55	60	85	80
90	100				90
FPC 0 Exhaust-B Temp Sensor		55	60	85	80
90	100				90
FPC 0 EA0 Chip		87	92	97	97
105	110				105
FPC 0 EA0-XR0 Chip		88	93	98	98
120	125				120
FPC 0 EA0-XR1 Chip		88	93	98	98
120	125				120
FPC 0 EA1 Chip		87	92	97	97
105	110				105
FPC 0 EA1-XR0 Chip		88	93	98	98
120	125				120
FPC 0 EA1-XR1 Chip		88	93	98	98
120	125				120
FPC 0 EA2 Chip		87	92	97	97
105	110				105
FPC 0 EA2-XR0 Chip		88	93	98	98
120	125				120
FPC 0 EA2-XR1 Chip		88	93	98	98
120	125				120
FPC 0 PF Chip		89	94	104	104
120	120				120
FPC 0 EA0_HMC0 Logic die		88	93	103	103
120	125				120
FPC 0 EA0_HMC0 DRAM botm		83	88	98	98
120	125				120
FPC 0 EA0_HMC1 Logic die		88	93	103	103
120	125				120
FPC 0 EA0_HMC1 DRAM botm		83	88	98	98
120	125				120
FPC 0 EA0_HMC2 Logic die		88	93	103	103
					120



120	125					
FPC 0	EA0_HMC2	DRAM botm	83	88	98	98 120
120	125					
FPC 0	EA1_HMC0	Logic die	88	93	103	103 120
120	125					
FPC 0	EA1_HMC0	DRAM botm	83	88	98	98 120
120	125					
FPC 0	EA1_HMC1	Logic die	88	93	103	103 120
120	125					
FPC 0	EA1_HMC1	DRAM botm	83	88	98	98 120
120	125					
FPC 0	EA1_HMC2	Logic die	88	93	103	103 120
120	125					
FPC 0	EA1_HMC2	DRAM botm	83	88	98	98 120
120	125					
FPC 0	EA2_HMC0	Logic die	88	93	103	103 120
120	125					
FPC 0	EA2_HMC0	DRAM botm	83	88	98	98 120
120	125					
FPC 0	EA2_HMC1	Logic die	88	93	103	103 120
120	125					
FPC 0	EA2_HMC1	DRAM botm	83	88	98	98 120
120	125					
FPC 0	EA2_HMC2	Logic die	88	93	103	103 120
120	125					
FPC 0	EA2_HMC2	DRAM botm	83	88	98	98 120
120	125					
FPC 1	Intake	Temp Sensor	40	45	75	70 85
80	95					
FPC 1	Exhaust-A	Temp Sensor	55	60	85	80 90
90	100					
FPC 1	Exhaust-B	Temp Sensor	55	60	85	80 90
90	100					
FPC 1	EA0	Chip	87	92	97	97 105
105	110					
FPC 1	EA0-XR0	Chip	88	93	98	98 120
120	125					
FPC 1	EA0-XR1	Chip	88	93	98	98 120
120	125					
FPC 1	EA1	Chip	87	92	97	97 105
105	110					
FPC 1	EA1-XR0	Chip	88	93	98	98 120
120	125					
FPC 1	EA1-XR1	Chip	88	93	98	98 120

120	125				
FPC 1 EA2 Chip		87	92	97	97
105	110				105
FPC 1 EA2-XR0 Chip		88	93	98	98
120	125				120
FPC 1 EA2-XR1 Chip		88	93	98	98
120	125				120
FPC 1 PF Chip		89	94	104	104
120	120				120
FPC 1 EA0_HMC0 Logic die		88	93	103	103
120	125				120
FPC 1 EA0_HMC0 DRAM botm		83	88	98	98
120	125				120
FPC 1 EA0_HMC1 Logic die		88	93	103	103
120	125				120
FPC 1 EA0_HMC1 DRAM botm		83	88	98	98
120	125				120
FPC 1 EA0_HMC2 Logic die		88	93	103	103
120	125				120
FPC 1 EA0_HMC2 DRAM botm		83	88	98	98
120	125				120
FPC 1 EA1_HMC0 Logic die		88	93	103	103
120	125				120
FPC 1 EA1_HMC0 DRAM botm		83	88	98	98
120	125				120
FPC 1 EA1_HMC1 Logic die		88	93	103	103
120	125				120
FPC 1 EA1_HMC1 DRAM botm		83	88	98	98
120	125				120
FPC 1 EA1_HMC2 Logic die		88	93	103	103
120	125				120
FPC 1 EA1_HMC2 DRAM botm		83	88	98	98
120	125				120
FPC 1 EA2_HMC0 Logic die		88	93	103	103
120	125				120
FPC 1 EA2_HMC0 DRAM botm		83	88	98	98
120	125				120
FPC 1 EA2_HMC1 Logic die		88	93	103	103
120	125				120
FPC 1 EA2_HMC1 DRAM botm		83	88	98	98
120	125				120
FPC 1 EA2_HMC2 Logic die		88	93	103	103
120	125				120

FPC 1	EA2_HMC2	DRAM botm	83	88	98	98	120
120	125						

# show interfaces extensive satellite-device

## Syntax

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

## Release Information

Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.  
 Command introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.

## Description

Display the satellite device extended ports in a Junos Fusion.

## Options

**device-alias** *device-alias*—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

## RELATED DOCUMENTATION

| *Configuring or Expanding a Junos Fusion Enterprise*

## List of Sample Output

[show interfaces extensive satellite-device all on page 624](#)

## Output Fields

[Table 28 on page 617](#) 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 28: show interfaces extensive satellite-device Output Fields

Field Name	Field Description	Level of Output
<b>Physical Interface</b>		
<b>Physical interface</b>	Name of the physical interface.	All levels

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

Field Name	Field Description	Level of Output
<b>Interface index</b>	Index number of the physical interface, which reflects its initialization sequence.	<b>detail extensive</b> none
<b>Device flags</b>	Information about the physical device.	All levels
<b>Flow control</b>	Flow control status: <b>Enabled</b> or <b>Disabled</b> .  <b>NOTE:</b> This field is only displayed if asymmetric flow control is not configured.	All levels
<b>Pad to minimum frame size</b>	Pad Tx VLAN-tagged frame to minimum of 68 bytes.	
<b>Device flags</b>	Information about the physical device.	All levels
<b>Interface flags</b>	Information about the interface.	All levels
<b>Current address</b>	Configured MAC address.	<b>detail extensive</b> none
<b>Last flapped</b>	Date, time, and how long ago the interface went from down to up. The format is <b>Last flapped: year-month-day hour: :minute:second:timezone (hour:minute:second ago)</b> . For example, <b>Last flapped: 2008-01-16 10:52:40 UTC (3d 22:58 ago)</b> .	<b>detail extensive</b> none
<b>Statistics last cleared</b>	Time when the statistics for the interface were last set to zero.	<b>detail extensive</b>
<b>Extended port information</b>	Satellite device port ID	
<b>Traffic statistics</b>	Number and rate of bytes and packets received and transmitted on the physical interface.  <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul> <b>NOTE:</b> The bandwidth bps counter is not enabled.	<b>detail extensive</b>

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

Field Name	Field Description	Level of Output
<b>IPv6 transit statistics</b>	<p>Number and rate of bytes and packets received and transmitted on the physical interface.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul> <p><b>NOTE:</b> The bandwidth bps counter is not enabled.</p>	<b>detail extensive</b>
<b>Input errors</b>	<p>Input errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Errors</b>—Sum of the incoming frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Framing errors</b>—Number of packets received with an invalid frame checksum (FCS).</li> <li>• <b>Runts</b>—Number of frames received that are smaller than the runt threshold.</li> <li>• <b>Giants</b>—Number of frames received that are greater than the giant threshold.</li> <li>• <b>Policed discards</b>—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that Junos OS does not handle.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul>	<b>extensive</b>

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

Field Name	Field Description	Level of Output
<b>Output errors</b>	<p>Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Carrier transitions</b>—Number of times the interface has gone from <b>down</b> to <b>up</b>. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and then up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC or PIM is malfunctioning.</li> <li>• <b>Errors</b>—Sum of the outgoing frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>MTU errors</b>—Number of packets whose size exceeded the MTU of the interface.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul>	<b>extensive</b>
<b>Egress queues</b>	Total number of egress queues supported on the specified interface.	<b>detail extensive</b>
<b>Queue counters</b>	<p>CoS queue number and its associated user-configured forwarding class name.</p> <ul style="list-style-type: none"> <li>• <b>Queued packets</b>—Number of queued packets.</li> <li>• <b>Transmitted packets</b>—Number of transmitted packets.</li> <li>• <b>Dropped packets</b>—Number of packets dropped by the ASIC's RED mechanism.</li> </ul>	<b>detail extensive</b>
<b>Queue Number</b>	The CoS queue number and the forwarding classes mapped to the queue number. The <b>Mapped forwarding class</b> column lists the forwarding classes mapped to each CoS queue.	<b>detail extensive</b>
<b>Active alarms and Active defects</b>	<p>Ethernet-specific defects that can prevent the interface from passing packets. When a defect persists for a certain amount of time, it is promoted to an alarm. Based on the switch configuration, an alarm can ring the red or yellow alarm bell on the switch, or turn on the red or yellow alarm LED on the craft interface. These fields can contain the value <b>None</b> or <b>Link</b>.</p> <ul style="list-style-type: none"> <li>• <b>None</b>—There are no active defects or alarms.</li> <li>• <b>Link</b>—Interface has lost its link state, which usually means that the cable is unplugged, the far-end system has been turned off, or the PIC is malfunctioning.</li> </ul>	<b>detail extensive none</b>

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

Field Name	Field Description	Level of Output
<b>MAC statistics</b>	<p><b>Receive and Transmit</b> statistics reported by the PIC's MAC subsystem.</p> <ul style="list-style-type: none"> <li>• <b>Total octets</b> and <b>total packets</b>—Total number of octets and packets. For Gigabit Ethernet IQ PICs, the received octets count varies by interface type.</li> <li>• <b>Unicast packets</b>, <b>Broadcast packets</b>, and <b>Multicast packets</b>—Number of unicast, broadcast, and multicast packets.</li> <li>• <b>CRC/Align errors</b>—Total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, and had either a bad FCS with an integral number of octets (FCS Error) or a bad FCS with a nonintegral number of octets (Alignment Error).</li> <li>• <b>FIFO error</b>—Number of FIFO errors that are reported by the ASIC on the PIC. If this value is ever nonzero, the PIC is probably malfunctioning.</li> <li>• <b>MAC control frames</b>—Number of MAC control frames.</li> <li>• <b>MAC pause frames</b>—Number of MAC control frames with <b>pause</b> operational code.</li> <li>• <b>Oversized frames</b>—Number of packets that exceeds the configured MTU.</li> <li>• <b>Jabber frames</b>—Number of frames that were longer than 1518 octets (excluding framing bits, but including FCS octets), and had either an FCS error or an alignment error. This definition of jabber is different from the definition in IEEE-802.3 section 8.2.1.5 (10BASE5) and section 10.3.1.4 (10BASE2). These documents define jabber as the condition in which any packet exceeds 20 ms. The allowed range to detect jabber is from 20 ms to 150 ms.</li> <li>• <b>Fragment frames</b>—Total number of packets that were less than 64 octets in length (excluding framing bits, but including FCS octets), and had either an FCS error or an alignment error. Fragment frames normally increment because both runts (which are normal occurrences caused by collisions) and noise hits are counted.</li> <li>• <b>VLAN tagged frames</b>—Number of frames that are VLAN tagged. The system uses the TPID of 0x8100 in the frame to determine whether a frame is tagged or not. This counter is not supported on EX Series switches and is always displayed as 0.</li> <li>• <b>Code violations</b>—Number of times an event caused the PHY to indicate "Data reception error" or "invalid data symbol error."</li> </ul>	<b>extensive</b>
<b>Filter statistics</b>	<b>Receive and Transmit</b> statistics reported by the PIC's MAC address filter subsystem.	<b>extensive</b>



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

Field Name	Field Description	Level of Output
<b>Packet Forwarding Engine configuration</b>	<p>Information about the configuration of the Packet Forwarding Engine:</p> <ul style="list-style-type: none"> <li>• <b>Destination slot</b>—FPC slot number.</li> <li>• <b>CoS transmit queue</b>—Queue number and its associated user-configured forwarding class name.</li> <li>• <b>Bandwidth %</b>—Percentage of bandwidth allocated to the queue.</li> <li>• <b>Bandwidth bps</b>—Bandwidth allocated to the queue (in bps).</li> <li>• <b>Buffer %</b>—Percentage of buffer space allocated to the queue.</li> <li>• <b>Buffer usec</b>—Amount of buffer space allocated to the queue, in microseconds. This value is nonzero only if the buffer size is configured in terms of time.</li> <li>• <b>Priority</b>—Queue priority: <b>low</b> or <b>high</b>.</li> <li>• <b>Limit</b>—Displayed if rate limiting is configured for the queue. Possible values are <b>none</b> and <b>exact</b>. If <b>exact</b> is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If <b>none</b> is configured, the queue transmits beyond the configured bandwidth if bandwidth is available.</li> </ul>	<b>extensive</b>
<b>Logical Interface</b>		
<b>Logical interface</b>	Name of the logical interface.	All levels
<b>Index</b>	Index number of the logical interface, which reflects its initialization sequence.	<b>detail extensive</b> none
<b>SNMP ifIndex</b>	SNMP interface index number for the logical interface.	<b>detail extensive</b> none
<b>Generation</b>	Unique number for use by Juniper Networks technical support only.	<b>detail extensive</b>
<b>Flags</b>	Information about the logical interface.	All levels
<b>Statistics</b>	<ul style="list-style-type: none"> <li>• <b>Packets</b></li> <li>• <b>pps</b></li> <li>• <b>Bytes</b></li> <li>• <b>bps</b></li> </ul>	All levels

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

Field Name	Field Description	Level of Output
<b>Bundle</b>	<p>Provide information for each active bundle link.</p> <ul style="list-style-type: none"> <li>• <b>Input</b> <ul style="list-style-type: none"> <li>• Packets—</li> <li>• pps</li> <li>• Bytes</li> <li>• bps</li> </ul> </li> <li>• <b>Output</b> <ul style="list-style-type: none"> <li>• Packets—</li> <li>• pps</li> <li>• Bytes</li> <li>• bps</li> </ul> </li> </ul>	All levels
<b>Adaptive Statistics</b>	<ul style="list-style-type: none"> <li>• Adaptive Adjusts</li> <li>• Adaptive Scans</li> <li>• Adaptive Updates</li> </ul>	All levels
<b>Link</b>	Link state: up or down.	All levels
<b>LACP info</b>	<p>LACP state information for each aggregated interface:</p> <ul style="list-style-type: none"> <li>• <b>Role priority</b>—Role played by the interface. It can be one of the following: <ul style="list-style-type: none"> <li>• <b>Actor</b>—Local device participating in LACP negotiation.</li> <li>• <b>Partner</b>—Remote device participating in LACP negotiation.</li> <li>• <b>System identifier</b>—48-bit (6-byte) globally unique field.</li> </ul> </li> <li>• <b>System priority</b>—LACP system priority at the aggregated Ethernet interface level. This system priority value takes precedence over a system priority value configured at the global [edit chassis] hierarchy level.</li> <li>• <b>Port number</b></li> <li>• <b>Port key</b></li> <li>• <b>Port</b></li> </ul>	All levels

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

Field Name	Field Description	Level of Output
<b>LACP Statistics</b>	<p>LACP statistics are returned when the <b>extensive</b> option is used and provides the following information:</p> <ul style="list-style-type: none"> <li>• <b>LACP Rx</b>—LACP received counter that increments for each normal hello.</li> <li>• <b>LACP Tx</b>—Number of LACP transmit packet errors logged.</li> <li>• <b>Unknown Rx</b>—Number of unrecognized packet errors logged.</li> <li>• <b>Illegal Rx</b>—Number of invalid packets received.</li> </ul>	All levels
<b>Marker statistics</b>	<p>Marker statistics are returned when the <b>extensive</b> option is used and provides the following information:</p> <ul style="list-style-type: none"> <li>• <b>Marker Rx</b>—Marker received counter that increments for each normal hello.</li> <li>• <b>Resp Tx</b>—Number of RESP transmit packet errors logged.</li> <li>• <b>Unknown Rx</b>—Number of unrecognized packet errors logged.</li> <li>• <b>Illegal Rx</b>—Number of invalid packets received.</li> </ul>	All levels
<b>Protocol</b>	Protocol family configured on the logical interface.	All levels
<b>MTU</b>	MTU size on the logical interface. If the MTU value is negotiated down to meet the MRRU requirement on the remote side, this value is marked Adjusted.	All levels
<b>Generation</b>	Unique number for use by Juniper Networks technical support only.	All levels
<b>Route table</b>	Routing table in which this address exists. For example, Route table:0 refers to inet.0.	All levels
<b>Mesh table</b>	Information regarding mesh topology.	All levels

## Sample Output

**show interfaces extensive satellite-device all**

```
user@aggregation-device> show interfaces extensive satellite-device all
```

```
Physical interface: ae0 (Extended Port, Enabled, Physical link is Up
  Interface index: 128, SNMP ifIndex: 574, Generation: 131
```

```

Link-level type: Ethernet, MTU: 1514, Speed: 2Gbps, BPDU Error: None, MAC-REWRITE
Error: None, Loopback: Disabled, Source filtering: Disabled,
Flow control: Disabled
Pad to minimum frame size: Disabled
Minimum links needed: 1, Minimum bandwidth needed: 1bps
Device flags   : Present Running
Interface flags: SNMP-Traps Internal: 0x4000
Current address: f4:b5:2f:f7:3f:c0, Hardware address: f4:b5:2f:f7:3f:c0
Last flapped   : 2015-03-31 18:36:43 PDT (07:05:56 ago)
Statistics last cleared: Never
Extended port information:
    Satellite device port id : 415
Traffic statistics:
    Input bytes   :          13515908          2032 bps
    Output bytes  :          12289920          2032 bps
    Input packets :           99514           2 pps
    Output packets:           96015           2 pps
IPv6 transit statistics:
    Input bytes   :          0
    Output bytes  :          0
    Input packets :          0
    Output packets:          0
Input errors:
    Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0, Policed discards:
0, Resource errors: 0
Output errors:
    Carrier transitions: 0, Errors: 0, Drops: 0, MTU errors: 0, Resource errors:
0
Egress queues: 8 supported, 7 in use
Queue counters:      Queued packets  Transmitted packets      Dropped packets
    0                  0                95867                  0
    1                  0                 0                  0
    2                  0                 0                  0
    3                  0                 0                  0
    4                  0                 0                  0
    5                  0                 0                  0
    7                  0                 0                  0
Queue number:      Mapped forwarding classes
    0                FC0
    1                FC1
    2                FC2
    3                FC3
    4                FC4
    5                FC5, be-3

```

7

be-2

Logical interface ae0.0 (Index 337) (SNMP ifIndex 575) (Generation 1194)

Flags: Up SNMP-Traps 0x24024000 Encapsulation: Ethernet-Bridge

Statistics	Packets	pps	Bytes	bps
------------	---------	-----	-------	-----

Bundle:

Input :	1729	0	601692	0
---------	------	---	--------	---

Output:	0	0	0	0
---------	---	---	---	---

Adaptive Statistics:

Adaptive Adjusts:	0
-------------------	---

Adaptive Scans :	0
------------------	---

Adaptive Updates:	0
-------------------	---

Link:

ge-104/0/24.0

Input :	0	0	0	0
---------	---	---	---	---

Output:	0	0	0	0
---------	---	---	---	---

ge-103/0/0.0

Input :	1729	0	601692	0
---------	------	---	--------	---

Output:	0	0	0	0
---------	---	---	---	---

LACP info:	Role	System	System	Port	Port	Port
------------	------	--------	--------	------	------	------

	priority	identifier	priority	number	key
--	----------	------------	----------	--------	-----

ge-104/0/24.0	Actor	127	f4:b5:2f:f7:3f:c0	127	31	1
---------------	-------	-----	-------------------	-----	----	---

ge-104/0/24.0	Partner	127	f4:b5:2f:41:0a:40	127	24	1
---------------	---------	-----	-------------------	-----	----	---

ge-103/0/0.0	Actor	127	f4:b5:2f:f7:3f:c0	127	7	1
--------------	-------	-----	-------------------	-----	---	---

ge-103/0/0.0	Partner	127	f4:b5:2f:41:0a:40	127	1	1
--------------	---------	-----	-------------------	-----	---	---

LACP Statistics:	LACP Rx	LACP Tx	Unknown Rx	Illegal Rx
------------------	---------	---------	------------	------------

ge-104/0/24.0	25470	25495	0	0
---------------	-------	-------	---	---

ge-103/0/0.0	25469	25512	0	0
--------------	-------	-------	---	---

Marker Statistics:	Marker Rx	Resp Tx	Unknown Rx	Illegal Rx
--------------------	-----------	---------	------------	------------

ge-104/0/24.0	0	0	0	0
---------------	---	---	---	---

ge-103/0/0.0	0	0	0	0
--------------	---	---	---	---

Protocol bridge, MTU: 1514, Generation: 1229, Route table: 3, Mesh Group:

\_\_all\_ces\_\_

Physical interface: ae1 (Extended Port, Enabled, Physical link is Up

Interface index: 129, SNMP ifIndex: 790, Generation: 132

Link-level type: Ethernet, MTU: 1514, Speed: 200mbps, BPDU Error: None,

MAC-REWRITE Error: None, Loopback: Disabled, Source filtering: Disabled,

Flow control: Disabled

Pad to minimum frame size: Disabled

Minimum links needed: 1, Minimum bandwidth needed: 1bps

Device flags : Present Running

Interface flags: SNMP-Traps Internal: 0x4000

```

Current address: f4:b5:2f:f7:3f:c1, Hardware address: f4:b5:2f:f7:3f:c1
Last flapped   : 2015-03-31 18:36:44 PDT (07:05:55 ago)
Statistics last cleared: Never
Extended port information:
    Satellite device port id : 431
Traffic statistics:
    Input bytes :          13285288          2032 bps
    Output bytes :          12166400          2032 bps
    Input packets:           98447           2 pps
    Output packets:          95050           2 pps
IPv6 transit statistics:
    Input bytes :          0
    Output bytes :          0
    Input packets:          0
    Output packets:         0
Input errors:
    Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0, Policed discards:
0, Resource errors: 0
Output errors:
    Carrier transitions: 0, Errors: 0, Drops: 0, MTU errors: 0, Resource errors:
0
Egress queues: 8 supported, 7 in use
Queue counters:      Queued packets  Transmitted packets      Dropped packets
    0                  0                94909                  0
    1                  0                 0                  0
    2                  0                 0                  0
    3                  0                 0                  0
    4                  0                 0                  0
    5                  0                 0                  0
    7                  0                 0                  0
Queue number:      Mapped forwarding classes
    0                FC0
    1                FC1
    2                FC2
    3                FC3
    4                FC4
    5                FC5, be-3
    7                be-2

Logical interface ael.0 (Index 338) (SNMP ifIndex 1216) (Generation 1195)
Flags: Up SNMP-Traps 0x24024000 Encapsulation: Ethernet-Bridge
Statistics      Packets      pps      Bytes      bps
Bundle:
    Input :      2785      0      688380      0

```

```

Output:          0          0          0          0
Adaptive Statistics:
  Adaptive Adjusts:      0
  Adaptive Scans   :      0
  Adaptive Updates:      0
Link:
ge-104/0/25.0
  Input  :          10          0          600          0
  Output:          0          0          0          0
ge-103/0/1.0
  Input  :        2775          0        687780          0
  Output:          0          0          0          0
LACP info:      Role      System          System      Port      Port      Port
                priority          identifier  priority  number      key

ge-104/0/25.0   Actor      127    f4:b5:2f:f7:3f:c0      127      32      2
ge-104/0/25.0   Partner    127    f4:b5:2f:41:0a:40      127      25      2
ge-103/0/1.0    Actor      127    f4:b5:2f:f7:3f:c0      127       8      2
ge-103/0/1.0    Partner    127    f4:b5:2f:41:0a:40      127       2      2
LACP Statistics:  LACP Rx    LACP Tx    Unknown Rx  Illegal Rx
ge-104/0/25.0    25470      25494          0          0
ge-103/0/1.0     25469      25513          0          0
Marker Statistics: Marker Rx    Resp Tx    Unknown Rx  Illegal Rx
ge-104/0/25.0          0          0          0          0
ge-103/0/1.0          0          0          0          0
Protocol bridge, MTU: 1514, Generation: 1230, Route table: 3, Mesh Group:
__all_ces__
Physical interface: ae0 (Extended Port, Enabled, Physical link is Up
  Interface index: 128, SNMP ifIndex: 574, Generation: 131
  Link-level type: Ethernet, MTU: 1514, Speed: 2Gbps, BPDU Error: None, MAC-REWRITE
Error: None, Loopback: Disabled, Source filtering: Disabled,
  Flow control: Disabled
  Pad to minimum frame size: Disabled
  Minimum links needed: 1, Minimum bandwidth needed: 1bps
  Device flags      : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  Current address: f4:b5:2f:f7:3f:c0, Hardware address: f4:b5:2f:f7:3f:c0
  Last flapped      : 2015-03-31 18:36:43 PDT (07:05:56 ago)
  Statistics last cleared: Never
  Extended port information:
    Satellite device port id : 415
  Traffic statistics:
    Input bytes :          13515908          2032 bps

```

```

Output bytes :          12289920          2032 bps
Input  packets:          99514          2 pps
Output packets:          96015          2 pps
IPv6 transit statistics:
  Input  bytes :          0
  Output bytes :          0
  Input  packets:          0
  Output packets:          0
Input errors:
  Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0, Policed discards:
0, Resource errors: 0
Output errors:
  Carrier transitions: 0, Errors: 0, Drops: 0, MTU errors: 0, Resource errors:
0
Egress queues: 8 supported, 7 in use
Queue counters:      Queued packets  Transmitted packets      Dropped packets
  0                   0                95867                   0
  1                   0                0                   0
  2                   0                0                   0
  3                   0                0                   0
  4                   0                0                   0
  5                   0                0                   0
  7                   0                0                   0
Queue number:      Mapped forwarding classes
  0                FC0
  1                FC1
  2                FC2
  3                FC3
  4                FC4
  5                FC5, be-3
  7                be-2

Logical interface ae0.0 (Index 337) (SNMP ifIndex 575) (Generation 1194)
Flags: Up SNMP-Traps 0x24024000 Encapsulation: Ethernet-Bridge
Statistics      Packets      pps      Bytes      bps
Bundle:
  Input :        1729        0      601692      0
  Output:         0         0         0         0
Adaptive Statistics:
  Adaptive Adjusts:      0
  Adaptive Scans :      0
  Adaptive Updates:      0
Link:
  ge-104/0/24.0

```



```

      Input :           0           0           0           0
      Output:           0           0           0           0
ge-103/0/0.0
      Input :       1729           0       601692           0
      Output:           0           0           0           0
LACP info:      Role      System              System      Port      Port      Port
                priority          identifier  priority  number  key

ge-104/0/24.0   Actor      127   f4:b5:2f:f7:3f:c0      127      31      1
ge-104/0/24.0   Partner    127   f4:b5:2f:41:0a:40      127      24      1
ge-103/0/0.0    Actor      127   f4:b5:2f:f7:3f:c0      127       7      1
ge-103/0/0.0    Partner    127   f4:b5:2f:41:0a:40      127       1      1
LACP Statistics:  LACP Rx    LACP Tx    Unknown Rx  Illegal Rx
ge-104/0/24.0      25470      25495           0           0
ge-103/0/0.0      25469      25512           0           0
Marker Statistics: Marker Rx    Resp Tx    Unknown Rx  Illegal Rx
ge-104/0/24.0           0           0           0           0
ge-103/0/0.0           0           0           0           0
Protocol bridge, MTU: 1514, Generation: 1229, Route table: 3, Mesh Group:
__all_ces__
Physical interface: ael (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 ael.0 (Index 338) (SNMP ifIndex 1216) (Generation 1195)
Flags: Up SNMP-Traps 0x24024000 Encapsulation: Ethernet-Bridge
Statistics      Packets      pps      Bytes      bps
Bundle:
    Input :      2785        0      688380        0
    Output:        0        0         0         0
Adaptive Statistics:
    Adaptive Adjusts:      0
    Adaptive Scans :      0
    Adaptive Updates:      0
Link:
    ge-104/0/25.0
        Input :      10        0        600         0
        Output:        0        0         0         0
    ge-103/0/1.0
        Input :      2775        0      687780        0
        Output:        0        0         0         0
LACP info:      Role      System      System      Port      Port      Port

```

```

                                priority      identifier  priority  number  key
ge-104/0/25.0    Actor      127  f4:b5:2f:f7:3f:c0      127      32      2
ge-104/0/25.0    Partner     127  f4:b5:2f:41:0a:40      127      25      2
ge-103/0/1.0     Actor      127  f4:b5:2f:f7:3f:c0      127       8      2
ge-103/0/1.0     Partner     127  f4:b5:2f:41:0a:40      127       2      2
LACP Statistics:   LACP Rx      LACP Tx      Unknown Rx   Illegal Rx
ge-104/0/25.0      25470      25494           0           0
ge-103/0/1.0      25469      25513           0           0
Marker Statistics: Marker Rx      Resp Tx      Unknown Rx   Illegal Rx
ge-104/0/25.0         0         0           0           0
ge-103/0/1.0         0         0           0           0
Protocol bridge, MTU: 1514, Generation: 1230, Route table: 3, Mesh Group:
__all_ces__

Physical interface: ae0 (Extended Port, Enabled, Physical link is Up
Interface index: 128, SNMP ifIndex: 574, Generation: 131
Link-level type: Ethernet, MTU: 1514, Speed: 2Gbps, BPDU Error: None, MAC-REWRITE
Error: None, Loopback: Disabled, Source filtering: Disabled,
Flow control: Disabled
Pad to minimum frame size: Disabled
Minimum links needed: 1, Minimum bandwidth needed: 1bps
Device flags      : Present Running
Interface flags: SNMP-Traps Internal: 0x4000
Current address: f4:b5:2f:f7:3f:c0, Hardware address: f4:b5:2f:f7:3f:c0
Last flapped      : 2015-03-31 18:36:43 PDT (07:05:56 ago)
Statistics last cleared: Never
Extended port information:
  Satellite device port id : 415
Traffic statistics:
Input  bytes :          13515908          2032 bps
Output bytes :          12289920          2032 bps
Input  packets:          99514           2 pps
Output packets:          96015           2 pps
IPv6 transit statistics:
Input  bytes :              0
Output bytes :              0
Input  packets:              0
Output packets:              0
Input errors:
  Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0, Policed discards:
0, Resource errors: 0
Output errors:
  Carrier transitions: 0, Errors: 0, Drops: 0, MTU errors: 0, Resource errors:

```

0

Egress queues: 8 supported, 7 in use

Queue counters:	Queued packets	Transmitted packets	Dropped packets
0	0	95867	0
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0
7	0	0	0

Queue number:	Mapped forwarding classes
0	FC0
1	FC1
2	FC2
3	FC3
4	FC4
5	FC5, be-3
7	be-2

Logical interface ae0.0 (Index 337) (SNMP ifIndex 575) (Generation 1194)

Flags: Up SNMP-Traps 0x24024000 Encapsulation: Ethernet-Bridge

Statistics	Packets	pps	Bytes	bps
Bundle:				
Input :	1729	0	601692	0
Output:	0	0	0	0

Adaptive Statistics:	
Adaptive Adjusts:	0
Adaptive Scans :	0
Adaptive Updates:	0

Link:

ge-104/0/24.0				
Input :	0	0	0	0
Output:	0	0	0	0
ge-103/0/0.0				
Input :	1729	0	601692	0
Output:	0	0	0	0

LACP info:	Role	System	System	Port	Port	Port
		priority	identifier	priority	number	key
ge-104/0/24.0	Actor	127	f4:b5:2f:f7:3f:c0	127	31	1
ge-104/0/24.0	Partner	127	f4:b5:2f:41:0a:40	127	24	1
ge-103/0/0.0	Actor	127	f4:b5:2f:f7:3f:c0	127	7	1
ge-103/0/0.0	Partner	127	f4:b5:2f:41:0a:40	127	1	1

```

LACP Statistics:      LACP Rx      LACP Tx      Unknown Rx      Illegal Rx
ge-104/0/24.0        25470        25495         0              0
ge-103/0/0.0         25469        25512         0              0
Marker Statistics:   Marker Rx      Resp Tx      Unknown Rx      Illegal Rx
ge-104/0/24.0         0            0            0              0
ge-103/0/0.0         0            0            0              0

Protocol bridge, MTU: 1514, Generation: 1229, Route table: 3, Mesh Group:
__all_ces__

Physical interface: ae1 (Extended Port, Enabled, Physical link is Up
Interface index: 129, SNMP ifIndex: 790, Generation: 132
Link-level type: Ethernet, MTU: 1514, Speed: 200mbps, BPDU Error: None,
MAC-REWRITE Error: None, Loopback: Disabled, Source filtering: Disabled,
Flow control: Disabled
Pad to minimum frame size: Disabled
Minimum links needed: 1, Minimum bandwidth needed: 1bps
Device flags      : Present Running
Interface flags: SNMP-Traps Internal: 0x4000
Current address: f4:b5:2f:f7:3f:c1, Hardware address: f4:b5:2f:f7:3f:c1
Last flapped      : 2015-03-31 18:36:44 PDT (07:05:55 ago)
Statistics last cleared: Never
Extended port information:
  Satellite device port id   : 431
Traffic statistics:
Input  bytes   :          13285288          2032 bps
Output bytes   :          12166400          2032 bps
Input  packets :          98447         2 pps
Output packets :          95050         2 pps
IPv6 transit statistics:
Input  bytes   :              0
Output bytes   :              0
Input  packets :              0
Output packets :              0
Input errors:
  Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0, Policed discards:
0, Resource errors: 0
Output errors:
  Carrier transitions: 0, Errors: 0, Drops: 0, MTU errors: 0, Resource errors:
0
Egress queues: 8 supported, 7 in use
Queue counters:      Queued packets  Transmitted packets      Dropped packets
0                    0                94909                    0
1                    0                0                      0
2                    0                0                      0
3                    0                0                      0

```

```

4                0                0                0
5                0                0                0
7                0                0                0
Queue number:    Mapped forwarding classes
0                FC0
1                FC1
2                FC2
3                FC3
4                FC4
5                FC5, be-3
7                be-2

Logical interface ael.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:
Total octets          Receive          Transmit
Total packets         0              0
Unicast packets       0              0
Broadcast packets     0              0
Multicast packets     0              0
CRC/Align errors      0              0
FIFO errors           0              0
MAC control frames    0              0
MAC pause frames      0              0
Oversized frames      0
Jabber frames         0
Fragment frames       0
VLAN tagged frames    0
Code violations       0
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

# show interfaces satellite-device

## Syntax

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

## Release Information

Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.  
Command introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.

## Description

Display the satellite device extended ports in a Junos Fusion.

## Options

**device-alias** *device-alias*—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

## RELATED DOCUMENTATION

| *Configuring or Expanding a Junos Fusion Enterprise*

## List of Sample Output

[show interfaces satellite-device all on page 644](#)

## Output Fields

[Table 29 on page 641](#) lists the output fields for the **show interfaces satellite-device** command. Output fields are listed in the approximate order in which they appear.

Table 29: show interfaces satellite-device Output Fields

Field Name	Field Description	Level of Output
Physical Interface		
Physical interface	Name of the physical interface.	All levels

Table 29: show interfaces satellite-device Output Fields (*continued*)

Field Name	Field Description	Level of Output
<b>Interface index</b>	Index number of the physical interface, which reflects its initialization sequence.	<b>detail extensive</b> none
<b>Link-level type</b>	Encapsulation being used on the physical interface.	All levels
<b>Device flags</b>	Information about the physical device.	All levels
<b>Flow control</b>	Flow control status: <b>Enabled</b> or <b>Disabled</b> .  <b>NOTE:</b> This field is only displayed if asymmetric flow control is not configured.	All levels
<b>Pad to minimum frame size</b>	Pad Tx VLAN-tagged frame to minimum of 68 bytes.	All levels
<b>Minimum links needed</b>	Minimum number of aggregated links.	All levels
<b>Minimum bandwidth needed</b>	Minimum bandwidth configured for aggregated bundle.	All levels
<b>Device flags</b>	Information about the physical device.	All levels
<b>Interface flags</b>	Information about the interface.	All levels
<b>Current address</b>	Configured MAC address.	<b>detail extensive</b> none
<b>Last flapped</b>	Date, time, and how long ago the interface went from down to up. The format is <b>Last flapped: year-month-day hour:minute:second:timezone (hour:minute:second ago)</b> . For example, <b>Last flapped: 2008-01-16 10:52:40 UTC (3d 22:58 ago)</b> .	<b>detail extensive</b> none
<b>Input rate</b>	Input rate in bits per second (bps) and packets per second (pps). The value in this field also includes the Layer 2 overhead bytes for ingress traffic on Ethernet interfaces if you enable accounting of Layer 2 overhead at the PIC level or the logical interface level.	All levels
<b>Output rate</b>	Output rate in bps and pps. The value in this field also includes the Layer 2 overhead bytes for egress traffic on Ethernet interfaces if you enable accounting of Layer 2 overhead at the PIC level or the logical interface level.	All levels

Table 29: show interfaces satellite-device Output Fields (*continued*)

Field Name	Field Description	Level of Output
<b>Extended port information</b>	Satellite device port ID	All levels
<b>Active alarms and Active defects</b>	<p>Ethernet-specific defects that can prevent the interface from passing packets. When a defect persists for a certain amount of time, it is promoted to an alarm. Based on the switch configuration, an alarm can ring the red or yellow alarm bell on the switch, or turn on the red or yellow alarm LED on the craft interface. These fields can contain the value <b>None</b> or <b>Link</b>.</p> <ul style="list-style-type: none"> <li>• <b>None</b>—There are no active defects or alarms.</li> <li>• <b>Link</b>—Interface has lost its link state, which usually means that the cable is unplugged, the far-end system has been turned off, or the PIC is malfunctioning.</li> </ul>	<b>detail extensive none</b>
<b>Interface transmit statistics</b>	All levels	All levels
<b>Logical Interface</b>		
<b>Logical interface</b>	Name of the logical interface.	All levels
<b>Index</b>	Index number of the logical interface, which reflects its initialization sequence.	<b>detail extensive none</b>
<b>SNMP ifIndex</b>	SNMP interface index number for the logical interface.	<b>detail extensive none</b>
<b>Generation</b>	Unique number for use by Juniper Networks technical support only.	<b>detail extensive</b>
<b>Flags</b>	Information about the logical interface.	All levels
<b>Statistics</b>	<ul style="list-style-type: none"> <li>• <b>Packets</b></li> <li>• <b>pps</b></li> <li>• <b>Bytes</b></li> <li>• <b>bps</b></li> </ul>	All levels

Table 29: show interfaces satellite-device Output Fields (*continued*)

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

## Sample Output

## Sample Output

**show interfaces satellite-device all**

user@aggregation-device> **show interfaces satellite-device all**

```
Physical interface: ae0 (Extended Port, Enabled, Physical link is Up
  Interface index: 128, SNMP ifIndex: 574
  Link-level type: Ethernet, MTU: 1514, Speed: 2Gbps, BPDU Error: None, MAC-REWRITE
  Error: None, Loopback: Disabled, Source filtering: Disabled,
  Flow control: Disabled
  Pad to minimum frame size: Disabled
  Minimum links needed: 1, Minimum bandwidth needed: 1bps
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
```

Current address: f4:b5:2f:f7:3f:c0, Hardware address: f4:b5:2f:f7:3f:c0  
 Last flapped : 2015-03-31 18:36:43 PDT (06:54:08 ago)  
 Input rate : 2032 bps (2 pps)  
 Output rate : 3048 bps (2 pps)

Logical interface ae0.0 (Index 337) (SNMP ifIndex 575)

Flags: Up SNMP-Traps 0x24024000 Encapsulation: Ethernet-Bridge

Statistics	Packets	pps	Bytes	bps
------------	---------	-----	-------	-----

Bundle:

Input :	1704	0	592992	0
Output:	0	0	0	0

Adaptive Statistics:

Adaptive Adjusts:	0
Adaptive Scans :	0
Adaptive Updates:	0

Protocol bridge, MTU: 1514

Physical interface: ae1 (Extended Port, Enabled, Physical link is Up

Interface index: 129, SNMP ifIndex: 790

Link-level type: Ethernet, MTU: 1514, Speed: 200mbps, BPDU Error: None,

MAC-REWRITE Error: None, Loopback: Disabled, Source filtering: Disabled,

Flow control: Disabled

Pad to minimum frame size: Disabled

Minimum links needed: 1, Minimum bandwidth needed: 1bps

Device flags : Present Running

Interface flags: SNMP-Traps Internal: 0x4000

Current address: f4:b5:2f:f7:3f:c1, Hardware address: f4:b5:2f:f7:3f:c1

Last flapped : 2015-03-31 18:36:44 PDT (06:54:07 ago)

Input rate : 2032 bps (2 pps)

Output rate : 2032 bps (2 pps)

Logical interface ae1.0 (Index 338) (SNMP ifIndex 1216)

Flags: Up SNMP-Traps 0x24024000 Encapsulation: Ethernet-Bridge

Statistics	Packets	pps	Bytes	bps
------------	---------	-----	-------	-----

Bundle:

Input :	2759	0	679982	0
Output:	0	0	0	0

Adaptive Statistics:

Adaptive Adjusts:	0
Adaptive Scans :	0
Adaptive Updates:	0

Protocol bridge, MTU: 1514

Physical interface: xe-101/0/31 (Extended Port, Enabled, Physical link is Up

Interface index: 336, SNMP ifIndex: 829



```

Link-level type: Ethernet, MTU: 1514, LAN-PHY mode, Speed: 10Gbps
Device flags    : Present Running
Interface flags: SNMP-Traps Internal: 0x4000
Link flags      : None
CoS queues      : 8 supported, 8 maximum usable queues
Current address: 10:0e:7e:bf:2d:24, Hardware address: 10:0e:7e:bf:2d:24
Last flapped   : 2015-03-31 08:28:23 PDT (17:02:29 ago)
Input rate      : 0 bps (0 pps)
Output rate     : 0 bps (0 pps)
Active alarms   : None
Active defects  : None
Interface transmit statistics: Disabled

```

```

Logical interface xe-101/0/31.0 (Index 491) (SNMP ifIndex 926)
  Flags: Up SNMP-Traps 0x24024000 Encapsulation: Ethernet-Bridge
  Input packets : 0
  Output packets: 0
  Protocol bridge, MTU: 1514

```

```

Physical interface: xe-101/0/32 (Extended Port, Enabled, Physical link is Up
  Interface index: 337, SNMP ifIndex: 836
  Link-level type: Ethernet, MTU: 1514, LAN-PHY mode, Speed: 10Gbps
  Device flags    : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  Link flags      : None
  CoS queues      : 8 supported, 8 maximum usable queues
  Current address: 10:0e:7e:bf:2d:25, Hardware address: 10:0e:7e:bf:2d:25
  Last flapped   : 2015-03-31 08:28:23 PDT (17:02:29 ago)
  Input rate      : 0 bps (0 pps)
  Output rate     : 0 bps (0 pps)
  Active alarms   : None
  Active defects  : None
  Interface transmit statistics: Disabled

```

```

Logical interface xe-101/0/32.0 (Index 492) (SNMP ifIndex 935)
  Flags: Up SNMP-Traps 0x24024000 Encapsulation: Ethernet-Bridge
  Input packets : 0
  Output packets: 0
  Protocol bridge, MTU: 1514

```

## show interfaces statistics

### Syntax

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

### Release Information

Command introduced before Junos OS Release 7.4.

Command introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers.

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

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

### Description

Display static interface statistics, such as errors.

**NOTE:** When the **show interfaces statistics** command is executed on an interface that is configured on T4000 Type 5 FPC, the *IPv6 transit statistics* field displays:

- Total statistics (sum of transit and local statistics) at the physical interface level
- Transit statistics at the logical interface level

### Options

**interface-name**—Name of an interface.

**satellite-device [*device-alias-name* | all ]**—(Junos Fusion only) (Optional) Display interface statistics for interfaces on the specified satellite device in the Junos Fusion, or on all satellite devices in the Junos Fusion.

**NOTE:** In a Junos Fusion Enterprise, logical interface statistics are not synced across aggregation devices in a dual-aggregation device topology.

**detail**—(Optional) Display detailed output.

### Required Privilege Level

view

## RELATED DOCUMENTATION

| [clear interfaces statistics](#)

### List of Sample Output

[show interfaces statistics \(Fast Ethernet\) on page 648](#)  
[show interfaces statistics \(Gigabit Ethernet PIC—Egress\) on page 649](#)  
[show interfaces statistics detail \(Aggregated Ethernet\) on page 652](#)  
[show interfaces statistics detail \(Aggregated Ethernet—Ingress\) on page 653](#)  
[show interfaces statistics detail \(Aggregated Ethernet—Egress\) on page 655](#)  
[show interfaces statistics \(SONET/SDH\) on page 656](#)  
[show interfaces statistics \(Aggregated SONET/SDH—Ingress\) on page 658](#)  
[show interfaces statistics \(Aggregated SONET/SDH—Egress\) on page 659](#)  
[show interfaces statistics \(MX Series Routers\) on page 660](#)  
[show interfaces statistics \(MX Series Routers: Dynamic Interfaces with RPF Check Detail\) on page 661](#)  
[show interfaces statistics \(PTX Series Packet Transport Routers\) on page 662](#)  
[show interfaces statistics \(ACX Series routers\) on page 663](#)

### 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

      Packets
Destination class      (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
  Bit errors              Seconds
  109
  Errored blocks          109
Interface transmit statistics: Disabled

```

#### show interfaces statistics (MX Series Routers: Dynamic Interfaces with RPF Check Detail)

user@host> **show interfaces statistics pp0.3221225475 detail**

```

Logical interface pp0.3221225475(Index 536870921)(SNMP ifIndex 200000009)
(Generation 6)
  Flags: Up Point-To-Point Encapsulation: PPPoE
  PPPoE:
    State: SessionUp, Session ID: 1,
    Session AC name: B, Remote MAC address:00:00:5E:00:53:01,
    Underlying interface: xe-1/0/0.3221225474 (Index 536870919)
    Ignore End-Of-List tag: Disable
  Bandwidth: 0
  Traffic statistics:
    Input  bytes   :                34
    Output bytes   :                 0
    Input  packets :                 1
    Output packets :                 1
  Local statistics:
    Input  bytes   :                 0
    Output bytes   :                 0
    Input  packets :                 0
    Output packets :                 0
  Transit statistics:
    Input  bytes   :                34
                                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: upstrml-inet-pp0.3221225475-in
    Output Filters: dwnstrml-inet-pp0.3221225475-out
    Addresses, Flags: Is-Primary
        Destination: Unspecified, Local: 10.255.96.19, Broadcast: Unspecified,
Generation: 0

```

### show interfaces statistics (PTX Series Packet Transport Routers)

user@host> **show interfaces statistics em0**

```

Physical interface: em0, Enabled, Physical link is Up
    Interface index: 8, SNMP ifIndex: 0
    Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Speed: 1000mbps
    Device flags      : Present Running
    Interface flags: SNMP-Traps
    Link type         : Full-Duplex
    Current address: 00:00:5E:00:53:1b, Hardware address: 00:00:5E:00:53:1b
    Last flapped      : Never
    Statistics last cleared: Never
Input packets : 212620
Output packets: 71
    Input errors: 0, Output errors: 0

    Logical interface em0.0 (Index 3) (SNMP ifIndex 0)
    Flags: SNMP-Traps Encapsulation: ENET2
    Input packets : 212590
    Output packets: 71
    Protocol inet, MTU: 1500

```

```

Flags: Is-Primary
Addresses, Flags: Is-Default Is-Preferred Is-Primary
  Destination: 192.168.3/24, Local: 192.168.3.30,
  Broadcast: 192.168.3.255

```

### show interfaces statistics (ACX Series routers)

user@host> **show interfaces statistics ge-0/1/7**

```

Physical interface: ge-0/1/7, Enabled, Physical link is Down
  Interface index: 151, SNMP ifIndex: 524
  Link-level type: Ethernet, Media type: Copper, MTU: 1514, Link-mode: Full-duplex,
  Speed: 1000mbps, BPDU Error: None, MAC-REWRITE Error: None, Loopback: Disabled,
  Source filtering: Disabled, Flow control: Enabled, Auto-negotiation: Enabled,
  Remote fault: Online
  Device flags      : Present Running Down
  Interface flags: Hardware-Down SNMP-Traps Internal: 0x0
  Link flags       : None
  CoS queues       : 8 supported, 8 maximum usable queues
  Current address: 00:00:5E:00:53:a3, Hardware address: 00:00:5E:00:53:a3
  Last flapped    : 2012-05-11 04:25:28 PDT (2d 20:23 ago)
  Statistics last cleared: 2012-05-13 23:07:23 PDT (01:41:25 ago)
  Input rate      : 0 bps (0 pps)
  Output rate     : 0 bps (0 pps)
  Input errors: 0, Output errors: 0
  Active alarms   : LINK
  Active defects  : LINK
  Interface transmit statistics: Disabled

```

# show interfaces terse satellite-device

## Syntax

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

## Release Information

Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.  
 Command introduced in Junos OS Release 16.1R1 for Junos Fusion Enterprise.

## Description

Display the satellite device extended ports in a Junos Fusion.

## Options

**device-alias** *device-alias*—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

## RELATED DOCUMENTATION

| *Configuring or Expanding a Junos Fusion Enterprise*

## List of Sample Output

[show interfaces terse satellite-device device-alias on page 665](#)

[show interfaces terse satellite-device all on page 666](#)

## Output Fields

[Table 30 on page 664](#) 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 30: show interfaces terse satellite-device Output Fields

Field Name	Field Description
Interface	Interface name.
Admin	Whether the interface is turned on (up) or off (down).

Table 30: show interfaces terse satellite-device Output Fields (continued)

Field Name	Field Description
<b>Link</b>	Link state: <b>up</b> or <b>down</b> .
<b>Proto</b>	Protocol family configured on the logical interface.
<b>Local</b>	Local IP address of the logical interface.
<b>Remote</b>	Remote IP address of the logical interface.

## Sample Output

**show interfaces terse satellite-device device-alias**

user@aggregation-device> **show interfaces terse satellite-device TOR1**

Interface	Admin	Link	Proto	Local	Remote
sd-101/0/0	up	up			
sd-101/0/0.32770	up	up	bridge		
xe-101/0/14	up	up			
xe-101/0/15	up	up			
xe-101/0/16	up	up			
xe-101/0/17	up	up			
xe-101/0/24	up	up			
xe-101/0/25	up	up			
xe-101/0/31	up	up			
xe-101/0/31.0	up	up	bridge		
xe-101/0/32	up	down			
xe-101/0/32.0	up	down	bridge		
xe-101/0/33	up	down			
xe-101/0/33.0	up	down	bridge		
ge-101/0/36	up	down			
et-101/0/48	up	down			
xe-101/0/50:0	up	up			
xe-101/0/50:0.0	up	up	bridge		
xe-101/0/50:1	up	up			
xe-101/0/50:2	up	up			
xe-101/0/50:2.0	up	up	bridge		
xe-101/0/50:3	up	up			

## Sample Output

**show interfaces terse satellite-device all**

user@aggregation-device> **show interfaces terse satellite-device all**

Interface	Admin	Link	Proto	Local	Remote
ae0	up	up			
ae0.0	up	up	bridge		
ae1	up	up			
ae1.0	up	up	bridge		
ae2	up	up			
ae2.0	up	up	bridge		
ae3	up	up			
ae3.0	up	up	bridge		
ae4	up	up			
ae4.0	up	up	bridge		
ae5	up	up			
ae5.0	up	up	bridge		
ae6	up	up			
ae6.0	up	up	bridge		
ae7	up	up			
ae7.0	up	up	bridge		
ae8	up	up			
ae8.0	up	up	bridge		
ae9	up	up			
ae9.0	up	up	bridge		
ae10	up	down			
ae10.0	up	down	bridge		
xe-101/0/14	up	up			
xe-101/0/15	up	up			
xe-101/0/16	up	up			
xe-101/0/17	up	up			
xe-101/0/24	up	up			
xe-101/0/25	up	up			
xe-101/0/31	up	up			
xe-101/0/31.0	up	up	bridge		
xe-101/0/32	up	down			
xe-101/0/32.0	up	down	bridge		
xe-101/0/33	up	down			
xe-101/0/33.0	up	down	bridge		
ge-101/0/36	up	down			
et-101/0/48	up	down			
xe-101/0/50:0	up	up			
xe-101/0/50:0.0	up	up	bridge		

```

xe-101/0/50:1      up    up
xe-101/0/50:2      up    up
xe-101/0/50:2.0    up    up    bridge
xe-101/0/50:3      up    up
xe-102/0/10        up    up
xe-102/0/11        up    up
xe-102/0/12        up    down
xe-102/0/13        up    up
xe-102/0/14        up    up
xe-102/0/15        up    up
xe-102/0/16        up    up
xe-102/0/17        up    up
xe-102/0/24        up    up
xe-102/0/25        up    up
xe-102/0/31        up    up
xe-102/0/31.0      up    up    bridge
xe-102/0/32        up    up
xe-102/0/32.0      up    up    bridge
xe-102/0/33        up    up
xe-102/0/45        up    down
ge-102/0/46        up    down
xe-102/0/47        up    down
et-102/0/48        up    down
et-102/0/49        up    down
et-102/0/50        up    down
et-102/0/51        up    down
et-102/0/52        up    down
et-102/0/53        up    down
ge-103/0/0         up    up
ge-103/0/0.0       up    up    aenet    --> ae0.0
ge-103/0/1         up    down
ge-103/0/1.0       up    down    aenet    --> ae1.0
ge-103/0/2         up    up
ge-103/0/2.0       up    up    aenet    --> ae2.0
ge-103/0/3         up    up

```

## show system core-dumps

### List of Syntax

[Syntax on page 668](#)

[Syntax \(SRX Series\) on page 668](#)

[Syntax \(Junos OS Evolved\) on page 668](#)

[Syntax \(EX Series Switches\) on page 668](#)

[Syntax \(TX Matrix Router\) on page 668](#)

[Syntax \(TX Matrix Plus Router\) on page 668](#)

[Syntax \(QFX Series and OCX Series\) on page 669](#)

### 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)>
```

### Release Information

Command introduced before Junos OS Release 8.5.

Command introduced in Junos OS Release 9.0 for EX Series switches.

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

Command introduced in Junos OS Release 11.1 for the QFX Series.

**re0**, **re1**, and **routing-engine** options introduced for dual Routing Engines in Junos OS Release 13.1.

Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

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

**core-file-info** option is deprecated in Junos OS Release 16.1R3.

### Description

Show core files on all routers or switches running Junos OS. You can use the **show system core-dumps** command to show a list of system core files created when the router or switch has failed. This command can be useful for diagnostic purposes. Each list item includes the file permissions, number of links, owner, group, size, modification date, and path and filename. If dual Routing Engines are present, you can view core-dump files for either routing engine or both routing engines together. On a QFabric system, you can view core-dump files on individual QFabric system devices as well as on the entire QFabric system.

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.



## Options

**none**—Display a list of all existing core-dump files.

**NOTE:** If dual Routing Engines are present, then only the core-dump files for the active Routing Engine are listed. For Junos OS Evolved, core-dump files for all Routing Engines are listed.

**all-chassis**—(TX Matrix and TX Matrix Plus routers only) (Optional) On a routing matrix based on a TX Matrix router, display system core files for the TX Matrix router switch-card chassis [SCC] and all the T640 routers [LCCs] connected to the TX Matrix router.

On a routing matrix based on a TX Matrix Plus router, display system core files for the TX Matrix Plus router (switch-fabric chassis [SFC]) and all the T1600 routers [LCCs] connected to the TX Matrix Plus router.

**<all-lcc | lcc number>**—(TX Matrix and TX Matrix Plus routers only) (Optional) On a routing matrix based on the TX Matrix router, display core dump files for all T640 routers (line-card chassis [LCCs]) or a specific T640 router [LCC] connected to the TX Matrix router.

On a routing matrix based on the TX Matrix Plus router, display logging information for all T1600 routers (line-card chassis [LCCs]) or a specific T1600 router (LCC) connected to the TX Matrix Plus router. When using the **lcc number** option, replace **number** with a value from 0 through 3.

**NOTE:** The **all-chassis** option displays system core files for the SCC or SFC and the LCCs connected to the SCC or SFC in the routing matrix while the **all-lcc** option only displays system core files for the LCCs in the routing matrix.

**all-members**—(EX4200 switches) (Optional) Display system core files on all members of the Virtual Chassis configuration.

**component (UUID | serial number | all)**—(QFabric systems only) (Optional) Display a list of core-dump files located on individual QFabric system device or on the entire QFabric system.

**display-order (timestamp-sort | alphanumeric-sort)**—(QFabric systems only) (Optional) Display list of debug artifacts generated within the specified period—for example, within the last hour, within the last 20 minutes, or within the last 32 seconds—or according to their filename.

**display-period (hours | minutes | seconds)**—(QFabric systems only) (Optional) Display core-dump files generated within the specified period—for example, within the last hour, within the last 20 minutes, or within the last 32 seconds.

**kernel-crashinfo component (UUID | serial number)**—(QFabric systems only) (Optional) Display kernel crash information from the EEPROM on a QFabric system device.

**local**—(EX4200 switches only) (Optional) Display system core files on the local Virtual Chassis member.

**member member-id**—(EX4200 switches only) (Optional) Display system core files on the specified member of the Virtual Chassis configuration. Replace **member-id** with a value from 0 through 9.

**node node-name**—(Optional) (Junos OS Evolved only) Display system core files generated on the specified node.

**re0**—(Dual Routing Engines only) Display the core-dump files on re0.

**re1**—(Dual Routing Engines only) Display the coredump files on re1.

**repository (core | log)**—(QFabric systems only) (Optional) Specify either the core or log repository in which to view core-dump files.

**routing-engine (backup | both | local | master | other)**—(Dual routing engines only) Display a list of core-dump files for either the backup, local, master, or other routing engine or both routing engines.

**satellite [fpc-slot-id | device-alias alias-name]**—(Junos Fusion only)(Optional) Display system core files for the specified satellite device in a Junos Fusion, or for all satellite devices in the Junos Fusion if no satellite devices are specified.

**scc**—(TX Matrix routers only) (Optional) Display system core files on the TX Matrix router (or switch-card chassis).

**sfc**—(TX Matrix Plus routers only) (Optional) Display system core files on the TX Matrix Plus router (or switch-fabric chassis).

### Required Privilege Level

view

### List of Sample Output

[show system core-dumps on page 674](#)

[show system core-dumps on page 674](#)

[show system core-dumps routing-engine both on page 674](#)

[show system core-dumps \(SRX Series\) on page 675](#)

[show system core-dumps \(TX Matrix Plus Router\) on page 676](#)

[show system core-dumps \(QFX3500 Switch\) on page 678](#)

[show system core-dumps \(QFabric Systems\) on page 678](#)

[show system core-dumps component serial number display-order alphanumeric-sort repository core \(QFabric Systems\) on page 679](#)

[show system core-dumps display-period \(QFabric Systems\) on page 679](#)

[show system core-dumps kernel-crashinfo component serial number \(QFabric Systems\) on page 682](#)

[show system core-dumps repository core \(QFabric Systems\) on page 684](#)

[show system core-dumps repository log \(QFabric Systems\) on page 685](#)

## Output Fields

[Table 31 on page 672](#) describes the output fields for the **show system core-dumps** command. Output fields are listed in the approximate order in which they appear.

**Table 31: show system core-dumps Output Fields**

Field Name	Field Description
<b>Permissions</b>	Read/write permissions for the file named.
<b>Links</b>	Number of links to the file.
<b>Owner</b>	Name of the file owner.
<b>Group</b>	Name of the group with file access.
<b>File size</b>	File size in bytes.
<b>Modified</b>	Last file modification date and time.
<b>Path/filename</b>	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 <b>show system core-dumps</b> command does not display information about files pertaining to the relayd process.
<b>Repository scope:</b>	Repository where core-dump files and log files are stored. The core-dump files are located in the <b>core</b> repository, and the log files are located in the <b>log</b> repository. The default <b>Repository scope</b> is shared since both the <b>core</b> and <b>log</b> repositories are shared by all of the QFabric system devices.
<b>Repository head:</b>	Path to the top-level repository location.
<b>Repository name:</b>	Name of the repository: <b>core</b> or <b>log</b> .
<b>List of nodes for core repository:</b>	List of core-dump files associated with a particular QFabric system device located in the core repository.
<b>Node Group</b>	Name of the QFabric system device.
<b>Node Identifier</b>	UUID or serial number of the QFabric system device.

Table 31: show system core-dumps Output Fields (*continued*)

Field Name	Field Description
<b>Num</b>	Number of core-dump and log files.
<b>Model</b>	Model number of the QFabric system device.
<b>Usage</b>	Usage of the repository in megabytes.
<b>Total usage of core repository:</b>	Total usage of core-dump files associated with a particular QFabric system device located in the core repository. Usage is specified in megabytes and as a percentage.
<b>Total usage of log repository:</b>	Total usage of log files associated with a particular QFabric system device located in the log repository. Usage is specified in megabytes and as a percentage.
<b>List of nodes for core repository:</b>	List of core-dump files associated with a particular QFabric system device located in the core repository.
<b>List of nodes for log repository:</b>	List of log files associated with a particular QFabric system device located in the log repository.
<b>Filename</b>	Name of the core-dump file.
<b>Date</b>	Last core-dump file modification date and time.
<b>Size</b>	Size of the core-dump file.
<b>Core filename</b>	Filename of the core-dump file.
<b>Process name</b>	Name of the process that is generating a core-dump file or log file.
<b>Release</b>	Junos OS release.
<b>Build server</b>	Junos OS build server.
<b>Build date</b>	Junos OS build date.
<b>Stack trace</b>	Stack trace of the core-dump file.

## Sample Output

### show system core-dumps

This example shows the command output if core files exist.

```
user@host> show system core-dumps
```

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

### show system core-dumps

This example shows the command output if core files do not exist.

```
user@host> show system core-dumps
```

```
/var/crash/*core*: No such file or directory
/var/tmp/*core*: No such file or directory
/var/tmp/pics/*core*: No such file or directory
/var/crash/kernel.*: No such file or directory
```

### show system core-dumps routing-engine both

This example shows the command output if dual Routing Engines are present.

```
user@host> show system core-dumps routing-engine both
```

```
re0:
-----
/var/crash/*core*: No such file or directory
/var/tmp/pics/*core*: No such file or directory
/var/crash/kernel.*: No such file or directory

/var/tmp/cores:
total blocks: 496776
-rw-rw---- 1 root field 11910589 Nov 8 13:20 chassisd.core.0.201311081320
...

-rw-rw---- 1 root field 11737227 Oct 28 14:21
rpd.core-tarball.4.tgz.201310281421.3458162
total files: 10
```

```

rel:
-----
/var/crash/*core*: No such file or directory
/var/tmp/pics/*core*: No such file or directory
/var/crash/kernel.*: No such file or directory

/var/tmp/cores:
total blocks: 3178420
-rw-rw----  1 root  field   19039721 Nov  8  14:29
chassisd.core.0.201311081429.3485600.gz
-rw-rw----  1 root  field   19039793 Nov  8  14:37
chassisd.core.1.201311081437.3485599.gz
..

-rw-rw----  1 root  field   11710113 Oct 17  15:26
rpd.core-tarball.1.1.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	d0afdale-0710-11e1-ald0-00e081c5297e	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	d0afdale-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%)				

### 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	d0afdale-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 storage satellite

## Syntax

```
show system storage satellite
<fpc-slot>
device-alias <device-alias>
```

## Release Information

Command introduced in Junos OS Release 17.1R1.

## Description

Displays the storage usage of satellite devices in Junos Fusion.

## Options

**none**—Display the storage usage for all listed satellite devices.

**detail**—(Optional) Display detail output.

**fpc-slot**—(Optional) Display satellite device connection information for the satellite device using the specified FPC slot number only.

**device-alias device-alias**—(Optional) Display satellite device connection information for the satellite device using the specified device alias only.

## Required Privilege Level

view

## List of Sample Output

[show system storage satellite on page 687](#)

## Output Fields

[Table 32 on page 686](#) describes the output fields for the **show system storage** command. Output fields are listed in the approximate order in which they appear.

Table 32: show system storage Output Fields

Field Name	Field Description
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.

Table 32: show system storage Output Fields (*continued*)

Field Name	Field Description
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

# Power over Ethernet, LLDP, and LLDP-MED on a Junos Fusion Provider Edge

## IN THIS CHAPTER

- [Understanding Power over Ethernet in a Junos Fusion | 689](#)
- [Understanding LLDP and LLDP-MED on a Junos Fusion | 692](#)
- [Configuring Power over Ethernet in a Junos Fusion | 694](#)
- [Verifying PoE Configuration and Status for a Junos Fusion \(CLI Procedure\) | 699](#)

## Understanding Power over Ethernet in a Junos Fusion

### IN THIS SECTION

- [Power over Ethernet in a Junos Fusion Overview | 690](#)
- [Understanding the Role of the Aggregation Devices for PoE Support in a Junos Fusion | 690](#)
- [Understanding the Role of the Satellite Devices for PoE Support in a Junos Fusion | 690](#)
- [Understanding PoE Configuration in a Junos Fusion | 691](#)
- [Understanding PoE Support Standards for Extended Ports in a Junos Fusion | 691](#)
- [Understanding Maximum PoE Power Budgets in a Junos Fusion | 691](#)
- [Understanding PoE Controller Software in a Junos Fusion | 692](#)
- [Understanding PoE Power Allocation Configuration Options in a Junos Fusion | 692](#)

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 22](#)

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 | 694](#)

[Verifying PoE Configuration and Status for a Junos Fusion \(CLI Procedure\) | 699](#)

## Understanding LLDP and LLDP-MED on a Junos Fusion

### IN THIS SECTION

● [LLDP and LLDP-MED in a Junos Fusion Overview | 693](#)

● [Understanding LLDP and LLDP-MED Configuration and Traffic Handling in a Junos Fusion | 693](#)

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, it is 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 | 695](#)
- [Enabling PoE | 696](#)
- [Disabling PoE | 696](#)
- [Setting the Power Management Mode | 697](#)
- [Setting the Maximum Power That Can Be Delivered from a PoE Interface | 697](#)
- [Setting the Guard Band | 698](#)
- [Setting the PoE Interface Priority | 698](#)

## PoE Configurable Options

Table 33 on page 695 shows the configurable PoE options and their default settings in a Junos Fusion.

Some PoE options can be configured globally and per interface. In cases where a PoE interface setting is different from a global PoE setting, the PoE interface setting is configured on the interface.

**Table 33: Configurable PoE Options and Default Settings**

Option	Default	Description
<a href="#">disable (Power over Ethernet)</a>	Not included in default configuration.  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.
<a href="#">guard-band</a>	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.
<a href="#">management</a>	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"> <li>• <b>class</b>—In this mode, the power allocated to a PoE extended port is determined by the class of the connected powered device. If there is no powered device connected, standard 15.4W power is allocated on the interface.</li> <li>• <b>static</b>—The maximum power delivered by an interface is statically configured and is independent of the class of the connected powered device. The maximum power is allocated to the interface even if a powered device is not connected.</li> </ul>
<a href="#">maximum-power (Interface)</a>	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 <b>static</b> .  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 <b>class</b> .

Table 33: Configurable PoE Options and Default Settings (*continued*)

Option	Default	Description
<a href="#">priority (Power over Ethernet)</a>	<b>low</b>	Sets an interface's power priority to either <b>low</b> or <b>high</b> . If power is insufficient for all PoE interfaces, the PoE power to low-priority interfaces is shut down before power to high-priority interfaces is shut down. Among interfaces that have the same assigned priority, the power priority is determined by port number, with lower-numbered ports having higher priority.

## Enabling PoE

PoE is disabled by default for all extended ports in a Junos Fusion.

To enable PoE on all PoE-supported interfaces:

```
[edit]
user@aggregation-device# set poe interface all-extended
```

To enable PoE on a specific PoE-supported interface:

```
[edit]
user@aggregation-device# set poe interface interface-name
```

For instance, to enable PoE on extended port interface ge-100/0/24:

```
[edit]
user@aggregation-device# set poe interface ge-100/0/24
```

## Disabling PoE

PoE is disabled by default in a Junos Fusion. Use this procedure to disable PoE in a Junos Fusion that has PoE previously enabled.

If PoE is enabled globally but disabled on a specific interface, PoE is disabled on the specified interface. This procedure can, therefore, be used to individually disable ports in cases where PoE is globally enabled.

If you want to disable PoE on all extended port interfaces in a Junos Fusion:

```
[edit]
user@aggregation-device# set poe interface all-extended disable
```

If you want to disable PoE on one extended port interface:

```
[edit]
user@aggregation-device# set poe interface interface-name disable
```

For instance, to disable PoE on extended port 101/0/1 in a Junos Fusion:

```
[edit]
user@aggregation-device# set poe interface 101/0/1 disable
```

If you want to enable PoE on all PoE-supported extended ports in a Junos Fusion except 101/0/10, enter the following commands:

```
[edit]
user@aggregation-device# set poe interface all-extended
user@aggregation-device# set poe interface 101/0/10 disable
```

## Setting the Power Management Mode

The power management mode in a Junos Fusion is set for all extended ports in a Junos Fusion .

The default power management mode is class.

To set the power management mode to static for all PoE extended ports:

```
[edit]
user@aggregation-device# set poe management static
```

To set the power management mode back to class for all PoE extended ports:

```
[edit]
user@aggregation-device# set poe management class
```

## Setting the Maximum Power That Can Be Delivered from a PoE Interface

To set the maximum power that can be delivered to a connected device using PoE when the power management mode is set to static:

```
[edit]
user@aggregation-device# set poe interface interface-name maximum-power watts
```

To configure all extended port interfaces to the same maximum power, enter **all-extended** as the *interface-name*.

For instance, to change the maximum power for all PoE extended ports configured in static power management mode to 25 watts:

```
[edit]
user@aggregation-device# set poe interface all-extended maximum-power 25
```

To change the maximum power for interface 101/0/1 to 25 watts:

```
[edit]
user@aggregation-device# set poe interface 101/0/1 maximum-power 25
```

## Setting the Guard Band

One guard band is configured for all extended ports in a Junos Fusion.

To set the guard band for all extended ports in a Junos Fusion:

```
[edit]
user@aggregation-device# set poe guard-band watts
```

For instance, to set the guard-band to 19 watts for all PoE extended ports:

```
[edit]
user@aggregation-device# set poe guard-band 19
```

## Setting the PoE Interface Priority

To set a PoE interface priority to high:

```
[edit]
user@aggregation-device# set poe interface interface-name priority high
```

For instance, to assign a high priority to interface 101/0/1:

```
[edit]
user@aggregation-device# set poe interface 101/0/1 priority high
```

To set a PoE interface priority to low:

```
[edit]
user@aggregation-device# set poe interface interface-name priority low
```

For instance, to assign a low priority to interface 102/0/1:

```
[edit]
user@aggregation-device# set poe interface 102/0/1 priority low
```

RELATED DOCUMENTATION

- [Verifying PoE Configuration and Status for a Junos Fusion \(CLI Procedure\) | 699](#)
- [Understanding Power over Ethernet in a Junos Fusion | 689](#)

## Verifying PoE Configuration and Status for a Junos Fusion (CLI Procedure)

You can verify the Power over Ethernet (PoE) configuration and status on Junos Fusion.

This topic describes how to verify:

- [PoE Power Budgets, Consumption, and Mode on Satellite Devices | 699](#)
- [PoE Interface Configuration and Status | 700](#)

### PoE Power Budgets, Consumption, and Mode on Satellite Devices

**Purpose**

Verify the PoE configuration and status, such as the PoE power budget, total PoE power consumption, power management mode, and the supported PoE standard.

**Action**

Enter the following command:

```
user@aggregation-device> show poe controller
```

Controller index	Maximum power	Power consumption	Guard band	Management	Status	Lldp Priority
------------------	---------------	-------------------	------------	------------	--------	---------------

100	925.00W	0.00W	19W	Class	AT_MODE	Disabled
120	125.00W	6.08W	19W	Class	AT_MODE	Disabled

### Meaning

- Satellite device 100 has a PoE power budget of 925 W, of which 0 W were being used by the PoE extended ports at the time the command was executed. The Guard band field shows that 19 W of power is reserved out of the PoE power budget to protect against spikes in power demand. The power management mode is class. The PoE ports on the switch support PoE+ (IEEE 802.3at).
- Satellite device 120 has a PoE power budget of 125 W, of which 6.08 W were being used by the PoE extended ports at the time the command was executed. The Guard band field shows that 19 W of power is reserved out of the PoE power budget to protect against spikes in power demand. The power management mode is class. The PoE ports on the switch support PoE+ (IEEE 802.3at).

## PoE Interface Configuration and Status

### Purpose

Verify that PoE interfaces are enabled and set to the correct maximum power and priority settings. Also verify current operational status and power consumption.

### Action

To view configuration and status for all PoE interfaces, enter:

```
user@switch> show poe interface
```

Interface	Admin status	Oper status	Max power	Priority	Power consumption	Class
ge-100/0/0	Enabled	OFF	16.0W	Low	0.0W	
not-applicable						
ge-100/0/1	Enabled	OFF	16.0W	Low	0.0W	
not-applicable						
ge-100/0/2	Enabled	OFF	16.0W	Low	0.0W	
not-applicable						
ge-100/0/3	Enabled	OFF	16.0W	Low	0.0W	
not-applicable						
ge-100/0/4	Enabled	OFF	16.0W	Low	0.0W	
not-applicable						
ge-100/0/5	Enabled	OFF	16.0W	Low	0.0W	
not-applicable						
ge-100/0/6	Enabled	OFF	16.0W	Low	0.0W	
not-applicable						
ge-100/0/7	Enabled	OFF	16.0W	Low	0.0W	

not-applicable						
ge-100/0/8	Enabled	OFF	16.0W	Low	0.0W	
not-applicable						
ge-100/0/9	Enabled	OFF	16.0W	Low	0.0W	
not-applicable						
ge-100/0/10	Enabled	OFF	16.0W	Low	0.0W	
not-applicable						
ge-100/0/11	Enabled	OFF	16.0W	Low	0.0W	
not-applicable						
ge-100/0/12	Enabled	OFF	16.0W	Low	0.0W	
not-applicable						
ge-100/0/13	Enabled	OFF	16.0W	Low	0.0W	
not-applicable						
ge-100/0/14	Enabled	OFF	16.0W	Low	0.0W	
not-applicable						
ge-100/0/15	Enabled	OFF	16.0W	Low	0.0W	
not-applicable						
ge-100/0/16	Enabled	OFF	16.0W	Low	0.0W	
not-applicable						
ge-100/0/17	Enabled	OFF	16.0W	Low	0.0W	
not-applicable						
ge-100/0/18	Enabled	OFF	16.0W	Low	0.0W	
not-applicable						
ge-100/0/19	Enabled	OFF	16.0W	Low	0.0W	
not-applicable						
ge-100/0/20	Enabled	OFF	16.0W	Low	0.0W	
not-applicable						
ge-100/0/21	Enabled	OFF	16.0W	Low	0.0W	
not-applicable						
ge-100/0/22	Enabled	OFF	16.0W	Low	0.0W	
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](#) | 694

[Understanding Power over Ethernet in a Junos Fusion](#) | 689

# Configuration Statements for Power over Ethernet and Power Supply Management on a Junos Fusion Provider Edge

## IN THIS CHAPTER

- `disable` (Power over Ethernet) | 706
- `guard-band` | 707
- `interface` (Power over Ethernet) | 708
- `management` | 710
- `maximum-power` (Interface) | 712
- `n-plus-n` (satellite-management) | 714
- `poe` | 715
- `priority` (Power over Ethernet) | 718
- `psu` (satellite-management) | 719
- `redundancy` (satellite-management) | 720

## disable (Power over Ethernet)

### Syntax

```
disable;
```

### Hierarchy Level

```
[edit poe interface (all | all-extended | interface-name)],  
[edit poe interface (all | all-extended | interface-name) telemetry],  
[edit poe notification-control fpc slot-number]
```

### Release Information

Statement introduced in Junos OS Release 9.0 for EX Series switches.

Statement introduced in Junos OS Release 12.2 for ACX2000 Universal Metro Routers.

**all-extended** option introduced in Junos OS Release 16.1R1.

Statement introduced in Junos OS Release 17.2R1 for a Junos Fusion Provider Edge.

### 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 **telemetry**—Disable the collection of PoE power consumption records for this interface. Any previously collected records are deleted. However, the **telemetry** configuration is retained, including the values for **interval** and **duration**. To reenabling record collection, delete the **disable** statement from the **telemetry** 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.

### RELATED DOCUMENTATION

*Example: Configuring PoE Interfaces with Different Priorities on an EX Series Switch*

*Configuring PoE on EX Series Switches (CLI Procedure)*

[Configuring Power over Ethernet in a Junos Fusion](#) | 694

## guard-band

### Syntax

```
guard-band watts;
```

### Hierarchy Level

```
[edit poe],  
[edit poe (all | fpc slot-number)]
```

### Release Information

Statement introduced in Junos OS Release 9.0 for EX Series switches.

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.

### 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.

## RELATED DOCUMENTATION

*Configuring PoE on EX Series Switches (CLI Procedure)*

[Configuring Power over Ethernet in a Junos Fusion](#) | 694

## interface (Power over Ethernet)

### 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**]

### Release Information

Statement introduced in Junos OS Release 9.0 for EX Series switches.

Statement introduced in Junos OS Release 17.2R1 for a Junos Fusion Provider Edge.

### 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.

## RELATED DOCUMENTATION

*Example: Configuring PoE Interfaces with Different Priorities on an EX Series Switch*

---

*Configuring PoE on EX Series Switches (CLI Procedure)*

---

[Configuring Power over Ethernet in a Junos Fusion](#) | 694



## management

### Syntax

```
management (class | static | high-power);
```

### Hierarchy Level

```
[edit poe],  
[edit poe (all | fpc slot-number)]
```

### Release Information

Statement introduced in Junos OS Release 9.0 for EX Series switches.

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.

### 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 power allocation, see *Understanding PoE on EX Series 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.

**RELATED DOCUMENTATION**

---

*Configuring PoE on EX Series Switches (CLI Procedure)*

---

[Configuring Power over Ethernet in a Junos Fusion](#) | 694

---

*Understanding PoE on EX Series Switches*

## maximum-power (Interface)

### Syntax

```
maximum-power watts;
```

### Hierarchy Level

```
[edit poe interface (all | all-extended | interface-name)]
```

### Release Information

Statement introduced in Junos OS Release 9.0 for EX Series switches.

Statement introduced in Junos OS Release 12.2 for ACX2000 routers.

Statement introduced in Junos OS Release 17.2R1 for a Junos Fusion Provider Edge.

### 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.

## RELATED DOCUMENTATION

*Configuring PoE on EX Series Switches (CLI Procedure)*

[Configuring Power over Ethernet in a Junos Fusion](#) | 694

## n-plus-n (satellite-management)

### Syntax

```
n-plus-n
```

### Hierarchy Level

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

### Release Information

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

Statement introduced in Junos OS Release 17.2R1 for a Junos Fusion Provider Edge.

### 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.

## RELATED DOCUMENTATION

[Understanding Power over Ethernet in a Junos Fusion](#) | 689

## poe

### Syntax

For switches other than EX6200 and EX8200 switches:

```
poe {
  guard-band watts;
  interface (all | interface-name) {
    disable;
    maximum-power watts;
    priority (high | low);
    telemetry {
      disable;
      duration hours;
      interval minutes;
    }
  }
  lldp-priority;
  management (class | static);
  notification-control {
    fpc slot-number {
      disable;
    }
  }
}
```

For a Junos Fusion:

```
poe {
  guard-band watts;
  interface (all-extended | interface-name) {
    disable;
    maximum-power watts;
    priority (high | low);
  }
  management (class | static);
}
```

For EX6200 and EX8200 switches:

```
poe {
  fpc ( all | slot-number ) {
    guard-band watts;
```

```

    lldp-priority;
    management (class | static);
    maximum-power watts;
}
interface (all | interface-name) {
    af-mode;
    disable;
    maximum-power watts;
    priority (high | low);
    telemetries {
        disable;
        duration hours;
        interval minutes;
    }
}
notification-control {
    fpc slot-number {
        disable;
    }
}
}

```

### Hierarchy Level

[edit]

### Release Information

Statement introduced in Junos OS Release 9.0 for EX Series switches.

Statement introduced in Junos OS Release 17.2R1 for a Junos Fusion Provider Edge.

### 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.

## RELATED DOCUMENTATION

*Example: Configuring PoE Interfaces with Different Priorities on an EX Series Switch*

---

*Example: Configuring PoE on an EX6200 or EX8200 Switch*

---

*Configuring PoE on EX Series Switches (CLI Procedure)*

---

[Configuring Power over Ethernet in a Junos Fusion](#) | 694



## priority (Power over Ethernet)

### Syntax

```
priority (low | high);
```

### Hierarchy Level

```
[edit poe interface (interface-name | all | all-extended)]
```

### Release Information

Statement introduced in Junos OS Release 9.0 for EX Series switches.

Statement introduced in Junos OS Release 17.2R1 for a Junos Fusion Provider Edge.

### 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.

## RELATED DOCUMENTATION

*Example: Configuring PoE Interfaces with Different Priorities on an EX Series Switch*

*Configuring PoE on EX Series Switches (CLI Procedure)*

[Configuring Power over Ethernet in a Junos Fusion](#) | 694

## psu (satellite-management)

### Syntax

```
psu {  
  redundancy {  
    n-plus-n;  
  }  
}
```

### Hierarchy Level

[edit chassis [satellite-management](#)]

### Release Information

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

Statement introduced in Junos OS Release 17.2R1 for a Junos Fusion Provider Edge.

### 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.

### RELATED DOCUMENTATION

| [Understanding Power over Ethernet in a Junos Fusion](#) | 689

## redundancy (satellite-management)

### Syntax

```
redundancy {  
    n-plus-n;  
}
```

### Hierarchy Level

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

### Release Information

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

Statement introduced in Junos OS Release 17.2R1 for a Junos Fusion Provider Edge.

### Description

Configure  $N+N$  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.

### RELATED DOCUMENTATION

[Understanding Power over Ethernet in a Junos Fusion](#) | 689

# Operational Commands for Power over Ethernet and Power Supply Management on Junos Fusion Provider Edge

## IN THIS CHAPTER

- [show chassis satellite power-budget-statistics | 722](#)
- [show poe controller | 725](#)
- [show poe interface | 729](#)

# show chassis satellite power-budget-statistics

## Syntax

```
show chassis satellite power-budget-statistics
<slot-id slot-id-number>
```

## Release Information

Command introduced in Junos OS Release 16.1R1 for a Junos Fusion Enterprise.  
Statement introduced in Junos OS Release 17.2R1 for a Junos Fusion Provider Edge.

## 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

## RELATED DOCUMENTATION

| [Understanding Power over Ethernet in a Junos Fusion](#) | 689

## List of Sample Output

[show chassis satellite power-budget-statistics on page 723](#)

## Output Fields

[Table 34 on page 722](#) 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 34: show chassis satellite-management power-budget-statistics Output Fields

Field Name	Field Description
FPC <i>n</i>	The FPC slot ID number in the Junos Fusion, where <i>n</i> is the FPC slot ID. The FPC slot ID and the satellite device number are the same thing in a Junos Fusion.

Table 34: show chassis satellite-management power-budget-statistics Output Fields (continued)

Field Name	Field Description
PSU <i>n</i> (supply type)	Capacity rating of the power supply and whether the power supply is currently operating ( <b>Online</b> ) or not ( <b>Offline</b> ). If a power supply is offline, the capacity is shown as 0 W.
Total Power supplied by all Online PSUs	Total number of watts supplied by all currently operating power supplies for the satellite device.
Power Redundancy Configuration	Configured power redundancy setting, either 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

```

# show poe controller

## Syntax

```
show poe controller
```

## Release Information

Command introduced in Junos OS Release 9.0 for EX Series switches.  
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.

## Description

Display configuration and status of the PoE controllers.

## Required Privilege Level

view

## RELATED DOCUMENTATION

<a href="#">show poe interface   729</a>
<i>request system firmware upgrade poe</i>
<i>Verifying PoE Configuration and Status (CLI Procedure)</i>
<a href="#">Verifying PoE Configuration and Status for a Junos Fusion (CLI Procedure)   699</a>
<i>Monitoring PoE Power Consumption (CLI Procedure)</i>
<i>Upgrading the PoE Controller Software</i>

## List of Sample Output

- [show poe controller \(EX3200 Switch\) on page 727](#)
- [show poe controller \(EX8200 Switch\) on page 727](#)
- [show poe controller \(Controller Software Upgrade in Progress\) on page 727](#)
- [show poe controller \(ACX2000 Router\) on page 728](#)

## Output Fields

[Table 35 on page 726](#) lists the output fields for the **show poe controller** command. Output fields are listed in the approximate order in which they appear.



Table 35: show poe controller Output Fields

Field Name	Field Description
<b>Controller index</b>	<p>PoE controller number:</p> <ul style="list-style-type: none"> <li>• 0 for EX2200, EX3200, standalone EX3300, standalone EX4200 switches, standalone EX4300 switches, and ACX2000 routers.</li> <li>• Member ID for switches in an EX3300 Virtual Chassis, EX4200 Virtual Chassis, EX4300 Virtual Chassis, a mixed EX4200 and EX4500 Virtual Chassis.</li> <li>• Slot number for line cards with a PoE controller in an EX6200 or EX8200 switch.</li> </ul>
<b>Maximum power</b>	The maximum PoE power consumption for the switch or line card. This is the total amount of power available to the PoE controller to allocate to the PoE ports.
<b>Power consumption</b>	Total amount of power being consumed by the PoE ports at the time the command is executed. This value, which represents actual power consumption, cannot exceed the value for <b>Maximum power</b> .
<b>Guard Band</b>	Amount of power that has been placed in reserve for power demand spikes and that cannot be allocated to a PoE interface.
<b>Management</b>	<p>Power management mode: <b>class</b> or <b>static</b> or <b>high-power</b>.</p> <p><b>NOTE:</b> The mode <b>high-power</b> is available on only ACX2000 routers.</p>
<b>Status</b>	<p>Status of the PoE controller:</p> <ul style="list-style-type: none"> <li>• <b>AF_ENHANCE</b>—Controller supports enhanced PoE. The maximum power per PoE port is 18.6 W in static mode (15.4 W in class mode).</li> <li>• <b>DEVICE FAIL</b>—Software download to the controller has failed or the PoE controller is not initialized because of a hardware failure.</li> <li>• <b>DOWNLOAD_INIT</b>—Software download to the controller is in the initial phase.</li> <li>• <b>AF_MODE</b>—Controller supports standard IEEE 802.3af. The maximum power per PoE port is 15.4 W.</li> <li>• <b>AT/AF COMBO</b>—Controller supports a mix of standard IEEE 802.3af and IEEE 802.3at (PoE+) ports. The maximum power per port is 30 W for IEEE 802.3at (PoE+) ports and 15.4 W for the IEEE 802.3af ports.</li> <li>• <b>AT_MODE</b>—Controller supports IEEE 802.3at (PoE+). The maximum power per PoE port is 30 W.</li> <li>• <b>SW_DOWNLOAD (n%)</b>—Software download to the controller is in progress.</li> </ul>

Table 35: show poe controller Output Fields (*continued*)

Field Name	Field Description
Lldp Priority	<p>Link Layer Discovery Protocol (LLDP) priority operating state. The state can be <b>Enabled</b> or <b>Disabled</b>.</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 index	Maximum power	Power consumption	Guard band	Management	Status	Lldp Priority
0	130.00W	81.20W	10W	Static	AF_ENHANCE	Disabled

### show poe controller (EX8200 Switch)

```
user@switch> show poe controller
```

Controller index	Maximum power	Power consumption	Guard band	Management	Status	Lldp Priority
0	792.00W	603.50W	0W	Class	AT/AF COMBO	Disabled
4	915.00W	781.00W	0W	Class	AT/AF COMBO	Disabled
7	915.00W	0.00W	0W	Class	AT/AF COMBO	Disabled

### show poe controller (Controller Software Upgrade in Progress)

```
user@switch> show poe controller
```

Controller index	Maximum power	Power consumption	Guard band	Management	Status	Lldp Priority
0	130.00W	0.00W	0W	Static	AF_ENHANCE	Disabled
8**	130.00W	0.00W	0W	Static	SW_DOWNLOAD(10%)	Disabled

```

    **New PoE software upgrade available.
Use 'request system firmware upgrade poe fpc-slot <slot>'
    This procedure will take around 10 minutes (recommended to be performed during
maintenance)

```

**show poe controller (ACX2000 Router)**

user@host> **show poe controller**

Controller index	Maximum power	Power consumption	Guard band	Management	Status	Lldp Priority
0	130.0 W	14.2 W	0 W	high-power	UP	

## show poe interface

### Syntax

```
show poe interface
<fpc-slot number>
<interface-name>
```

### Release Information

Command introduced in Junos OS Release 9.0 for EX Series switches.

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.

### 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

## RELATED DOCUMENTATION

[show poe controller | 725](#)

*Verifying PoE Configuration and Status (CLI Procedure)*

*Monitoring PoE Power Consumption (CLI Procedure)*

*Troubleshooting PoE Interfaces*

### List of Sample Output

[show poe interface on page 731](#)

[show poe interface \(EX2300 and EX3400\) on page 732](#)

[show poe interface \(with LLDP Negotiation\) on page 732](#)

[show poe interface \(PoE-bt mode\) on page 732](#)

[show poe interface \(Specific Interface\) on page 733](#)

[show poe interface \(Specific Interface in PoE-bt mode\) on page 733](#)

[show poe interface \(Specific FPC Slot\) on page 734](#)

[show poe interface \(Specific Interface on ACX2000 Universal Metro Routers\) on page 735](#)

## Output Fields

[Table 36 on page 730](#) lists the output fields for the **show poe interface** command. Output fields are listed in the approximate order in which they appear.

**Table 36: show poe interface Output Fields**

Field Name (All Interfaces Output)	Field Name (Single Interface Output)	Field Description
<b>Interface</b>	<b>PoE Interface</b>	Interface name.
<b>Admin status</b>	<b>Administrative status</b>	Administrative state of the PoE interface: <b>Enabled</b> or <b>Disabled</b> . If the PoE interface is disabled, it can provide network connectivity, but it cannot provide power to connected devices.
<b>Oper status</b>	<b>Operational status</b>	Operational state of the PoE interface: <ul style="list-style-type: none"> <li>• <b>ON</b>—The interface is currently supplying power to a powered device.</li> <li>• <b>OFF</b>—PoE is enabled on the interface, but the interface is not currently supplying power to a powered device.</li> <li>• <b>FAULT</b>—PoE interface is in the <b>OFF</b> state due to a fault condition.</li> <li>• <b>Disabled</b>—PoE is disabled on the interface.</li> </ul>
	<b>Operational status detail</b>	Additional information for troubleshooting the operational state of the PoE interface: <ul style="list-style-type: none"> <li>• <b>Admin up but disabled on hardware</b>—The interface is disabled due to power budget unavailability.</li> <li>• <b>Overload</b>—Interface is in the fault condition.</li> <li>• <b>IEEE PD Detected</b>—The interface is providing power to the powered device.</li> <li>• <b>Detection In Progress</b>—Detection of the powered device is ongoing.</li> </ul>
	<b>FourPair status</b>	Status of high-power mode of power delivery over all four pairs of the Ethernet cable: <ul style="list-style-type: none"> <li>• <b>Enabled</b>—High power mode is enabled.</li> <li>• <b>Disabled</b>—High power mode is disabled.</li> </ul>

Table 36: show poe interface Output Fields (*continued*)

Field Name (All Interfaces Output)	Field Name (Single Interface Output)	Field Description
Pair/Mode status		Shows the mode of power delivery configured on the interface. <ul style="list-style-type: none"> <li>• <b>4P/AT</b>—Interface is configured for high power mode.</li> <li>• <b>4P/POH</b>—Interface is configured for ultra-high power mode.</li> <li>• <b>DS/BT</b>—Interface is configured for dual-signature powered devices.</li> <li>• <b>SS/BT</b>—Interface is configured for single-signature powered devices.</li> </ul>
Max power	Power limit on the interface	Maximum power that can be provided by the interface.  An <b>(L)</b> next to the value indicates that the value on the port was negotiated by LLDP.
Priority	Priority	Interface power priority: either <b>High</b> or <b>Low</b> .  An <b>(L)</b> next to the value indicates that the value on the port was negotiated by LLDP.
Power consumption	Power consumed	Amount of power being used by the interface at the time the command is executed.
Class	Class of power device	IEEE PoE class of the powered device. <b>Class 0</b> is the default class and is used when the class of the powered device is unknown. If no powered device is connected, this field contains <b>not applicable</b> .  PoE-bt supports power devices with dual signatures. For dual-signature devices, the output value contains both the class values, e.g. <b>5/5</b> . For single-signature devices, the output value is formatted as <b>5/-</b> .
	PoE Mode	IEEE PoE standard supported by the interface—either <b>802.3af</b> , or <b>802.3at</b> , <b>ultra-poe</b> , or <b>802.3bt</b> .

## 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 (EX2300 and EX3400)

```
user@switch> show poe interface
```

Interface	Admin status	Oper status	Pair/Mode status	Max power	Priority	Power consumption	Class
ge-0/0/0	Enabled	OFF	4P/AT	60.0W	Low	4.5W	2
ge-0/0/1	Enabled	OFF	4P/AT	60.0W	Low	4.5W	2
ge-0/0/2	Enabled	OFF	4P/AT	60.0W	Low	4.5W	2
ge-0/0/3	Enabled	OFF	4P/AT	60.0W	Low	4.5W	2
ge-0/0/4	Enabled	OFF	4P/AT	60.0W	Low	4.5W	2

### show poe interface (with LLDP Negotiation)

```
user@switch> show poe interface
```

Interface	Admin 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 (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 (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 Interface in PoE-bt mode)

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
```



**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
```

# Monitoring Junos Fusion Provider Edge

## IN THIS CHAPTER

- [Connectivity Fault Management in Junos Fusion | 736](#)

## 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) | 738

## Chassis MIB Support (Junos Fusion)

The Chassis MIB has been enhanced to enable satellite devices to be represented in the chassis MIB. Satellite devices are represented as FPCs/slots (100, 101,102,...) in the aggregation device. The support is enabled using a separate range of container indices (CIDX), which allows the SNMP process to redirect relevant SNMP requests to the satellite device management process.

The CIDX for representing satellite device hardware components in Junos Fusion are offset by 100 from indices for hardware components on Junos devices; for example a regular CIDX 2 (Power Supply) is 102 for the power supply of the satellite device. Using these indices you can distinguish the satellite device hardware from the aggregate device. The L1 index for satellite device entries refers to their FPC slot identifiers. As per the chassis MIB convention, identifiers are 1-based. For example, satellite device 100 will have an L1 index of 101, satellite device 101 will have an L1 index of 102, and so on.

Table 37 on page 738 shows the CIDXs used for satellite devices.

Table 37: CIDX's for Satellite Devices

CIDX	Component Type
102	Power Supply
104	Fan
107	FPC
108	PIC

The following tables have been enhanced to include object IDs for satellite devices:

- jnxContainersTable
- jnxContentsTable
- jnxFilledTable
- jnxOperatingTable
- jnxFRUTable

Examples of new object IDs in the jnxContainersTable:

```
jnxContainersType.102 = jnxSatelliteDeviceSlotPower.0
jnxContainersType.104 = jnxSatelliteDeviceSlotFan.0
jnxContainersType.107 = jnxSatelliteDeviceSlotFPC.0
jnxContainersType.108 = jnxSatelliteDeviceMediaCardSpacePIC.0
...
...
jnxContainersDescr.102 = SD PEM slot
jnxContainersDescr.104 = SD FAN slot
jnxContainersDescr.107 = SD FPC slot
jnxContainersDescr.108 = SD PIC slot
```

Examples of new object IDs in the jnxContentsTable:

```
jnxContentsType.102.102.1.0 = jnxSatelliteDeviceSlotPower
jnxContentsType.102.102.2.0 = jnxSatelliteDeviceSlotPower
jnxContentsType.104.102.1.0 = jnxSatelliteDeviceSlotFan
jnxContentsType.104.102.2.0 = jnxSatelliteDeviceSlotFan
jnxContentsType.104.102.3.0 = jnxSatelliteDeviceSlotFan
jnxContentsType.104.102.4.0 = jnxSatelliteDeviceSlotFan
jnxContentsType.104.102.5.0 = jnxSatelliteDeviceTypeSlotFan
jnxContentsType.107.102.0.0 = jnxSatelliteDeviceSlotFPC
jnxContentsType.108.102.1.0 = jnxSatelliteDeviceMediaCardSpacePIC
...
jnxContentsDescr.102.102.1.0 = SD101 PEM 0
jnxContentsDescr.102.102.2.0 = SD101 PEM 1
jnxContentsDescr.104.102.1.0 = SD101 Fan Tray 0
jnxContentsDescr.104.102.2.0 = SD101 Fan Tray 1
jnxContentsDescr.104.102.3.0 = SD101 Fan Tray 2
jnxContentsDescr.104.102.4.0 = SD101 Fan Tray 3
jnxContentsDescr.104.102.5.0 = SD101 Fan Tray 4
```

```
jnxContentsDescr.107.102.0.0 = SD101 FPC: QFX5100-48S-6Q @ 101/*/*
jnxContentsDescr.108.102.1.0 = SD101 PIC: 48x10G-6x40G @ 101/0/*
```

The following SNMP traps are generated for Satellite Devices, which are also logged as syslog messages:

- Satellite Device (as FPC) add (online) or remove
- Satellite Device Fan add (online) or remove
- Satellite Device PSU add (online) or remove
- Satellite Device PIC add (online) or remove
- Satellite Device FAN failure or status
- Satellite Device PSU failure or status

[Table 38 on page 740](#) shows the SNMP traps that can be generated for satellite devices.

**Table 38: SNMP Traps Generated for Satellite Devices**

Trap	Condition
jnxFruRemoval	Sent when the specified FRU (FAN/PSU) has been removed from the chassis, or the satellite device has been removed from the aggregation device's database
jnxFruInsertion	Sent when the specified FRU (FAN/PSU) has been inserted into the satellite device
jnxFruPowerOff	Sent when the specified FRU (FAN/PSU) has been powered off in the satellite device
jnxFruPowerOn	Sent when the specified FRU (FAN/PSU) has been powered on in the satellite device
jnxFruFailed	Sent when the specified FRU (FAN/PSU) has failed in the satellite device. Typically, this is due to the FRU not powering up or being unable to load software. FRU replacement might be required
jnxFruOK	
jnxFruOffline	Sent when FPC's new reported state is not online or PSU/FAN/PIC is not present due to satellite device removal
jnxFruOnline	Sent when specified FRU (FPC,PIC,PSU,FAN) gets added in the aggregation device database
jnxFruCheck	Sent when the specified FRU (FAN/PSU) has encountered operational errors

Given below are examples of the system log messages generated:

```
messages:Apr 15 21:28:36 card spmd[6706]: SPMD_SNMP_TRAP10: SNMP trap generated:
  Fru Offline (jnxFruContentsIndex 102, jnxFruL1Index 109, jnxFruL2Index 1,
jnxFruL3Index 0, jnxFruName SD108 PEM 0, jnxFruType 7, jnxFruSlot 0,
jnxFruOfflineReason 1, jnxFruLastPowerOff 0, jnxFruLastPowerOn 0)
```

```
messages:Apr 15 21:28:36 card spmd[6706]: SPMD_SNMP_TRAP10: SNMP trap generated:
  Fru Offline (jnxFruContentsIndex 104, jnxFruL1Index 109, jnxFruL2Index 1,
jnxFruL3Index 1, jnxFruName SD108 Fan Tray 0, jnxFruType 13, jnxFruSlot 0,
jnxFruOfflineReason 1, jnxFruLastPowerOff 0, jnxFruLastPowerOn 0)
```

```
messages:Apr 15 21:28:57 card spmd[8847]: SPMD_SNMP_TRAP7: SNMP trap generated:
  Fru Online (jnxFruContentsIndex 107, jnxFruL1Index 103, jnxFruL2Index 0,
jnxFruL3Index 0, jnxFruName SD102 FPC: @ 102/*/*, jnxFruType 3, jnxFruSlot 102)
```

```
messages:Apr 15 21:28:36 card spmd[6706]: SPMD_SNMP_TRAP10: SNMP trap generated:
  Fru Offline (jnxFruContentsIndex 108, jnxFruL1Index 109, jnxFruL2Index 1,
jnxFruL3Index 0, jnxFruName SD108 PIC: 48x 10/100/1000 Base-T @ 108/0/*, jnxFruType
11, jnxFruSlot 0, jnxFruOfflineReason 1, jnxFruLastPowerOff 0, jnxFruLastPowerOn
0)
```



# 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 | 742](#)
- [Configuring an Aggregated Ethernet Interface | 744](#)
- [Configuring Junos OS for Supporting Aggregated Devices | 746](#)

## Understanding Link Aggregation and Link Aggregation Control Protocol in a Junos Fusion

### IN THIS SECTION

- [Link Aggregation in Junos Fusion | 742](#)
- [Link Aggregation Control Protocol in Junos Fusion | 743](#)
- [Configuring Link Aggregation and LACP in Junos Fusion | 743](#)
- [Software and Hardware Guidelines when Configuring Link Aggregation and LACP in Junos Fusion | 744](#)

### 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 | 14](#)

*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” on page 14](#).

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

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 | 746](#)
- [Configuring LACP Link Protection at the Chassis Level | 747](#)
- [Enabling LACP Link Protection | 748](#)
- [Configuring System Priority | 749](#)
- [Configuring the Maximum Links Limit | 749](#)
- [Configuring PPM on Junos Fusion | 750](#)

### 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 39 on page 747](#) 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 39: 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).

## SEE ALSO

### Enabling LACP Link Protection

To enable LACP link protection for aggregated Ethernet interfaces on the chassis, use the **link-protection** statement at the **[edit chassis aggregated-devices ethernet lacp]** hierarchy level:

```
[edit chassis aggregated-devices ethernet lacp]
link-protection {
  non-revertive;
}
```

By default, LACP link protection reverts to a higher-priority (lower-numbered) link when that higher-priority link becomes operational or a link is added to the aggregator that is determined to be higher in priority. However, you can suppress link calculation by adding the **non-revertive** statement to the LACP link protection configuration. In nonrevertive mode, after a link is active and collecting and distributing packets,

the subsequent addition of a higher-priority (better) link does not result in a switch, and the current link remains active.

**BEST PRACTICE:** (MX Series) In a highly scaled configuration over aggregated Ethernet, we recommend that you prevent the router from performing such a switch by including the **non-revertive** statement. Failure to do so may result in some traffic loss if a MIC on which a member interface is located reboots. Using the **non-revertive** statement for this purpose is not effective if both the primary and secondary interfaces are on the MIC that reboots.



**CAUTION:** If both ends of an aggregator have LACP link protection enabled, make sure to configure both ends of the aggregator to use the same mode. Mismatching LACP link protection modes can result in lost traffic.

## Configuring System Priority

To configure LACP system priority for aggregated Ethernet interfaces on the chassis, use the **system-priority** statement at the **[edit chassis aggregated-devices ethernet lacp]** hierarchy level:

```
[edit chassis aggregated-devices ethernet lacp]
system-priority priority;
```

The system priority is a 2-octet binary value that is part of the LACP system ID. The LACP system ID consists of the system priority as the two most-significant octets and the interface MAC address as the six least-significant octets. The system with the numerically lower value for system priority has the higher priority. By default, system priority is 127, with a range of 0 through 65,535.

## Configuring the Maximum Links Limit

To configure the maximum links limit, use the **maximum-links** statement at the **[edit chassis aggregated-devices]** hierarchy level:

```
[edit chassis aggregated-devices]
maximum-links maximum-links-limit;
```



## Configuring PPM on Junos Fusion

If you use Junos Fusion with Junos OS Release 14.2R3, you need to ensure that link aggregation (and STP) work properly by configuring timers for the periodic packet management (PPM) daemons on the aggregation and satellite devices. We recommend using the following timer values:

```
[edit routing-options ppm]
  redistribution-timer 120;
  tcp-keepalive-interval 3000;
  tcp-keepalive-idle 3000;
```

Starting in Junos OS Release 14.2R4, the timer values that ensure proper link aggregation and STP functions are configured by default if you use Junos Fusion with Junos OS.

**Release History Table**

Release	Description
<a href="#">15.1F5</a>	In Junos OS 15.1F5 and 15.1F6 releases, you can configure a maximum of 480 aggregated interfaces on MX240, MX480, and MX960 routers.
<a href="#">15.1F5</a>	In Junos OS 15.1F5 and 15.1F6 releases, you can configure a maximum of 800 aggregated interfaces on MX2010 and MX2020 routers.
<a href="#">14.2R4</a>	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.
<a href="#">14.2R3</a>	In Junos release 14.2R3 and later, you can configure a maximum of 1000 aggregated interfaces on MX240, MX480, and MX960 routers.
<a href="#">14.2R3</a>	In Junos release 14.2R3 and later, you can configure a maximum of 800 aggregated interfaces on MX2010 and MX2020 routers.
<a href="#">14.2R3</a>	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.
<a href="#">14.2R2</a>	In Junos release 14.2R2 and earlier, you can configure a maximum of 480 aggregated interfaces on MX Series routers.
<a href="#">13.2</a>	For SONET/SDH, starting with Junos OS Release 13.2, the maximum number of logical interfaces is 64, numbered from <b>as0</b> through <b>as63</b> .

## RELATED DOCUMENTATION

| *Configuring Aggregated SONET/SDH Interfaces*

# Uplink Failure Detection on Junos Fusion Provider Edge

## IN THIS CHAPTER

- Overview of Uplink Failure Detection on a Junos Fusion | 752
- Configuring Uplink Failure Detection on a Junos Fusion | 754

## 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 40 on page 753](#) 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 40: 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

[Configuring Uplink Failure Detection on a Junos Fusion](#) | 754

## Configuring Uplink Failure Detection on a Junos Fusion

### IN THIS SECTION

- [Enabling Uplink Failure Detection on a Junos Fusion | 754](#)
- [Configuring a Candidate Uplink Port Policy | 755](#)
- [Configuring an Uplink Port Group | 758](#)

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 41 on page 755](#).

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 755](#).

**Table 41: Junos Fusion Uplink Failure Detection Default Configuration**

Configuration Parameter	Description	Default
<b>holddown</b>	Configures the interval of time uplink failure detection waits before trying to re-enable a satellite device's extended ports after shutting them down due to an uplink port failure.	6 seconds
<b>minimum-links</b>	Configures the minimum number of active uplink ports a satellite device must have. If a satellite device has fewer than this number of active uplink ports, uplink failure detection shuts down its extended ports.	1 link
<b>uplink-port-group</b>	Defines a set of candidate uplink ports to assign to satellite devices.	Each satellite device model has a set of default uplink ports. You only need to assign uplink ports if you do not want to use the default ports. See <a href="#">Table 40 on page 753</a> for the default uplink ports by device.

## Configuring a Candidate Uplink Port Policy

A candidate uplink port policy contains uplink failure detection uplink port configuration that you can apply to satellite devices to override the default uplink failure detection behavior.

You can enter configuration statements in a candidate uplink port policy at these levels of the hierarchy:

- Enter configuration statements at the level **[edit policy-options satellite-policies candidate-uplink-port-policy *policy-name*]** to override the default uplink failure detection behavior. Statements configured at this level are applied if the policy is applied to a satellite device that does not match a **product-model** statement in any term in the policy. If the policy contains no terms, the statements at this level are applied to every satellite device to which the policy is applied.
- Create terms within the candidate uplink port policy at the level **[edit policy-options satellite-policies candidate-uplink-port-policy *policy-name* term *term-name*]**. Use terms to apply different uplink failure

detection configurations to certain satellite devices, based on their product model. Each term contains match criteria that is compared against the model name of each satellite device to which the policy is applied. If the criteria matches the device model, the configuration specified in the term is applied to the device. Terms are evaluated in the order they appear in the configuration. The first term that matches a satellite device is applied to the device.

Configuring a candidate uplink port policy is described in the following sections:

- [Configuring Candidate Uplink Port Policy Default Configuration | 756](#)
- [Configuring Candidate Uplink Port Policy Terms | 757](#)

### **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 41 on page 755](#).
- 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 752](#).

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 758](#).

### 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 758](#).

## 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 752](#). 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 | 752

## Configuration Statements for Uplink Failure Detection on Junos Fusion Provider Edge

### IN THIS CHAPTER

- `candidate-uplink-port-policy` (satellite-policies) | 761
- `holddown` (candidate-uplink-port-profile) | 762
- `minimum-links` (candidate-uplink-port-profile) | 763
- `pic` (satellite-policies port-group-alias) | 764
- `port` (satellite-policies port-group-alias) | 765
- `port-group-alias` (satellite-policies) | 766
- `product-model` (Junos Fusion) | 768
- `satellite-policies` | 770
- `term` (candidate-uplink-policy) | 772
- `uplink-failure-detection` (Junos Fusion) | 774
- `uplink-port-group` (Junos Fusion) | 776

## candidate-uplink-port-policy (satellite-policies)

### Syntax

```
candidate-uplink-port-policy 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>;
    }
  }
}
```

### Hierarchy Level

[edit policy-options [satellite-policies](#)]

### Release Information

Statement introduced in Junos OS Release 14.2R3.

### Description

Configures a candidate uplink port profile, which contains uplink failure detection feature configuration that can be applied to satellite devices in a Junos Fusion.

### Default

There is no configured candidate uplink port profile, by default.

### Options

***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.

## RELATED DOCUMENTATION

## holddown (candidate-uplink-port-profile)

### 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]
```

### Release Information

Statement introduced in Junos OS Release 14.2R3.

### 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.

## RELATED DOCUMENTATION

## minimum-links (candidate-uplink-port-profile)

### 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]
```

### Release Information

Statement introduced in Junos OS Release 14.2R3.

### 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.

## RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 44](#)

*Configuring or Expanding a Junos Fusion Enterprise*

## pic (satellite-policies port-group-alias)

### 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]
```

### Release Information

Statement introduced in Junos OS Release 14.2R3.

### 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.

## RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 44](#)

*Configuring or Expanding a Junos Fusion Enterprise*

## port (satellite-policies port-group-alias)

### 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]
```

### Release Information

Statement introduced in Junos OS Release 14.2R3.

### 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

**port-number**—The port number on the PIC on the satellite device.

**port-number-range**—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.

## RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 44](#)

*Configuring or Expanding a Junos Fusion Enterprise*



## port-group-alias (satellite-policies)

### 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](#)]

### Release Information

Statement introduced in Junos OS Release 14.2R3.

### 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 752](#)). 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.

## RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 44](#)

*Configuring or Expanding a Junos Fusion Enterprise*

## product-model (Junos Fusion)

### 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]
```

### Release Information

Statement introduced in Junos OS Release 14.2R3.

### 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.

## RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 44](#)

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*Configuring or Expanding a Junos Fusion Enterprise*

## satellite-policies

### Syntax

```

satellite-policies {
  <candidate-uplink-port-profile policy-name> {
    <holddown holddown-time>;
    <minimum-links number-of-links>;
    <uplink-port-group uplink-port-group-name>;
    term term-name {
      from {
        product-model model-name;
        <holddown holddown-time>;
        <minimum-links number-of-links>;
        <uplink-port-group uplink-port-group-name>;
      }
    }
  }
}

environment-monitoring-policy policy-name {
  <alarm <linkdown>
  term term-name {
    from {
      product-model model-name;
    }
  }
}

forwarding-policy {
  policy-name {
    port-group-extended name;
    filter filter-name;
    mirror-egress port-group-mirror port-group-mirror;
    mirror-ingress port-group-mirror port-group-mirror,
    port-group-uplink port-group-uplink-name
    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]

### Release Information

Statement introduced in Junos OS Release 14.2R3 for Junos Fusion.

### Description

Configure satellite policies for a Junos Fusion.

### Options

The remaining statements are explained separately.

### Required Privilege Level

admin—To view this statement in the configuration.

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

### RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 44](#)

*Configuring or Expanding a Junos Fusion Enterprise*

## term (candidate-uplink-policy)

### 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]
```

### Release Information

Statement introduced in Junos OS Release 14.2R3.

### 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

**term-name**—The user-defined name of the term.

A *term* 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.

**from**—The statements under the **from** statement define the satellite device model match criteria and uplink failure detection configuration for the term. Each term can contain only one **from** statement.

The remaining statements are explained separately.

### Required Privilege Level

admin—To view this statement in the configuration.

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

## RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 44](#)

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*Configuring or Expanding a Junos Fusion Enterprise*



## uplink-failure-detection (Junos Fusion)

### Syntax

```
uplink-failure-detection {
  <candidate-uplink-policy policy-name>;
}
```

### Hierarchy Level

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

### Release Information

Statement introduced in Junos OS Release 14.2R3.

### 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.

## RELATED DOCUMENTATION

[Configuring Junos Fusion Provider Edge | 44](#)

*Configuring or Expanding a Junos Fusion Enterprise*

## uplink-port-group (Junos Fusion)

### 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]
```

### Release Information

Statement introduced in Junos OS Release 14.2R3.

### 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 752](#)). 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.

## RELATED DOCUMENTATION

Configuring Junos Fusion Provider Edge | 44

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*Configuring or Expanding a Junos Fusion Enterprise*

# Operational Commands for Uplink Failure Detection on Junos Fusion Provider Edge

## IN THIS CHAPTER

- [show chassis satellite](#) | 779

## show chassis satellite

### Syntax

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

### Release Information

Command introduced in Junos OS Release 14.2R3 for Junos Fusion Provider Edge.

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

### 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** *device-alias*—(Optional) Display satellite device connection information for the satellite device 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-name*—(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** *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

### RELATED DOCUMENTATION

List of Sample Output

- [show chassis satellite on page 787](#)
- [show chassis satellite device-alias on page 788](#)
- [show chassis satellite fpc-slot 130 on page 789](#)
- [show chassis satellite terse on page 789](#)
- [show chassis satellite detail on page 789](#)

Output Fields

[Table 19 on page 531](#) lists the output fields for the **show chassis satellite** command. Output fields are listed in the approximate order in which they appear.

Table 42: show chassis satellite Output Fields

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

Table 42: show chassis satellite Output Fields *(continued)*

Field Name	Field Description	Level of Output
Device State		brief terse extensive none



Table 42: show chassis satellite Output Fields (continued)

Field Name	Field Description	Level of Output
	<p>The state of the satellite device within the Junos Fusion.</p> <p>The most common device states:</p> <ul style="list-style-type: none"> <li>• <b>Online</b>—the satellite device is online and active. This is the satellite device state during normal operating procedure.</li> <li>• <b>Offline</b>—the satellite device is offline and not detected. This state is typically seen when the satellite device has been disconnected from the aggregation device, or when all cascade or uplink ports connecting the satellite device to the aggregation device are down.</li> <li>• <b>Present</b>—the satellite device is recognized by the aggregation device, but is not online. This state is typically seen before a satellite device goes online, or while satellite device configuration is in progress or finalizing.</li> <li>• <b>Rebooting</b>—the satellite device is rebooting.</li> <li>• <b>Disable</b>—the satellite device has been disabled.</li> <li>• <b>Misconfig</b>—the satellite device is not properly configured. This state is typically seen when the system ID, cascade port, or FPC slot ID defined for the satellite device has a misconfiguration.</li> <li>• <b>Miswire</b>—the satellite device is miswired. This state is typically seen when a satellite device is wired to two aggregation devices but is not configured for multihoming. Use <b>show chassis satellite detail</b> to gather more information on the issue when the device state is <b>Miswire</b>.</li> </ul> <p>Other less common device states include:</p> <ul style="list-style-type: none"> <li>• <b>ModeChanging</b>—the device is converting from a standalone device to a satellite device, or from a satellite device to a standalone device.</li> <li>• <b>ModeChangeFail</b>—the mode change operation failed.</li> <li>• <b>MinorUpgradeOn</b>—A minor satellite software upgrade is in progress.</li> <li>• <b>MajorUpgradeOn</b>—A major satellite software upgrade is in progress.</li> <li>• <b>Upgrade-pending</b>—the satellite device is waiting for a satellite software upgrade.</li> </ul>	

Table 42: show chassis satellite Output Fields (continued)

Field Name	Field Description	Level of Output
	<ul style="list-style-type: none"> <li>● <b>ProvSessionDn</b>—the provisioning session is down.</li> <li>● <b>ReconcileState</b>—the satellite provisioning daemon has restarted and is reconciling the satellite device state.</li> </ul>	
<b>Cascade Ports</b>	<p>The cascade port or ports.</p> <p>A cascade port is a port on the aggregation device that connects to a satellite device in a Junos Fusion.</p>	<p>brief</p> <p>extensive</p> <p>none</p>
<b>Port State</b>	<p>The state of the cascade port on the aggregation device.</p> <p>Port states include:</p> <ul style="list-style-type: none"> <li>● <b>online</b>—the cascade port is online and active. This is the port state during normal operating procedure.</li> <li>● <b>txUpRxDn</b>—Tx or Rx forwarding is disabled on the cascade port. This state is often seen when a second aggregation device is added to a Junos Fusion topology, and the devices in the Junos Fusion are synchronizing to the new topology.</li> <li>● <b>miswire</b>—the cascade port is miswired. This state is typically seen when a satellite device is interconnected to two aggregation devices but multihoming is not configured. Use <b>show chassis satellite detail</b> to gather more information on the issue when the device state is <b>Miswire</b>.</li> <li>● <b>present</b>—The cascade port recognized the satellite device and is up.</li> <li>● <b>misconfig</b>—the cascade port is assigned, but this interface is not working correctly due to a misconfiguration.</li> <li>● <b>down</b>—the cascade port is down.</li> <li>● <b>offline</b>—the satellite device was previously recognized from this interface, but is no longer present.</li> <li>● <b>absent</b>—the cascade port is configured but no satellite device is detected on the interface.</li> </ul>	<p>brief</p> <p>extensive</p> <p>none</p>
<b>Extended Ports Total</b>	<p>The total number of extended ports on the satellite device.</p> <p>An extended port is a network-facing port on the satellite device that sends and receives network traffic for the Junos Fusion.</p>	<p>brief</p> <p>none</p> <p>terse</p>

Table 42: show chassis satellite Output Fields (continued)

Field Name	Field Description	Level of Output
<b>Extended Ports Up</b>	The number of active extended ports.	brief none terse
<b>Model</b>	The hardware model of the satellite device.	terse
<b>Version</b>	The version of satellite device software running on the satellite device.	terse
<b>Satellite Alias</b>	The satellite device's alias.  The satellite device's alias is configured using the <b>set chassis satellite-management fpc slot-id alias alias</b> statement.	detail
<b>FPC slot</b>	The FPC slot number of the satellite device.  The slot number can be configured using the <b>set chassis satellite-management fpc slot-id</b> statement.	detail
<b>Operational State</b>	The operational state of the satellite device.  The state UFDDown indicates that uplink failure detection disabled the satellite device's extended ports due to an uplink port failure.	detail
<b>Product Model</b>	The hardware model of the satellite device.	detail
<b>Product Family</b>	The product family of the satellite device.	detail
<b>Serial number</b>	The serial number of the satellite device.	detail
<b>System ID</b>	The system ID of the satellite device. The system ID is also the satellite device's MAC address.	detail
<b>Software package version</b>	The satellite software version running on the satellite device.	detail

Table 42: show chassis satellite Output Fields (continued)

Field Name	Field Description	Level of Output
<b>Host software version</b>	The host operating system software version running on the satellite device.	detail
<b>Management Address</b>	<p>The management IP address of the satellite device.</p> <p>This management IP address belongs to an internal routing instance. This management address is assigned by the control plane internally based on FPC slot ID and is used for the control plane traffic between the aggregation device and satellite device.</p> <p>All management in a Junos Fusion should be done through the aggregation device. The management IP address of the satellite device is useful for debugging purposes by expert users only.</p>	detail
<b>UFD config state</b>	Uplink failure detection configuration state.	detail
<b>Minimum link</b>	Uplink failure detection minimum active uplink port setting.	detail
<b>Holdddown timer (seconds)</b>	Uplink failure detection holdddown timer setting, in seconds.	detail
<b>UFD operational state</b>	Uplink failure detection operational state.	detail
<b>Candidate uplink interfaces (pic/port)</b>	Uplink failure detection candidate uplink interfaces.	detail
<b>Extended Ports</b>	<p>The number of extended ports for the satellite device.</p> <p>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.</p>	extensive
<b>When</b>	The date and time of the event.	extensive

Table 42: show chassis satellite Output Fields (continued)

Field Name	Field Description	Level of Output
<b>Event</b>	The event.	extensive
<b>Action</b>	The actions that resulted from the event.	extensive
<b>Fields for Cascade interfaces</b>		
<b>Interface Name</b>	The name of the cascade interface on the aggregation device.	detail
<b>State</b>	The state of the cascade interface.	detail
<b>Uplink Interface</b>	The name of the uplink interface on the satellite device.	detail
<b>Adjacency state</b>	The adjacency state of the cascade to uplink interface link.	detail
<b>Last transition</b>	The amount of time that has passed since the last transition of the cascade to uplink interface link.	detail
<b>Adjacency down count (Interface Name)</b>	The number of times the cascade to uplink interface link has gone into the down state.	detail
<b>RX Packet</b>	The number of packets received on the cascade interface.	detail
<b>Last received packet</b>	The amount of time that has passed since the last packet was received on the cascade interface.	detail
<b>Peer adjacency information</b>	The amount of time that has passed since the last peer adjacency transition.	detail
<b>Adjacency down count (Peer adjacency information)</b>	The number of times the cascade to uplink interface link has gone into the down state.	detail
<b>Last down cause</b>	The cause of the last adjacency failure.	detail

Table 42: show chassis satellite Output Fields (continued)

Field Name	Field Description	Level of Output
<b>SDPD restart detected</b>	The number of times that the satellite device protocol process has restarted.	detail
<b>Fields for Process information</b>		
<b>Process Name</b>	The name of the process.	detail
<b>PID</b>	The process identification number of the process.	detail
<b>State</b>	The current state of the process.	detail
<b>Number of restart detected</b>	The number of times the process has restarted.	detail
<b>Uptime</b>	The amount of time that the process has been running.	detail

## Sample Output

**show chassis satellite**

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

Alias	Slot	Device State	Cascade Ports	Port State	Extended Ports Total/Up
qfx5100-24q-01	100	Online	xe-0/0/1 xe-0/3/0	online	9/2
qfx5100-24q-02	101	Online	xe-0/0/2 xe-0/3/1	online	20/12
qfx5100-24q-03	102	Online	xe-0/0/3 xe-0/3/2	online	16/6
qfx5100-24q-04	103	Online	xe-0/0/4 xe-0/3/3	online	16/4
qfx5100-24q-05	104	Online	xe-0/0/5 xe-0/3/4	online	13/3
qfx5100-24q-06	105	Online	xe-0/0/6 xe-0/3/5	online	24/15
qfx5100-24q-07	106	Online	xe-0/0/7	online	24/15

qfx5100-24q-08	107	Online	xe-0/3/6	online	21/12
			xe-0/0/8	online	
			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	Cascade	Port	Extended Ports
		State	Ports	State	Total/Up
ex4300-22	130	Online	xe-0/2/7	online	49/1

## Sample Output

### show chassis satellite fpc-slot 130

```
user@aggregation-device> show chassis satellite fpc-slot 130
```

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

## Sample Output

### show chassis satellite terse

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

Slot	Device State	Model	Extended Ports Total/Up	Version
101	Online	QFX5100-48S-6Q	7/7	3.0R1.1
102	Online	QFX5100-48S-6Q	7/7	3.0R1.1
103	Online	QFX5100-48S-6Q	6/5	3.0R1.1
104	Online	QFX5100-48S-6Q	14/14	3.0R1.1
105	Online	QFX5100-48S-6Q	18/18	3.0R1.1
106	Online	QFX5100-48S-6Q	17/16	3.0R1.1
107	Online	EX4300-48T	52/6	3.0R1.1
108	Online	EX4300-48T	52/15	3.0R1.1
109	Online	EX4300-48T	51/14	3.0R1.1
110	Online	EX4300-48T	51/14	3.0R1.1
111	Online	EX4300-48T	51/13	3.0R1.1
112	Online	EX4300-48T	51/12	3.0R1.1
113	Online	EX4300-48T	51/13	3.0R1.1
114	Online	QFX5100-24Q-2P	17/13	3.0R1.1

### show chassis satellite detail

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

```
Satellite Alias: qfx5100-48s-02
FPC Slot: 101
Operational State: Online
Product Model: QFX5100-48S-6Q
```



```
Product Family: i386
Serial number: ABC123DEF456
System id: 00:11:22:aa:bb:cc
Software package version: 3.0R1.1
Host software version: 1.0.0
Management Address: 172.16.0.101/32
Cascade interfaces:
  Interface Name: xe-0/0/2 State: online
    Uplink Interface: xe-001/0/48:0
    Adjacency state: Two-Way
    Last transition: 00:10:22
    Adjacency down count: 0
    Rx Packet: 65 Last received packet: 00:00:02
    Peer adjacency information: 00:10:22
      Adjacency down count: 3
      Last down cause: Interface Down
      SDPD restart detected: 3
  Interface Name: xe-0/2/1 State: online
    Uplink Interface: xe-001/0/48:1
    Adjacency state: Two-Way
    Last transition: 00:10:22
    Adjacency down count: 0
    Rx Packet: 64 Last received packet: 00:00:02
    Peer adjacency information: 00:10:22
      Adjacency down count: 3
      Last down cause: Interface Down
      SDPD restart detected: 3
  Interface Name: xe-2/0/0 State: online
    Uplink Interface: xe-001/0/48:2
    Adjacency state: Two-Way
    Last transition: 00:10:22
    Adjacency down count: 0
    Rx Packet: 65 Last received packet: 00:00:02
    Peer adjacency information: 00:10:22
      Adjacency down count: 3
      Last down cause: Interface Down
      SDPD restart detected: 3
  Interface Name: xe-2/1/6 State: online
    Uplink Interface: xe-001/0/48:3
    Adjacency state: Two-Way
    Last transition: 00:10:22
    Adjacency down count: 0
    Rx Packet: 65 Last received packet: 00:00:02
    Peer adjacency information: 00:10:22
```

```

        Adjacency down count: 3
        Last down cause: Hold timer expire
        SDPD restart detected: 3
Process information:
    Process Name: Provisioning PID: 6716 State: Running
        Number of restart detected: 0
        Uptime: 00:10:22
    Process Name: PFE PID: 3194 State: Running
        Number of restart detected: 0
        Uptime: 00:10:22
UFD config state: Enable (persist), Minimum link: 1,
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>

```

# Multicast Replication on Junos Fusion Provider Edge

## IN THIS CHAPTER

- [Understanding Multicast Replication in a Junos Fusion | 793](#)
- [Ingress Replication at the Aggregation Device to Satellite Devices | 797](#)
- [Egress \(Local\) Replication on the Satellite Devices | 798](#)
- [Configuring Egress \(Local\) Replication on a Junos Fusion | 804](#)

## Understanding Multicast Replication in a Junos Fusion

### IN THIS SECTION

- [Junos Fusion Multicast Replication Overview | 793](#)
- [ECIDs for Multicast Traffic | 795](#)
- [Multicast Replication Limitations in a Junos Fusion | 796](#)

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 795](#).) 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 797](#) 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 795](#).) 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 798](#) for details.

To avoid creating loops and broadcast storms, for both ingress and egress multicast replication, both the aggregation devices and satellite devices maintain split-horizon next-hop information to prevent resending multicast or broadcast packets back out of the ingress port.

## ECIDs for Multicast Traffic

Traffic sent between aggregation devices and satellite devices is sent over a logical path, called an *e-channel*. The packets sent between the aggregation device and satellite device include the IEEE 802.1BR E-channel tag (ETAG) header with an E-channel identifier (ECID). The ECID identifies the path that will be used in forwarding traffic packets. Each extended port is identified by a unique ECID value. Junos Fusion reserves ECID values 1 through 4095 for unicast data packets. ECID values from 4096 through 16382, also called *multicast ECIDs*, are reserved for multicast, VLAN flooding, and broadcast data packets. Multicast ECIDs correspond to one or more destination extended ports on a satellite device.

The aggregation device automatically creates virtual interfaces named **sd-fpc-id/0/0** (where *fpc-id* is the satellite device ID) to represent satellite devices, and uses these virtual interfaces as the next-hop interface when forwarding traffic to a satellite device.

When local replication is disabled, similar to unicast packet flow (see [“Understanding the Flow of Data Packets in a Junos Fusion Topology” on page 28](#)), 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
<a href="#">16.1</a>	Starting in Junos OS Release 16.1, Junos Fusion supports enabling <i>egress multicast replication</i> , also referred to as <i>local replication</i> , where satellite devices replicate the multicast and broadcast packets destined for their local ports.

#### RELATED DOCUMENTATION

<a href="#">Ingress Replication at the Aggregation Device to Satellite Devices   797</a>
<a href="#">Egress (Local) Replication on the Satellite Devices   798</a>
<a href="#">Configuring Egress (Local) Replication on a Junos Fusion   804</a>
<a href="#">Understanding the Flow of Data Packets in a Junos Fusion Topology   28</a>

## Ingress Replication at the Aggregation Device to Satellite Devices

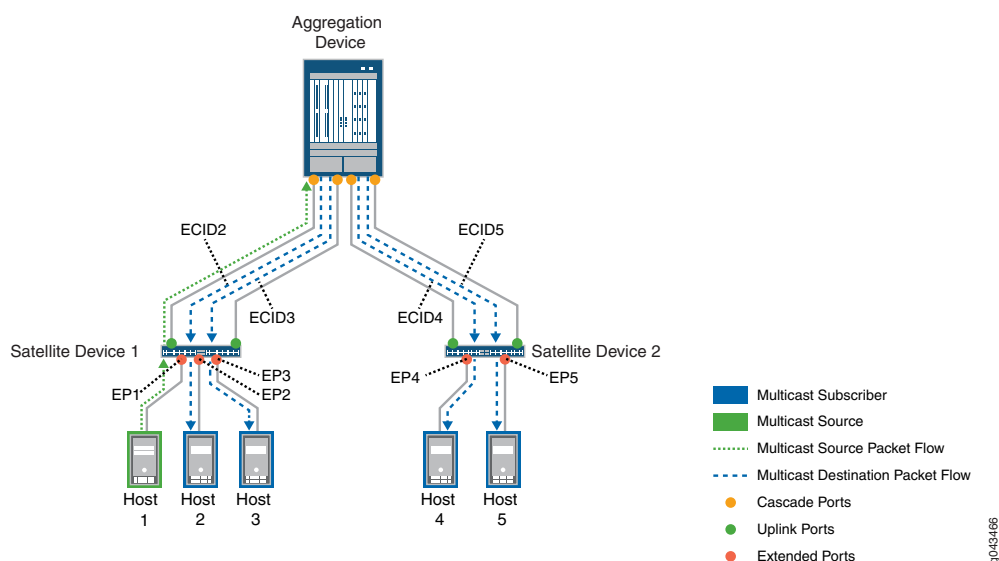
By default, Junos Fusion uses ingress replication on the aggregation devices to replicate and forward copies of packets to multicast destinations.

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 9 on page 797 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 9: 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 798 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 | 793](#)
- [Egress \(Local\) Replication on the Satellite Devices | 798](#)
- [Understanding the Flow of Data Packets in a Junos Fusion Topology | 28](#)

## Egress (Local) Replication on the Satellite Devices

### IN THIS SECTION

- [Local Replication for Layer 2 Multicast Traffic with IGMP Snooping | 799](#)
- [Local Replication for VLAN Flooding | 800](#)
- [Local Replication for Layer 3 Multicast Traffic Over IRB Interfaces | 802](#)

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.

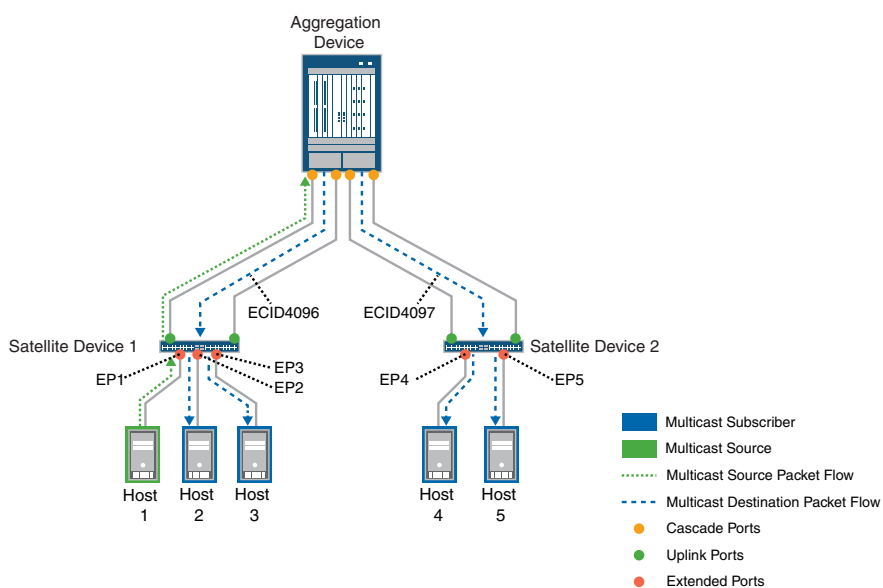
Local replication is performed at Layer 2. Each receiving satellite device maintains tables that map the assigned ECIDs to corresponding destination extended ports, and simply forward outgoing multicast or broadcast packets to local extended ports. For Layer 3 multicast traffic, such as when forwarding 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 10 on page 799 illustrates Layer 2 multicast traffic flow with IGMP snooping when local replication is enabled.

Figure 10: 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.

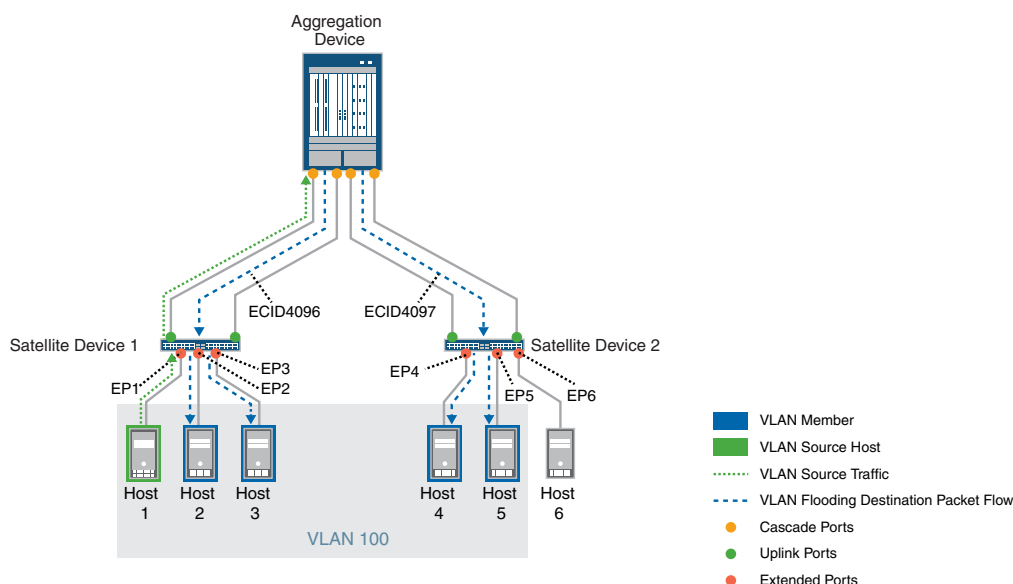
Other multicast destinations might be reached through ports on the aggregation devices, rather than through extended ports. For these destinations, the aggregation device creates and sends copies to those local ports directly.

### 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 11 on page 801](#) illustrates the packet flow for VLAN flooding when local replication is enabled.

Figure 11: 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.

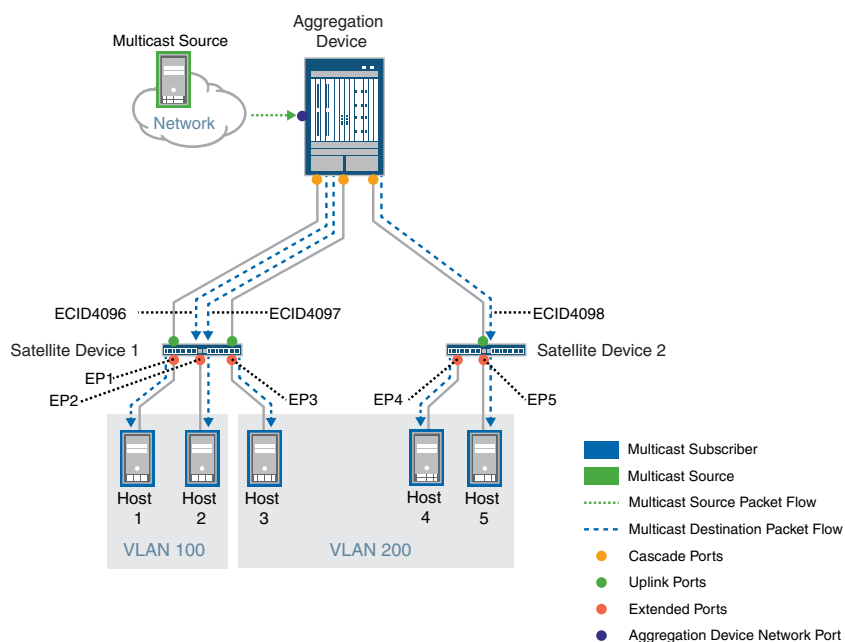
### Local Replication for Layer 3 Multicast Traffic Over IRB Interfaces

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 12 on page 803](#) 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 12: 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 | 793](#)

[Ingress Replication at the Aggregation Device to Satellite Devices | 797](#)

[Configuring Egress \(Local\) Replication on a Junos Fusion | 804](#)

## 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 793 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 | 797](#)

[Egress \(Local\) Replication on the Satellite Devices | 798](#)

# Configuration Statements and Operational Commands for Multicast Support

## IN THIS CHAPTER

- [local-replication | 806](#)
- [show bridge flood nexthops satellite | 807](#)
- [show bridge flood satellite | 810](#)
- [show bridge satellite device | 814](#)
- [show multicast ecid-mapping satellite | 817](#)
- [show multicast next-hops satellite | 821](#)
- [show multicast snooping next-hops satellite | 824](#)
- [show multicast snooping route satellite | 829](#)
- [show multicast statistics satellite | 835](#)
- [show multicast summary satellite | 837](#)



## local-replication

### Syntax

```
local-replication
```

### Hierarchy Level

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

### Release Information

Statement introduced in Junos OS Release 16.1.

### 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.

### RELATED DOCUMENTATION

[Configuring Egress \(Local\) Replication on a Junos Fusion](#) | 804

## show bridge flood nexthops satellite

### Syntax

```
show bridge flood nexthops satellite  
<brief | detail | extensive>  
<nexthop-id nexthop-id>
```

### Release Information

Command introduced in Junos OS Release 16.1.

### Description

Display bridge domain flood next hop information for satellite device destinations.

You can use this command to:

- View the current list of all flood traffic composite next hops.
- See details about a specified composite next hop.
- Follow aggregation device composite next-hop processing as the aggregation device resolves and updates composite next-hop table entries for extended port destinations.

The aggregation device allocates ECID tags that represent multicast or broadcast destinations behind satellite device extended ports, associates them with the corresponding satellite device virtual interfaces (*sd-fpc-id/0/0*), and updates flood next-hop table entries accordingly. More detailed output from this command shows events that result in next-hop table updates.

### Options

**brief | detail | extensive**—(Optional) Display the specified level of output. The default output level is **brief**.

**nexthop-id *nexthop-id***—Display more detailed bridge flooding next hop information only for the specified next hop.

### Required Privilege Level

view

### RELATED DOCUMENTATION

[Understanding Multicast Replication in a Junos Fusion](#) | 793

[Egress \(Local\) Replication on the Satellite Devices](#) | 798

### List of Sample Output

[show bridge flood next hops on page 809](#)

## Output Fields

Table 43 on page 808 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 43: show bridge flood next-hops satellite Command Output Fields

Field Name	Field Description	Level of Output
<b>Next-hop ID</b>	Next-hop ID for each next-hop entry displayed.	All
<b>Composite function</b>	Purpose of a composite next-hop entry. Values include: <ul style="list-style-type: none"> <li>• FLOOD_ALL—Flood next hop.</li> <li>• FLOOD_ALL_SPLIT_HZ—Flood next hop including split-horizon information.</li> </ul>	All
<b>Table</b>	Name of next-hop routing or forwarding table for the listed entry.	All
<b>Flags</b>	Flags giving additional information about a next-hop entry. Values include: <ul style="list-style-type: none"> <li>• SAT—The entry is a satellite destination composite next hop for an extended port destination that has been resolved and updated with the corresponding satellite device interface, <b>sd-fpc-id/0/0</b>, and the associated ECID shown in the <b>label</b> field.</li> <li>• ST—The entry is stale and waiting to be refreshed.</li> <li>• RU—The entry is stale, but is marked to be reused.</li> </ul>	All
<b>aggregation device</b>	Next-hop IDs and corresponding interfaces to reach local flood destination ports on the aggregation device.	detail extensive
<b>satellite-device-id id</b>	Satellite device ID with the next-hop IDs and interface names to reach extended ports that are flood destinations on the listed satellite device.  When an ECID has been assigned to destination extended ports on a satellite device, this field lists the satellite next-hop ID, the corresponding virtual satellite device interface ( <b>sd-fpc-id/0/0</b> ), and the allocated ECID ( <b>label</b> field).	detail extensive
<b>label</b>	ECID associated with a group of flood destination extended ports on the satellite device specified in the <b>satellite-device-id</b> field.	detail extensive

Table 43: show bridge flood next-hops satellite Command Output Fields *(continued)*

Field Name	Field Description	Level of Output
<b>When</b>	Elapsed time since an event related to a flood next-hop entry change.	extensive
<b>Event</b>	Brief description of the event related to a flood next-hop entry change.	extensive
<b>Action</b>	Brief description of actions that resulted from the event.	extensive

## Sample Output

**show bridge flood next hops**

user@host> **> show bridge flood next-hops satellite nexthop-id 962 detail**

```

Next-hop      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

```

## show bridge flood satellite

### Syntax

```
show bridge flood satellite
<brief | detail | extensive>
<bridge-domain-name bridge-domain-name>
<vswitch-name vswitch-name>
```

### Release Information

Command introduced in Junos OS Release 16.1.

### 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 *bridge-domain-name***—Display bridge flooding information for the specified bridge domain.

**vswitch-name *vswitch-name***—Display bridge flood information for the specified virtual satellite device.

### Required Privilege Level

view

### RELATED DOCUMENTATION

[Understanding Multicast Replication in a Junos Fusion](#) | 793

## List of Sample Output

[show bridge flood satellite on page 812](#)

### Output Fields

[Table 44 on page 811](#) 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 44: show bridge flood satellite Command Output Fields**

Field Name	Field Description	Level of Output
<b>Bridging domain</b>	Bridge domain name.	All
<b>Flood Routes</b>	Flood route information listed by route prefix.	All
<b>Prefix</b>	Flood route prefix.	All
<b>Token</b>	Internal ID for flood route prefix.	All
<b>NhIndex</b>	The ingress replication next-hop for the flood route.	All
<b>Satellite-Nh</b>	Satellite device next-hop ID when local replication is enabled and there are multiple flood destination extended ports.	All
<b>Next-hop information</b>	Details for each next hop, listed by next-hop or satellite next-hop iID.	detail extensive
<b>aggregation device</b>	Next-hop interfaces for ports that are flood destinations on the aggregation device, listed by next-hop ID.	detail extensive
<b>satellite device id</b>	Next-hop interfaces for extended ports that are flood destinations on satellite devices, listed by satellite next-hop ID.	detail extensive
<b>label</b>	ECID assigned to a satellite device interface.	detail extensive
<b>When</b>	Elapsed time since an event related to a flood route entry change.	extensive

Table 44: show bridge flood satellite Command Output Fields (continued)

Field Name	Field Description	Level of Output
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

```



# show bridge satellite device

## Syntax

```
show bridge satellite device
<brief | detail>
< device-id device-id>
```

## Release Information

Command introduced in Junos OS Release 16.1.

## Description

Display status and control information for all satellite devices or a specified satellite device.

## Options

**brief | detail**—(Optional) Display the specified level of output. The default output level is **brief**.

**device-id *device-id***—(Optional) Display information for the specified satellite device.

## Required Privilege Level

view

## RELATED DOCUMENTATION

[Understanding Multicast Replication in a Junos Fusion | 793](#)

## List of Sample Output

[show bridge satellite device on page 816](#)

## Output Fields

[Table 45 on page 814](#) 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 45: show bridge satellite device Command Output Fields

Field Name	Field Description	Level of Output
Device ID	Satellite device ID.	All
Device (detail view)		

Table 45: show bridge satellite device Command Output Fields (continued)

Field Name	Field Description	Level of Output
<b>Interface Index</b>  <b>Device Interface Index</b> (detail view)	Internal ID for the satellite device virtual interface.	All
<b>Interface Name</b>  <b>Device Interface Name</b> (detail view)	Satellite device virtual interface name ( <b>sd-fpc-id/0/0</b> , where <i>fpc-id</i> is the satellite device ID).	All
<b>State</b>  <b>Device Interface State</b> (detail view)	State of the satellite device virtual interface. If the interface is created and active, possible values include <b>Up</b> or <b>Down</b> .	All
<b>Connection State</b>  <b>Device connection Status</b> (detail view)	State of the satellite device interface connection to the aggregation device. The connection state is monitored using keep-alive messages between satellite and aggregation device control processes. Possible values include <b>Up</b> or <b>Down</b> .	All
<b>Requests</b>	Number of request messages sent to the listed satellite device aggregation device to allocate or update ECID mappings.	All
<b>Responses</b>	Number of response messages returned from the listed satellite device to the aggregation device for granting ECID requests.	All
<b>Device connection uptime</b>	Duration of the connection between the aggregation device and the specified satellite device.	detail

Table 45: show bridge satellite device Command Output Fields (continued)

Field Name	Field Description	Level of Output
<b>Device heartbeat status</b>	Status of keep-alive message exchange between satellite device and aggregation device control processes.	detail
<b>Echo packets sent</b>	Number of keep-alive packets sent to the satellite device from the aggregation device.	detail
<b>Echo packets received</b>	Number of keep-alive response packets sent to the aggregation device from the satellite device.	detail
<b>Multicast IPC stats</b>	Number of inter-process control (IPC) messages sent from the aggregation device to the satellite device related to multicast functions on the satellite device. This value is displayed for active satellite device connections.	detail
<b>Bridge IPC stats</b>	Number of IPC messages sent from the aggregation device to the satellite device related to Layer 2 bridging functions on the satellite device. This value is displayed for active satellite device connections.	detail

## Sample Output

**show bridge satellite device**

user@host> **show bridge satellite device**

Device ID	Interface index	Interface Name	State	Connection State	Requests	Responses
100	370	sd-100/0/0.32770	Up	Up	5	5
101	342	sd-101/0/0.32770	Up	Up	4	4
102	365	sd-102/0/0.32770	Up	Up	3	3
105	364	sd-105/0/0.32770	Up	Up	2	2

## show multicast ecid-mapping satellite

### Syntax

```
show multicast ecid-mapping satellite
  <brief | detail | extensive>
  <device-id device-id>
  <ecid ecid>
  <reference-id reference-id>
```

### Release Information

Command introduced in Junos OS Release 16.1.

### 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

### RELATED DOCUMENTATION

[Understanding Multicast Replication in a Junos Fusion | 793](#)

[Egress \(Local\) Replication on the Satellite Devices | 798](#)

### List of Sample Output

[show multicast ecid-mapping satellite on page 819](#)

[show multicast ecid-mapping satellite \(for specified satellite device-id and ECID\) on page 820](#)

### Output Fields

Table 46 on page 818 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 46: show multicast ecid-mapping satellite Command Output Fields**

Field Name	Field Description	Level of Output
<b>Satellite Device ID</b>	Satellite device ID.	All
<b>ECID</b>	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
<b>State</b>	Status of requesting and allocating the ECID. Values include: <ul style="list-style-type: none"> <li>• Init—An ECID mapping entry for a group of ports has been created.</li> <li>• Request Scheduled—An ECID mapping entry has been queued for an ECID value request.</li> <li>• Request Sent—The ECID request has been sent to the corresponding satellite device.</li> <li>• Response Received—An ECID value has been received from the satellite device.</li> <li>• Sync—An ECID mapping with an ECID value is to be synchronized with a satellite device.</li> <li>• Ready—An ECID next hop has been created and is ready to be referenced for forwarding.</li> </ul>	All
<b>Flags</b>	Internal flag values for troubleshooting.	All
<b>nhid</b>	Satellite device next-hop ID associated with the ECID.	All
<b>Reference ID</b>	Internal reference ID assigned to an ECID request message, used for troubleshooting ECID communication with satellite devices.	All (with specified <b>device-id</b> or <b>ecid</b> )

## Sample Output

**show multicast ecid-mapping satellite**

user@host> **show multicast ecid-mapping satellite**

Satellite	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

# show multicast next-hops satellite

## Syntax

```
show multicast next-hops satellite
```

## Release Information

Command introduced in Junos OS Release 16.1.

## 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

## RELATED DOCUMENTATION

- [Understanding Multicast Replication in a Junos Fusion | 793](#)
- [show multicast snooping next-hops satellite | 824](#)

## List of Sample Output

[show multicast next-hops satellite on page 822](#)

## Output Fields

[Table 47 on page 821](#) 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 47: 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 47: show multicast next-hops satellite Command Output Fields (continued)

Field Name	Field Description	Level of Output
<b>Interface Name</b>	Interface name for configured interfaces in the Junos Fusion.  A satellite device virtual interface named <b>sd-fpc-id/0/0</b> is used to send traffic to extended ports on satellite device <i>fpc-id</i> .	All
<b>Label</b>	A multicast ECID assigned to the satellite device interface next hop. If no ECIDs are assigned for the interface, the value displayed in this field is 0.  Satellite device interfaces might have multiple ECIDs listed that represent different groups of multicast destination extended ports on that satellite device.	All
<b>Flags</b>	Flags giving additional information about a next-hop entry. Values include:  <ul style="list-style-type: none"> <li>• SAT—The entry is a satellite composite next hop for extended port destinations that has been resolved and updated with the corresponding satellite device interface, <b>sd-fpc-id/0/0</b>, and the associated ECID shown in the <b>Label</b> field.</li> </ul>	All

## Sample Output

show multicast next-hops satellite

user@host> show multicast next-hops satellite

Next-hop ID	Interface index	Interface Name	Label	Flags
186	1	unknown	0	
530	323	unknown	0	
574	331	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	

## show multicast snooping next-hops satellite

### Syntax

```
show multicast snooping next-hops satellite
<brief | detail | extensive>
<nexthop-id nexthop-id>
```

### Release Information

Command introduced in Junos OS Release 16.1.

### 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

### RELATED DOCUMENTATION

[Understanding Multicast Replication in a Junos Fusion | 793](#)

[Egress \(Local\) Replication on the Satellite Devices | 798](#)

[show multicast snooping route satellite | 829](#)

### List of Sample Output

[show multicast snooping next-hops satellite on page 826](#)

[show multicast snooping next-hops satellite nexthop-id \(detail view for a specified next-hop ID\) on page 827](#)

[show multicast snooping next-hops satellite nexthop-id \(extensive view for a specified next-hop ID\) on page 827](#)

## Output Fields

Table 48 on page 825 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 48: show multicast snooping next-hops satellite Command Output Fields

Field Name	Field Description	Level of Output
<b>Next-hop ID</b>	Multicast next-hop ID (original multicast next hop used with ingress multicast replication).	All
<b>Forwarding Next-Hop Type</b>	Type of next-hop entry. Values include: <ul style="list-style-type: none"> <li>• COMPOSITE—Composite next hop.</li> </ul>	All
<b>Table</b>	Name of routing or forwarding table for the listed entry.	All
<b>Flags</b>	Flags giving additional information about a next-hop entry. Values include: <ul style="list-style-type: none"> <li>• SAT—The entry is a satellite destination composite next hop for an extended port destination that has been resolved and updated with the corresponding satellite device interface, <b>sd-fpc/0/0</b>, and the associated ECID shown in the <b>label</b> field.</li> <li>• ST—The entry is stale and waiting to be refreshed.</li> <li>• RU—The entry is stale, but is marked to be reused.</li> </ul>	All
<b>Mrouter</b>	Next-hop list for multicast routers connected to the bridge domain or VLAN.	detail extensive
<b>aggregation device</b>	Next-hop IDs and corresponding interfaces for the composite next hop to reach local multicast destination ports on the aggregation device.	detail extensive

Table 48: show multicast snooping next-hops satellite Command Output Fields (continued)

Field Name	Field Description	Level of Output
<del>satellite-device-id</del> <b>id</b>	Satellite device ID with the next-hop IDs and corresponding interface names for the composite next-hop chain to reach extended ports that are multicast destinations on that satellite device.  When an ECID has been assigned to destination extended ports on a satellite device, this field lists the satellite next-hop ID, the corresponding virtual satellite device interface ( <b>sd-fpc-id/0/0</b> ), and the allocated ECID ( <b>label</b> field).	detail extensive
<b>AE</b>	Link aggregation group interface next-hop IDs and interface names for multicast destination composite next hops.	detail extensive
<b>label</b>	ECID associated with one or more multicast destination extended ports on the satellite device in the <b>satellite-device-id</b> field.	detail extensive
<b>Linked Next-hop</b>	Multicast satellite next-hop ID (next hop used with egress multicast replication).	detail extensive
<b>When</b>	Elapsed time since an event related to a multicast next-hop entry change.	extensive
<b>Event</b>	Brief description of the event related to a multicast next-hop entry change.	extensive
<b>Action</b>	Brief description of actions that resulted from the event.	extensive

## Sample Output

show multicast snooping next-hops satellite

user@host> show multicast snooping next-hops satellite

Next-hop ID	Forwarding Next-Hop	Table	Flags
----------------	------------------------	-------	-------

	Type		
2097265	COMPOSITE	inet.0	
2097267	COMPOSITE	inet.0	
2097270	COMPOSITE	inet.0	
2097271	COMPOSITE	inet.0	
2094267	COMPOSITE	inet.0	SAT

**show multicast snooping next-hops satellite nexthop-id (detail view for a specified next-hop ID)**

user@host> **show multicast snooping next-hops satellite nexthop-id 524296 detail**

Next-hop ID	Forwarding Next-Hop Type	Table	Flags
524296	COMPOSITE	inet.0	SAT

satellite-device-id 106:  
 ->1839 sd-106/0/0.32770 label=4104  
 MRouter:  
 524293  
 aggregation-device:  
 ->1708 et-0/0/30.0  
 ->1826 xe-0/0/28:1.0  
 satellite-device-id 100:  
 ->1845 sd-100/0/0.32770 label=4101  
 satellite-device-id 106:  
 ->1847 sd-106/0/0.32770 label=4103  
 Linked Next-hop: 524295

**show multicast snooping next-hops satellite nexthop-id (extensive view for a specified next-hop ID)**

user@host> **show multicast snooping next-hops satellite nexthop-id 1048576 extensive**

Next-hop ID	Forwarding Next-Hop Type	Table	Flags
1048576	COMPOSITE	default	

satellite-device-id 100:  
 ->54297 xe-100/0/12.0  
 ->54299 xe-100/0/13.0  
 satellite-device-id 101:  
 ->54303 xe-101/0/12.0  
 ->54339 xe-101/0/13.0

Linked Next-hop: 1048578

When	Event	Action
1w0d 21:07:51.281	Next-hop linking	Linked with satellite nhid:1048578
1w0d 21:07:51.260	Adding satellite Indirect	DB add
1w0d 21:07:51.260	Processing translate Q	Translating Multicast composite INH
		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 ready	inhid:1048576: [ECID=0] Next-hop not ready
1w0d 21:07:51.241	Translate Q Skip ready	inhid:1048576: [ECID=0] Next-hop not ready
1w0d 21:07:51.241	Processing translate Q	Translating Multicast composite INH
1w0d 21:07:51.241	Add to translate Q	inhid:1048576 added
1w0d 21:07:51.241	Add to translate Q	Original INH decoded - Adding to
	Translate Q	
1w0d 21:07:51.241	ECID reference	Added ECID reference-ID:2
1w0d 21:07:51.241	ECID reference	Added ECID reference-ID:1
1w0d 21:07:51.241	Next-hop add	Linked to fwd CNH extension: 0xa67a200
		list[4]: {54297 54299 54303 54339 }
		nhid:1048576 from kernel
		fwd nhid[619]:

## show multicast snooping route satellite

### Syntax

```
show multicast snooping route satellite
<brief | detail | extensive>
<bridge-domain-name bridge-domain-name | <vlan-name vlan-name>
<group group-address>
<source source-address>
<vswitch-name virtual-switch-name>
```

### Release Information

Command introduced in Junos OS Release 16.1.

### 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 *bridge-domain-name***—(Junos Fusion Provider Edge only) Filter output to display bridge domain flooding information only for the specified bridge domain name.

**group *group-address***—Filter output to display flooding information only for the specified multicast group.

**source *source-address***—Filter output to display flooding information only for the specified multicast source.



**vswitch-name** *virtual-switch-name*—Filter output to display flooding information only for the specified Layer 2 virtual switch.

### Required Privilege Level

view

### RELATED DOCUMENTATION

[Understanding Multicast Replication in a Junos Fusion | 793](#)

[Egress \(Local\) Replication on the Satellite Devices | 798](#)

[show multicast snooping next-hops satellite | 824](#)

### List of Sample Output

[show multicast snooping route satellite on page 832](#)

[show multicast snooping route satellite detail on page 832](#)

[show multicast snooping route satellite group on page 833](#)

[show multicast snooping route satellite bridge-domain-name \(for specific bridge domain with detail view on Junos Fusion Provider Edge\) on page 834](#)

### Output Fields

[Table 49 on page 830](#) 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 49: show multicast snooping route satellite Command Output Fields**

Field Name	Field Description	Level of Output
<b>Route</b>	Multicast route information listed by route prefix under this heading.	All
<b>(S, G/m)</b>	Multicast entry state.	All
<b>Bridge Domain</b>	Bridge domain or VLAN name.	All
<b>NH Index</b>	Multicast next-hop ID (original multicast next hop used with ingress multicast replication).	brief
<b>Linked NH Index</b>	Multicast satellite next-hop ID (next hop used with egress multicast replication).	brief

Table 49: show multicast snooping route satellite Command Output Fields (continued)

Field Name	Field Description	Level of Output
<b>Next-hop information</b>	Detailed list of next-hop chain information for the original and satellite next-hop chains, listed by original next-hop index ( <b>NH Index</b> ) and satellite next-hop chain index ( <b>Linked NH Index</b> ) output field values.	detail extensive
<b>Mrouter</b>	Next-hop chain list for multicast routers connected to the bridge domain or VLAN.	detail extensive
<del>aggregation device</del>	Next-hop IDs and corresponding interfaces for the composite next hop to reach local multicast destination ports on the aggregation device.	detail extensive
<del>satellite device id</del> <b>id</b>	Satellite device ID with the next-hop IDs and corresponding interface names for the composite next-hop chain to reach extended ports that are multicast destinations on that satellite device.  When an ECID has been assigned to destination extended ports on a satellite device, this field lists the satellite next-hop ID, the corresponding virtual satellite device interface ( <b>sd-fpc-id/0/0</b> ), and the allocated ECID ( <b>label</b> field).	detail extensive
<b>AE</b>	Link aggregation group interface next-hop IDs and interface names multicast destination composite next hops.	detail extensive
<b>label</b>	ECID associated with one or more multicast destination extended ports on the satellite device in the <b>satellite-device-id</b> field.	
<b>When</b>	Elapsed time since an event related to a multicast next-hop entry addition or update.	extensive
<b>Event</b>	Brief description of the event related to a multicast next-hop entry addition or update.	extensive
<b>Action</b>	Brief description of actions that resulted from the event.	extensive

## Sample Output

### show multicast snooping route satellite

user@host> show multicast snooping route satellite

```

-----VSwitch Instance: default-switch-----
Route: 00.04.00.01.00.00.233.252.0.0.0.0.0.0.00.00/72
  (S, G/m): (*, 233.252.0.0/24)
    Bridge Domain:   bd100
    NH Index:        1048582
    Linked NH Index: 1048620
Route: 00.05.00.01.00.00.233.252.0.0.0.0.0.0.00.00/72
  (S, G/m): (*, 233.252.0.0/24)
    Bridge Domain:   bd1
    NH Index:        1048582
    Linked NH Index: 1048620
Route: 00.06.00.01.00.00.233.252.0.0.0.0.0.0.00.00/72
  (S, G/m): (*, 233.252.0.0/24)
    Bridge Domain:   bd10
    NH Index:        1048582
    Linked NH Index: 1048620

```

### show multicast snooping route satellite detail

user@host> show multicast snooping route satellite detail

```

-----VSwitch Instance: default-switch-----
Route: 00.03.00.01.00.00.233.252.0.0.0.0.0.0.00.00/52
  (S, G/m): (*, 233.252.0.0/4)
    Bridge Domain: VLAN800
    Next-hop information:
      524287
      MRouter:
        524286
        aggregation-device:
          ->1708 et-0/0/30.0
          ->1826 xe-0/0/28:1.0
        satellite-device-id 100:
          ->1838 xe-100/0/49:3.0
        satellite-device-id 106:
          ->1834 xe-106/0/11.0

```

```

524294
MRouter:
524293
    aggregation-device:
        ->1708 et-0/0/30.0
        ->1826 xe-0/0/28:1.0
    satellite-device-id 100:
        ->1845 sd-100/0/0.32770 label=4101
    satellite-device-id 106:
        ->1847 sd-106/0/0.32770 label=4103
Route: 00.03.00.01.00.00.233.252.0.1.0.0.0.0.00.00/80
(S, G/m): (*, 233.252.0.1/32)
Bridge Domain: VLAN800
Next-hop information:
524295
    satellite-device-id 106:
        ->1804 xe-106/0/13.0
MRouter:
524286
    aggregation-device:
        ->1708 et-0/0/30.0
        ->1826 xe-0/0/28:1.0
    satellite-device-id 100:
        ->1838 xe-100/0/49:3.0
    satellite-device-id 106:
        ->1834 xe-106/0/11.0
524296
    satellite-device-id 106:
        ->1839 sd-106/0/0.32770 label=4104
MRouter:
524293
    aggregation-device:
        ->1708 et-0/0/30.0
        ->1826 xe-0/0/28:1.0
    satellite-device-id 100:
        ->1845 sd-100/0/0.32770 label=4101
    satellite-device-id 106:
        ->1847 sd-106/0/0.32770 label=4103

```

**show multicast snooping route satellite group**

user@host> **show multicast snooping route satellite group 233.252.0.1**

```

-----VSwitch Instance: default-switch-----
Route: 00.04.00.01.00.00.233.252.0.1.0.0.0.0.00.00/80
(S, G/m): (*, 233.252.0.1/32)
  Bridge Domain:    bd100
  NH Index:         1048585
  Linked NH Index: 1048621

```

**show multicast snooping route satellite bridge-domain-name (for specific bridge domain with detail view on Junos Fusion Provider Edge)**

**user@host> show multicast snooping route satellite bridge-domain-name bd100 group 233.252.0.1 detail**

```

-----VSwitch Instance: default-switch-----
Route: 00.04.00.01.00.00.233.252.0.1.0.0.0.0.00.00/80
(S, G/m): (*, 233.252.0.1/32)
  Bridge Domain: bd100
  Next-hop information:
    1048576
      satellite-device-id 100:
        ->54297 xe-100/0/12.0
        ->54299 xe-100/0/13.0
      satellite-device-id 101:
        ->54303 xe-101/0/12.0
        ->54339 xe-101/0/13.0
    1048578
      satellite-device-id 100:
        ->627 sd-100/0/0.32770 label=4105
      satellite-device-id 101:
        ->626 sd-101/0/0.32770 label=4104

```

## show multicast statistics satellite

### Syntax

```
show multicast statistics satellite
<brief | detail >
```

### Release Information

Command introduced in Junos OS Release 16.1.

### 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

## RELATED DOCUMENTATION

[Understanding Multicast Replication in a Junos Fusion](#) | 793

### List of Sample Output

[show multicast statistics satellite on page 835](#)

## Sample Output

### show multicast statistics satellite

```
user@host> show multicast statistics satellite
```

```
Multicast Statistics:
  Number of flood route entries:          8000
  Number of satellite flood route entries: 8000
  Number of MCINET route entries:        44000
  Number of satellite MCINET route entries: 36000
  Unicast VPLS next-hops(non-satellite): 32
  Number of satellite ECID next-hops:     12
  Number of VPLS composite next-hops:     12000
  Number of satellite composite next-hops: 12000
```

Number of Indirect next-hops:	28002
Number of Satellite Indirect next-hops:	28001
Number of ECIDs requested:	14
Number of ECID responses received:	14
Number of ECID delete messages:	2
Number of ECID mapping entries in DB:	12
Number of ECID mapping entries ready:	12

## show multicast summary satellite

### Syntax

```
show multicast summary satellite
```

### Release Information

Command introduced in Junos OS Release 16.1.

### 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

## RELATED DOCUMENTATION

[Understanding Multicast Replication in a Junos Fusion | 793](#)

[Configuring Egress \(Local\) Replication on a Junos Fusion | 804](#)

[show multicast statistics satellite | 835](#)

### List of Sample Output

[show multicast summary satellite on page 837](#)

## Sample Output

```
show multicast summary satellite
```

```
user@host>show multicast summary satellite
```



**Multicast:**

Restart phase: Complete (11/11)

Egress replication: Enabled

# Class of Service on Junos Fusion Provider Edge

## IN THIS CHAPTER

- Understanding CoS on an MX Series Aggregation Device in Junos Fusion Provider Edge | 839
- Configuring CoS on an MX Series Aggregation Device in Junos Fusion | 847

## Understanding CoS on an MX Series Aggregation Device in Junos Fusion Provider Edge

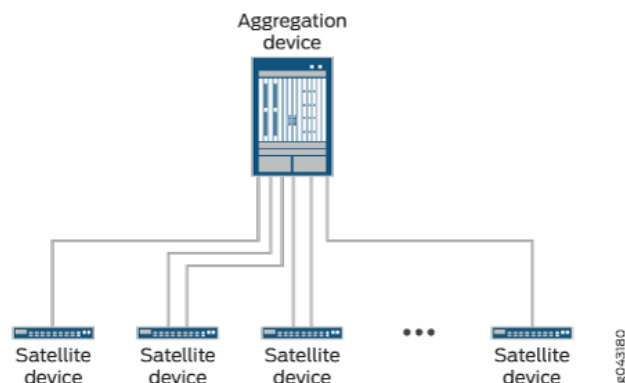
## IN THIS SECTION

- Overview of CoS on Different Types of Ports in Junos Fusion | 840
- CoS on Extended Ports and Uplink Ports in Junos Fusion | 842
- Per-unit and Hierarchical Scheduling on Extended Ports | 843
- Broadband Subscriber Services Support | 844
- CoS Hierarchical Port Scheduling with Enhanced Transmission Selection in Junos Fusion | 845
- CoS on Cascade Ports in Junos Fusion | 846

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 13 on page 840](#) for an illustration of the Junos Fusion topology.

Figure 13: 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.

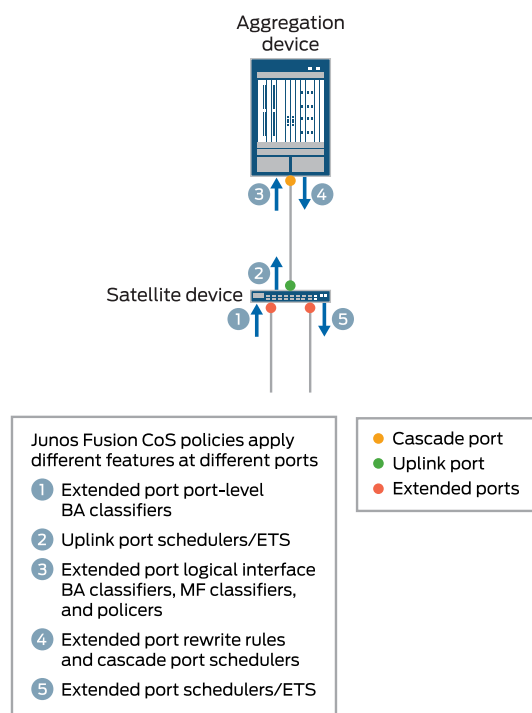
This topic describes class of service (CoS) on the different types of ports in Junos Fusion.

This topic covers:

### Overview of CoS on Different Types of Ports in Junos Fusion

[Figure 14 on page 841](#) provides an overview of packet flow through Junos Fusion and how CoS features are applied at the different ports.

Figure 14: 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 14 on page 841](#):

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/ Resource name weight	Shaping rate kbits	Guaranteed rate kbits	Guaranteed/ Excess priority	Queue weight	Excess
high/low					
ge-100/0/0(xe-2/0/5)	10000000				
ge-100/0/0(xe-2/0/5) RTP	10000000				
demux0.3221225473	1000	0			500
500					
best-effort	1000	0	Low Low	95	
network-control	1000	0	Low Low	5	

In the above sample output, **ge-100/0/0** is the extended port and **xe-2/0/5** is the cascade port.

Release History Table

Release	Description
18.4R1	Starting in Junos OS Release 18.4R1, Junos Fusion Provider Edge supports Broadband Edge Subscriber Management, including standard CoS functionality for Broadband Edge Subscriber Management.

RELATED DOCUMENTATION

<a href="#">Broadband Subscription Services on Junos Fusion   41</a>
<a href="#">CoS for Subscriber Access Overview</a>

CoS Hierarchical Port Scheduling with Enhanced Transmission Selection in Junos Fusion

In Junos Fusion, the satellite device can be either a QFX5100 or an EX4300 device. The QFX5100 supports enhanced transmission selection (ETS), which is described in IEEE 802.1Qaz. Configuration support for ETS has been added to the MX Series device only for satellite device ports that support this feature. If ETS is configured on the MX Series aggregation device for a satellite device port that does not support ETS, the satellite devices converts the ETS configuration to port scheduler.



**NOTE:** Local ports on the MX Series aggregation device do not support ETS.

## RELATED DOCUMENTATION

*Understanding CoS Hierarchical Port Scheduling (ETS)*

*CoS on Virtual Chassis Fabric (VCF) EX4300 Leaf Devices (Mixed Mode)*

## CoS on Cascade Ports in Junos Fusion

When a cascade port is created, two logical interfaces are automatically created:

- One in-band management logical interface (assigned unit 32769) for traffic that only flows between the aggregation device and the satellite devices, such as keepalives, for provisioning information, and for software updates.
- One for data logical interface (assigned unit 32770) for regular traffic that flows into and out of Junos Fusion.

Per-unit scheduling is automatically enabled on the cascade port to support multiple queues on each of the logical interfaces.

**NOTE:** All cascade ports must be configured on Modular Port Concentrators (MPCs) that support per-unit scheduling.

50 Mbps of bandwidth is reserved for the management logical interface. The remaining bandwidth is available to the data logical interface. A shaping rate of 10 percent is also applied to the management logical interface, which means it can use up to 10 percent of the full interface bandwidth, if available.

The default scheduling policy is applied to the data logical interface. This reserves 95 percent of the available bandwidth and buffer space for the best effort forwarding class (mapped to queue 0) and 5 percent for the network control forwarding class (mapped to queue 3). You can create custom forwarding classes and schedulers by applying a custom scheduler map to this logical interface.

## Release History Table

Release	Description
<a href="#">18.4R1</a>	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.
<a href="#">18.1R1</a>	Starting with Junos OS Release 18.1R1, you can set all cascade ports on an aggregation device to be in <b>replicate</b> mode, thereby copying scheduler parameters to each level of the aggregated interface member links, and automatically target all of an extended port's traffic to a specific cascade port.
<a href="#">17.2R1</a>	Beginning with Junos OS 17.2R1, Junos Fusion Provider Edge supports per-unit and hierarchical schedulers on extended ports.

## RELATED DOCUMENTATION

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

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

[Configuring CoS on an MX Series Aggregation Device in Junos Fusion | 847](#)

## Configuring CoS on an MX Series Aggregation Device in Junos Fusion

### IN THIS SECTION

- [Configuring Behavior Aggregate Classifiers on Satellite Device Extended Ports | 848](#)
- [Configuring Rewrite Rules on Satellite Device Extended Ports | 849](#)
- [Configuring CoS Hierarchical Port Scheduling with Enhanced Transmission Selection on Satellite Device Ports | 851](#)
- [Changing the Default Scheduling Policy on an Aggregated Device Cascade Port | 854](#)

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 devices 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 | 14](#)

*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-lp;
            }
        }
    }
}
```

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 | 14](#)

*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	<b>__cp_control_tc_prof</b>	Output	17227
Classifier	ipprec-compatibility	ip	13

Logical interface: xe-0/0/1.32770, Index: 343

Object	Name	Type	Index
Scheduler-map	<b>&lt;default&gt;</b>	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	1000000	50000			62 62
BE	1000000	47500	Low Low	118	
NC	1000000	2500	Low Low	6	

You can create custom forwarding classes and schedulers for the data logical interface by applying a customer scheduler map to that logical interface. For example, to apply a customer scheduler policy to the data logical interface:

#### 1. Create customer schedulers.

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

```
user@mx-agg-device#set schedulers AF_SCH_CORE transmit-rate percent 40
```

```
user@mx-agg-device#set schedulers AF_SCH_CORE buffer-size percent 40
```

```
user@mx-agg-device#set schedulers AF_SCH_CORE priority medium-high
```

```
user@mx-agg-device#set schedulers BE_SCH_CORE transmit-rate percent 10
```

```
user@mx-agg-device#set schedulers BE_SCH_CORE buffer-size percent 10
```

```
user@mx-agg-device#set schedulers BE_SCH_CORE priority low
```

```
user@mx-agg-device#set schedulers EF_SCH_CORE transmit-rate percent 40
```

```
user@mx-agg-device#set schedulers EF_SCH_CORE buffer-size percent 40
```

```
user@mx-agg-device#set schedulers EF_SCH_CORE priority medium-low
```

```
user@mx-agg-device#set schedulers NC_SCH_CORE transmit-rate percent 10
```

```

user@mx-agg-device#set schedulers NC_SCH_CORE buffer-size percent 10
user@mx-agg-device#set schedulers NC_SCH_CORE priority high

```

2. Create a scheduler map.

```

[edit class-of-service]
user@mx-agg-device#set scheduler-maps CORE_SCHED_MAP forwarding-class BE scheduler BE_SCH_CORE
user@mx-agg-device#set scheduler-maps CORE_SCHED_MAP forwarding-class EF scheduler EF_SCH_CORE
user@mx-agg-device#set scheduler-maps CORE_SCHED_MAP forwarding-class AF scheduler AF_SCH_CORE
user@mx-agg-device#set scheduler-maps CORE_SCHED_MAP forwarding-class NC scheduler NC_SCH_CORE

```

3. Apply the scheduler map to the data logical interface.

```

[edit class-of-service]
user@mx-agg-device#set interfaces xe-0/0/1 unit 32770 scheduler-map CORE_SCHED_MAP

```

4. Commit the changes and then confirm the configuration.

```

[edit class-of-service]
user@mx-agg-device# show
interfaces {
  xe-0/0/1 {
    unit 32770 {
      scheduler-map CORE_SCHED_MAP;
    }
  }
}
scheduler-maps {
  CORE_SCHED_MAP {
    forwarding-class BE scheduler BE_SCH_CORE;
    forwarding-class EF scheduler EF_SCH_CORE;
    forwarding-class AF scheduler AF_SCH_CORE;
    forwarding-class NC scheduler NC_SCH_CORE;
  }
}
schedulers {
  BE_SCH_CORE {
    transmit-rate percent 10;
    buffer-size percent 10;
    priority low;
  }
}

```

```

    }
    EF_SCH_CORE {
        transmit-rate percent 40;
        buffer-size percent 40;
        priority medium-low;
    }
    AF_SCH_CORE {
        transmit-rate percent 40;
        buffer-size percent 40;
        priority medium-high;
    }
    NC_SCH_CORE {
        transmit-rate percent 10;
        buffer-size percent 10;
        priority high;
    }
}

```

##### 5. Verify your changes.

```

user@mx-aggr-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-aggr-device# run show class-of-service scheduler-hierarchy interface
xe-0/0/1
Interface/          Shaping Guaranteed  Guaranteed/  Queue  Excess
Resource name       rate      rate      Excess  weight  weight
                   kbits      kbits      priority

```

xe-0/0/1.32770	10000000	0				1
1						
BE	10000000	0	Low	Low	12	
EF	10000000	0	Medium	Low	50	
AF	10000000	0	Medium	Low	50	
NC	10000000	0	High	High	12	
xe-0/0/1.32769	1000000	50000				62 62
BE	1000000	47500	Low	Low	118	
NC	1000000	2500	Low	Low	6	

SEE ALSO

- How Schedulers Define Output Queue Properties

Default Schedulers Overview

RELATED DOCUMENTATION

- Understanding CoS on an MX Series Aggregation Device in Junos Fusion Provider Edge | 839